UNITED NATIONS

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BASEL CONVENTION

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Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
Sixteenth meeting
Geneva, 1–12 May 2023

Provisional agenda

1. Opening of the meeting.
2. Adoption of the agenda.
3. Organizational matters:
   (a) Election of officers;
   (b) Organization of work;
   (c) Report on the credentials of representatives to the sixteenth meeting of the Conference of the Parties.
4. Matters related to the implementation of the Convention:
   (a) Strategic issues:
      (i) Strategic framework;
      (ii) Improving the functioning of the prior informed consent procedure;
      (iii) Development of guidelines for environmentally sound management;
   (b) Scientific and technical matters:
      (i) Technical guidelines;
      (ii) Classification and hazard characterization of wastes;
      (iii) National reporting;
      (iv) Electronic approaches to the notification and movement documents;
      (v) Further consideration of plastic waste;
      (vi) Amendments to Annexes II, VIII and IX on e-waste;
      (vii) Waste containing nanomaterials;
   (c) Legal, compliance and governance matters:
      (i) Committee Administering the Mechanism for Promoting Implementation and Compliance;
      (ii) Providing further legal clarity;

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(iii) National legislation, notifications, enforcement of the Convention and efforts to combat illegal traffic;

(iv) Proposal by the Russian Federation to amend paragraph 2 of Article 6 of the Convention;

(d) Technical assistance;

(e) Basel Convention Partnership Programme;

(f) Financial resources;

(g) Work programme of the Open-ended Working Group for the period 2024–2025.

5. International cooperation and coordination:

(a) Cooperation and coordination with the Minamata Convention on Mercury;

(b) Cooperation and coordination with other organizations.

6. Enhancing cooperation and coordination among the Basel, Rotterdam and Stockholm conventions:

(a) Clearing-house mechanism for information exchange;

(b) Mainstreaming gender;

(c) Synergies in preventing and combating illegal traffic and trade in hazardous chemicals and wastes;

(d) From science to action.

7. Programme of work and budget.

8. Implementation of the memorandum of understanding between the United Nations Environment Programme and the Conference of the Parties to the Basel Convention.

9. Venue and dates of the seventeenth meeting of the Conference of the Parties.

10. Other matters.

11. Adoption of the report of the meeting.

12. Closure of the meeting.

UNITED NATIONS

Food and Agriculture Organization of the United Nations

BC
RC
SC

UNEP/CHW.16/INF/2*
UNEP/FAO/RC/COP.11/INF/2*
UNEP/POPS/COP.11/INF/2*

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal

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23 January 2023

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Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade

Stockholm Convention on Persistent Organic Pollutants

Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
Sixteenth meeting
Geneva, 1–12 May 2023
Item 3 (b) of the provisional agenda**

Organizational matters: organization of work

Conference of the Parties to the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade
Eleventh meeting
Geneva, 1–12 May 2023
Item 3 (b) of the provisional agenda***

Organizational matters: organization of work

Conference of the Parties to the Stockholm Convention on Persistent Organic Pollutants
Eleventh meeting
Geneva, 1–12 May 2023
Item 3 (b) of the provisional agenda1****

Organizational matters: organization of work

Tentative schedule of work of the meetings of the conferences of the Parties to the Basel, Rotterdam and Stockholm conventions

Note by the Secretariat

The annexes to the present note contain a tentative schedule of work for the meetings of the conferences of the Parties to the Basel, Rotterdam and Stockholm conventions (annex I) and a list of possible contact and other groups (annex II). The tentative schedule of work, which was agreed to by the bureaux of the conferences of the Parties to the three conventions at their joint meeting on 18 January 2023, is provisional and could be subject to changes before or during the two weeks of the meetings.[1] The present note, including its annexes, has not been formally edited.

* Reissued for technical reasons on 2 March 2023.

** UNEP/CHW.16/1.

*** UNEP/FAO/RC/COP.11/1.

**** UNEP/POPS/COP.11/1.

[1] Participants may wish to take into account that each of the sessions of the conferences of the Parties may last longer or begin earlier, subject to the decisions taken by the bureaux, which would be expected to meet each morning from 8 a.m. to 9 a.m. to agree on the order of business for the day, and by the conferences of the Parties. Delegates are therefore advised to allow for a certain level of flexibility when making travel arrangements.

Annex I

Tentative schedule of work of the 2023 meetings of the conferences of the Parties[1]

	Mon, 1 May 2023	Tue, 2 May 2023	Wed, 3 May 2023	Thu, 4 May 2023	Fri, 5 May 2023	Sat, 6 May 2023
Morning session 10 a.m.–1 p.m.	**BC Item 1: Opening of the meeting** **BC Item 2: Adoption of the agenda** **RC Item 1: Opening of the meeting** **RC Item 2: Adoption of the agenda** **SC Item 1: Opening of the meeting** **SC Item 2: Adoption of the agenda** **Joint sessions of the COPs:** **BC Item 3; RC Item 3; SC Item 3: Organizational matters** (b) Organization of work; (a) Election of officers; (c) Credentials;[2] **BC Item 4: Matters related to the implementation of the Convention** (b) Scientific and technical matters: (i) Technical guidelines (POPs wastes); **SC Item 5: Matters related to the implementation of the Convention** (c) Measures to reduce or eliminate releases from wastes;	**Joint sessions of the COPs:** *Reports of contact groups* **Joint sessions of the COPs:** **BC Item 4 (cont.)** (d) Technical assistance; **RC Item 5: Matters related to the implementation of the Convention** (e) Technical assistance; **SC Item 5 (cont.)** (f) Technical assistance; **BC Item 4** (c) (cont.) (i) Mechanism for Promoting Implementation and Compliance of the Basel Convention; **RC Item 5 (cont.)** (d) Compliance; **SC Item 5 (cont.)** (j) Compliance;[3] **BC Item 7; RC Item 8; SC Item 8: Programme of work and budget.** **BC Item 8; RC Item 9; SC Item 9: Implementation of the MOU between UNEP and the COPs and FAO for RC**	**Joint sessions of the COPs:** *Reports of contact groups* **Session of SC COP-11:** **Item 5 (cont.)** (a) Measures to reduce or eliminate releases from intentional production and use (cont.): (iii) Polychlorinated biphenyls; (b) Measures to reduce or eliminate releases from unintentional production; (d) Implementation plans; (h) Reporting pursuant to Article 15;	**Joint sessions of the COPs:** *Reports of contact groups* **Session of SC COP-11:** *Consideration of the outcomes of the contact groups and draft decisions* **Item 4: Rules of procedure.** **Joint sessions of the COPs:** **BC Item 6; RC Item 7; SC Item 7: Enhancing cooperation and coordination among BRS** (c) Synergies in preventing and combating illegal traffic and trade in hazardous chemicals and wastes; **BC Item 9; RC Item 10; SC Item 10: Venue and date of the next COPs**. **BC Item 10; RC Item 11; SC Item 11: Other matters** (admission of observers).	**Joint sessions of the COPs:** *Reports of contact groups* **Session of BC COP-16:** **Item 4 (cont.)** (b) Scientific and technical matters (cont.): (i) Technical guidelines (cont.) (except POPs wastes); (a) Strategic issues: (i) Strategic framework; (ii) Improving the functioning of the PIC procedure; (iii) Development of guidelines for environmentally sound management; (c) Legal, compliance and governance matters (cont.): (i) Committee Administering the Mechanism for Promoting Implementation and Compliance of the Basel Convention (cont.);	**No formal meetings**
Afternoon session 3–6 p.m.	**Session of BC COP-16: Item 4 (cont.)** (b) Scientific and technical matters (cont.): (i) Technical guidelines (cont.) (except POPs wastes); (c) Legal, compliance and governance matters: (ii) Providing further legal clarity;[4] **Session of SC COP-11: Item 5** (e) Listing of chemicals in Annex A, B or C to the Convention;	**Session of SC COP-11: Item 5 (cont.)** (j) Compliance (cont.); (i) Effectiveness evaluation; (a) Measures to reduce or eliminate releases from intentional production and use: (i) Exemptions; (iv) Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride; (ii) DDT;	**Session of RC COP-11: Item 5 (cont.)** (c) Enhancing the effectiveness of the Convention;[5] **Joint sessions of the COPs:** **BC Item 4 (cont.)** (f) Financial resources; **RC Item 5 (cont.)** (f) Financial resources; **SC Item 5 (cont.)** (g) Financial resources and mechanisms; **BC Item 5; RC Item 6; SC Item 6: International cooperation and coordination** (a) Cooperation and coordination with the Minamata Convention on Mercury; (b) Cooperation and coordination with other organizations.	**Session of SC COP-11:** *Consideration of the outcomes of the contact groups and draft decisions* **Item 11: Other matters (cont.).**	**Session of SC COP-11:** *Consideration of the outcomes of the contact groups and draft decisions* **Item 12: Adoption of the report.** **Joint sessions of the COPs:** *Adoption of the reports on credentials.*	**No formal meetings**

[1] Items listed in the draft tentative schedule are from the provisional agendas of the meetings (UNEP/CHW.16/1; UNEP/FAO/RC/COP.11/1; UNEP/POPS/COP.11/1).

[2] The bureaux of the conferences of the Parties have agreed that, when examining credentials, they would accept, in addition to original credentials in good order, copies of credentials on the understanding that original credentials would be submitted as soon as possible. Each Bureau would present its report to the respective Conference of the Parties for its consideration in the afternoon of Friday, 5 May 2023. Any updates to the credentials report may be considered by the respective Conference of the Parties in the afternoon of Thursday, 11 May 2023.

[3] Consideration of the agenda items on compliance in joint session would be limited to an introduction by the Secretariat of the agenda items, as well as a report by each respective Chair on the work of the Basel and Rotterdam convention committees. Discussions and conclusions on the way forward would take place during the convention-specific sessions later in the weeks.

[4] This includes the proposal by the European Union to amend Annex IV and certain entries in Annexes II and IX to the Basel Convention.

[5] The session on Wednesday, 3 May 2023 would cover the proposal by Switzerland, Australia, Burkina Faso, Ghana and Mali to amend Articles 7, 10, 11 and 22 of the Rotterdam Convention and to add a new Annex VIII to the Convention. A contact group on this topic, if established, would not meet before Sunday, 7 May 2023. The remaining topics under this agenda item would be taken up on Tuesday, 9 May 2023.

	Sun, 7 May 2023	Mon, 8 May 2023	Tue, 9 May 2023	Wed, 10 May 2023	Thu, 11 May 2023	Fri, 12 May 2023
Morning session 10 a.m.–1 p.m.	**Joint sessions of the COPs:** *Reports of contact groups*	**Joint sessions of the COPs:** *Reports of contact groups*	**Joint sessions of the COPs:** *Reports of contact groups*	**Joint sessions of the COPs:** *Reports of contact groups*	**Joint sessions of the COPs:** *Reports of contact groups*	**Joint sessions of the COPs:** *Reports of contact groups*
	Session of BC COP-16: **Item 4 (cont.)** (c) Legal, compliance and governance matters (cont.): (iii) National legislation, notifications, enforcement of the Convention and efforts to combat illegal traffic; (iv) Proposal by the Russian Federation to amend paragraph 2 of Article 6 of the Convention; (e) Basel Convention Partnership Programme;	**Session of BC COP-16:** *Consideration of the outcomes of the contact groups and draft decisions* **Item 4 (cont.)** (g) Work programme of the OEWG for 2024–2025. **Item 10: Other matters (cont.)**.	**Session of BC COP-16:** *Consideration of the outcomes of the contact groups and draft decisions*	**Session of RC COP-11:** *Consideration of the outcomes of the contact groups and draft decisions* **Joint sessions of the COPs:** **BC Item 6 (cont.); RC Item 7 (cont.); SC Item 7 (cont.)** (a) Clearing-house mechanism for information exchange; (b) Mainstreaming gender; (d) From science to action.	**Session of RC COP-11:** *Consideration of the outcomes of the contact groups and draft decisions*	**Session of RC COP-11:** *Consideration of the outcomes of the contact groups and draft decisions* **Item 12: Adoption of the report.**
Afternoon session 3–6 p.m.	**Session of BC COP-16:** **Item 4 (cont.)** (b) Scientific and technical matters (cont.): (ii) Classification and hazard characterization of wastes; (iii) National reporting; (iv) Electronic approaches to the notification and movement documents; (v) Further consideration of plastic waste; (vi) Amendments to Annexes II, VIII and IX on e-waste; (vii) Waste containing nanomaterials;	**Session of RC COP-11:** **Item 5 (cont.)** (d) Compliance (cont.); (b) Listing of chemicals in Annex III to the Convention;	**Session of RC COP-11:** **Item 5 (cont.)** (b) Listing of chemicals in Annex III to the Convention (cont.); (c) Enhancing the effectiveness of the Convention (cont.);[6] (a) Status of implementation; **Item 4: Rules of procedure for the Conference of the Parties.** **Item 11: Other matters (cont.).**	**Session of BC COP-16:** *Consideration of the outcomes of the contact groups and draft decisions* **Item 11: Adoption of the report.** **Joint sessions of the COPs:** *Adoption of the sections of the reports on the joint sessions of the meetings of the COPs.*[7]	**Joint and Convention-specific sessions of the COPs:** *Consideration of the outcomes of the joint contact groups, adoption of the reports on credentials (possible updates) and adoption of outstanding decisions*	*Adoption of BC budget decision* *Adoption of RC budget decision* *Adoption of SC budget decision* **BC Item 12; RC Item 13; SC Item 13: Closure of the meetings**

Stockholm Convention Conference of the Parties (SC COP)	
Basel Convention Conference of the Parties (BC COP)	
Rotterdam Convention Conference of the Parties (RC COP)	
Joint sessions and Convention-specific sessions as necessary of the meetings of the conferences of the Parties	

[6] This includes the proposal to amend Article 16 of the Rotterdam Convention which was submitted prior to the eighth meeting of the Conference of the Parties by Botswana, Cameroon, Ghana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe.

[7] The conferences of the Parties are scheduled to meet in joint sessions to adopt the section of their report covering the joint sessions held from Monday, 1 May 2023, to Thursday, 4 May 2023.

Annex II

Possible contact and other groups at the 2023 meetings of the conferences of the Parties

The contact and other groups listed below have been tentatively identified and may be established during the two-week period of the meetings, and meet during a set amount of time, as needed. The total number of groups meeting at any one time would need to be limited to ensure that there is adequate opportunity for the interests of all delegations to be factored into the discussions. The groups are expected to complete their work by the day before the last convention-specific session in order to allow for adoption of decisions as much as possible by the end of convention-specific sessions they relate to.

Joint contact and other groups:

- Group on programmes of work and budgets
- Group on technical assistance/financial resources and mechanisms
- Group on joint issues

Stockholm Convention-specific contact and other groups:

- Group on listing of chemicals
- Group on compliance

Basel Convention-specific contact and other groups:

- Group on technical matters
- Group on compliance and legal matters
- Group on strategic matters

Rotterdam Convention-specific contact and other groups:

- Group on enhancing the effectiveness of the Convention
- Group on compliance
- Group on the listing of chemicals in Annex III

Version of 03/05/2023

Schedule of side events at the meetings of the conferences of the Parties to the

Basel, Rotterdam and Stockholm conventions: 1-12 May 2023, Geneva, Switzerland

	Mon, 1 May	Tue, 2 May	Wed, 3 May*	Thu, 4 May*	Fri, 5 May*
Lunch 1:15-2:45 p.m.	**Navigating the financing landscape: Strategies for accessing capital for chemicals management** *GEF* *Room B* **Kunming-Montreal Global Biodiversity Framework and opportunities for increasing cooperation and synergy between the biodiversity and chemicals and waste clusters** *UNEP, with BRS Secretariat* *Room C / Webex*	**Science Policy Panel on Chemicals, Waste and Pollution Prevention: Building the linkages from science to action** *UNEP* *Room B* **Plastics Treaty and the BRS COPs** *Norway, Rwanda and Uruguay* *Room C*	**PCB Fair Opening Ceremony** *Exhibition area* **Governing plastics along the waste hierarchy: Exploring synergies between the global plastics treaty and the Basel Convention** *European Union, Rwanda and Environmental Investigation Agency* *Room B* **Measuring the effectiveness of the Stockholm Convention including through GMP: assessment, insight and outlook – data for decision making** *Stockholm Convention's Effectiveness Evaluation Committee and UNEP* *Room C / Webex*	**Lessons learned from managing PCB, new issues and available tools to increase human protection** *SCRC-Czechia, co-organized with Czechia, Slovakia, the Republic of Moldova, Ukraine and WHO* *Room B* **Risks and opportunities of plastic credit financing instruments for the informal waste management sector** *Yunus Environnent Hub and China Biodiversity Conservation and Green Development Foundation* *Room C / MS Teams*	**PCB elimination by 2028: Potential of the non-combustion destruction technologies** *IPEN* *Room B* **Sustainable trade and development cooperation in support of the Basel Convention Plastic Amendments implementation** *UNCTAD and BRS Secretariat, in cooperation with WTO* *Room C / Zoom*
Evening 6:15-7:45 p.m.	**Reception** **Why low POPs content level matters?** *IPEN* *Room 3* **Chemicals and agricultural biodiversity** *China Biodiversity Conservation and Green Development Foundation* *Room 11-12*	**PFAS contamination and experiences on their phase-out in firefighting foams** *Finland and SCRC-Spain* *Room 3 / Zoom / YouTube* **Improving transmission, accessibility and use of data contained in NIPs through Stockholm Convention Integrated Electronic Toolkit use** *Cambodia, Honduras, Kenya, Madagascar, Papua New Guinea, the Republic of Moldova, Saint Lucia* and *UNEP* *Room 11-12*	**Achievements and lessons learnt from GEF Projects in phasing out of DDT** *UNEP, co-organized with UNIDO and WHO* *Room 3* **Targeting PCBs management in the Caribbean** *BCRC-Caribbean* *Room 11-12 / MS Teams*	**Results achieved, challenges and lessons learned on PCB elimination to meet the Stockholm Convention goals** *BCRC-SCRC-Senegal, with BRS Secretariat* *Room 3 / Webex* **Plastics and chemicals under the Stockholm convention: Impact on the ground and potential synergies and gaps in relation to a future plastics treaty** *IPEN* *Room 11-12* **Cooperation to combat illicit waste flows to South-East Asia: Contribution to sound management of waste and to the implementation of the Basel Convention** *UNODC and Indonesia* *Room 14 / Zoom*	**Ocean plastic turned into an opportunity in circular economy** *Foundation for Scientific and Industrial Research* *Room 3* **Tools and guidance to support Parties achieving the 2025 and 2028 Targets on PCB** *Colombia and UNEP, with BRS Secretariat* *Exhibition area / Webex*

* Days of the PCB Fair

	Sun, 7 May	Mon, 8 May	Tue, 9 May	Wed, 10 May	Thu, 11 May	Fri, 12 May
Lunch 1:15-2:45 p.m.	**ESM for e-waste, circular economy and trade** *GIZ, WEF and WBCSD* *Room B*	**Plastic Waste Partnership: Sharing insights and building foresight** *Plastic Waste Partnership* *Room B / Webex*	**Mercury waste management** *Burkina Faso and Minamata Secretariat, co-organized with Switzerland, UNEP and BRS Secretariat* *Room B / Webex*	**The GHS and agriculture** *UNITAR* *Room B*	**SAICM Beyond 2020, MEAs and SPP: Towards a comprehensive framework on chemicals and waste** *Germany, UK, Uruguay and SAICM Secretariat* *Room B*	**West Africa plastic pollution workshop: Preparing for a future global instrument** *IUCN and GRID-Arendal* *Room B*
	Supporting individual Parties to achieve compliance: Successes and opportunities offered by the Basel Convention Implementation and Compliance Committee *Basel Convention's Implementation and Compliance Committee* *Room C / Webex*	**Joining forces to stop illegal traffic in hazardous and other waste** *ENFORCE and UNODC* *Room C / Webex*	**Local solutions for global problems: Innovative approaches to address plastic pollution** *Norway, Norwegian Retailers Environment Fund, and Fonds Français pour l'Environnement Mondial, with BRS Secretariat* *Room C / Webex*	**Advancing a human rights-based approach to pollution for people and the planet** *OHCHR, UNEP, UNDP, ILO, FAO, UNECE, Minamata Secretariat and EMG* *Room C*	**Italy as a case study for mainstreaming biodiversity and sound pesticide management in agriculture and transforming agrifood systems in the Mediterranean** *Italy and FAO, with BRS Secretariat* *Room C / Webex*	**Next generation chemicals action: Educational tools to strengthen children and youth engagement in the BRS Conventions** *ECOmove, with BRS Secretariat* *Room C / Webex*
Evening 6:15-7:45 p.m.	**End of life refrigerators, cooling, and heating equipment. ESM challenges and opportunities in developed, developing and CET countries** *Partnership for Action on Challenges relating to E-wastes* *Room 3 / Webex*	**An "agile" approach to ePIC implementation** *Information Technology Industry Council* *Room 3*	**Connecting the dots: Youth and the National Implementation Plans (NIPs)** *AKO Foundation and IPEN* *Room 3*	**Abuse of Article 11 to escape the Basel Convention's Plastics Amendments** *Center for International Environmental Law and BAN* *Room 3*	**Tackling toxics: Gender dimensions of chemicals and waste policies** *Women Engage for a Common Future, with BRS Secretariat* *Room 3 / Webex*	X
	Innovative practices for the environmentally sound management of plastic wastes *BCRC-China and China Material Recycling Association* *Room 11-12*	**Tackling the hidden Basel plastic wastes** *BAN and IPEN* *Room 11-12*	**Chrysotile: Helping local communities** *International Chrysotile Association* *Room 11-12*	**Unlocking MEAs' potential: Supporting parties' environmental action through data and knowledge management** *Minamata Secretariat, CITES Secretariat and UNEP, with BRS Secretariat* *Room 11-12*	**China's practices in reducing hazardous pesticide and packaging waste** *Shenzhen Zero Waste* *Room 11-12*	X
				Supply chain transparency and traceability in agrochemicals supports the responsible use of crop protection products *CropLife International* *Room 14*		X

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BASEL CONVENTION

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Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
Sixteenth meeting
Geneva, 1–12 May 2023
Item 4 (a) (ii) of the provisional agenda*

Matters related to the implementation of the Convention: strategic issues: improving the functioning of the prior informed consent procedure

Improving the functioning of the prior informed consent procedure

Note by the Secretariat

I. Introduction

1. In part II of decision BC-15/3 on the strategic framework, on work to improve the functioning of the prior informed consent procedure, the Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal invited Parties and observers to submit to the Secretariat, by 30 November 2022, information on challenges in the implementation of the prior informed consent procedure and on best practices, possible approaches, initiatives and views to improve the functioning of the procedure, recognizing that developing countries faced increasing challenges in implementation of the prior informed consent procedure and that they needed further financial and technical assistance and capacity-building to address those challenges.

2. In the decision, the Conference of the Parties also requested the Secretariat to make available the information received on the website of the Convention and to prepare a compilation and synthesis of the information received, subject to the availability of resources, for consideration by the Open-ended Working Group at its thirteenth meeting. In the decision, the Conference of the Parties further requested the Open-ended Working Group, at its thirteenth meeting, on the basis of its consideration of the compilation and synthesis of information prepared by the Secretariat, to develop draft recommendations for consideration by the Conference of the Parties at its sixteenth meeting.

II. Implementation

3. In its 28 June 2022 letter, on a call for information in follow-up to the face-to-face segment of the fifteenth meeting of the Conference of the Parties,[1] the Secretariat reminded Parties and observers of the invitation set out in decision BC-15/3 to submit to the Secretariat, by 30 November 2022, information on challenges in the implementation of the prior informed consent procedure and on best practices, possible approaches, initiatives and views to improve the functioning of the procedure,

* UNEP/CHW.16/1.

[1] The letter is available at www.basel.int/TheConvention/Communications/tabid/1596/Default.aspx.

recognizing that developing countries faced increasing challenges in implementation of the prior informed consent procedure and that they needed further financial and technical assistance and capacity-building to address those challenges.

4. The information received from Parties and observers is available on the website of the Convention.[2] The compilation of information received and a synthesis thereof were set out in document UNEP/CHW/OEWG.13/INF/4 for consideration by the Open-ended Working Group at its thirteenth meeting. The information set out in annex I to that document is reproduced in document UNEP/CHW.16/INF/6.

5. The outcomes of the thirteenth meeting of the Open-ended Working Group, including draft recommendations for consideration by the Conference of the Parties, are set out in document UNEP/CHW.16/20/Add.1.

III. Proposed action

6. The Conference of the Parties may wish to consider the information in the present note and in the documents cited therein. It may also wish to take action, as appropriate, on work to improve the functioning of the prior informed consent procedure, taking into account the recommendations developed by the Open-ended Working Group at its thirteenth meeting as set out in document UNEP/CHW.16/20/Add.1.

[2] www.basel.int/Implementation/Controllingtransboundarymovements/ImprovingthePICprocedure/tabid/9319/Default.aspx.

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ADVANCE

Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
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Geneva, 1–12 May 2023
Item 4 (g) of the provisional agenda

Matters related to the implementation of the Convention: work programme of the Open-ended Working Group for the period 2024–2025

Outcomes of and follow-up to the thirteenth meeting of the Open-ended Working Group

Note by the Secretariat

I. Introduction

1. At its fifteenth meeting, the Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal agreed to hold the thirteenth meeting of the Open-ended Working Group in Geneva, as an in-person meeting and with the same conditions for online participation as agreed by the Bureau of the Conference of the Parties for the face-to-face segment of its fifteenth meeting, for a duration of three days in the week starting 20 February 2023. By its decision BC-15/23, the Conference of the Parties adopted the work programme of the Open-ended Working Group for the biennium 2022–2023, which included a priority level for each activity in the work programme to support the planning of the thirteenth meeting of the Open-ended Working Group, in case there was insufficient time to consider all the activities at that meeting.

2. In the light of the short time period between the thirteenth meeting of the Open-ended Working Group and the sixteenth meeting of the Conference of the Parties, the present note sets out information on the outcomes of and follow-up to the thirteenth meeting of the Working Group, including recommendations by the Working Group for consideration by the Conference of the Parties at its sixteenth meeting.[1]

[1] The report of the Open-ended Working Group on the work of its thirteenth meeting will be set out in document UNEP/CHW/OEWG.13/11.

II. Implementation

A. Strategic issues

1. Strategic framework

3. The Open-ended Working Group considered the draft report of findings and recommendations to improve the strategic framework for the implementation of the Basel Convention for 2012–2021[2] and requested the small intersessional working group to present recommendations to improve the strategic framework to the Conference of the Parties at its sixteenth meeting, taking into account the findings and recommendations as revised during the thirteenth meeting of the Open-ended Working Group.[3] The report of findings and recommendations to improve the strategic framework for the implementation of the Basel Convention for 2012–2021 have been made available to the Conference of the Parties in the annex to document UNEP/CHW.16/INF/5.

4. Comments on the recommendations as set out in document UNEP/CHW.16/INF/5 received pursuant to an invitation by the small intersessional working group after the thirteenth meeting of the Open-ended Working Group will be made available on the website of the Convention.[4]

2. Work to improve the functioning of the prior informed consent procedure

5. The Open-ended Working Group considered the compilation and synthesis of information on challenges in the implementation of the prior informed consent procedure and on best practices, possible approaches, initiatives and views to improve the functioning of the procedure.[5] The same information is available to the Conference of the Parties in document UNEP/CHW.16/INF/6.

6. The Open-ended Working Group recommended that the Conference of the Parties at its sixteenth meeting establish a small intersessional working group open to all Parties, inviting balanced representation of the five regional groups of the United Nations, to identify challenges in the implementation of the prior informed consent procedure under the Basel Convention and best practices, possible approaches and initiatives to improve its functioning, taking into account the compilation and synthesis of information received from Parties and observers set out in document UNEP/CHW/OEWG.13/INF/4 and the discussion during the Open-ended Working Group at its thirteenth meeting and ongoing work on electronic approaches to the notification and movement documents, as well as to develop recommendations on improving the functioning of the procedure.

7. The Conference of the Parties may wish to consider proceeding on the basis of the recommendations of the Open-ended Working Group.

B. Scientific and technical matters

1. Technical guidelines

(a) Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants

8. The Open-ended Working Group considered the following two sets of updated technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants:

(a) General technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants (draft updated version of 1 December 2022);[6]

(b) Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF), perfluorooctanoic acid (PFOA), its salts and PFOA-related

[2] UNEP/CHW/OEWG.13/INF/3, annex.

[3] UNEP/CHW/OEWG.13/INF/3/Rev.1, annex.

[4] www.basel.int/tabid/9464/Default.aspx.

[5] UNEP/CHW/OEWG.13/INF/4, annex.

[6] UNEP/CHW/OEWG.13/INF/5, annex. Also contained in UNEP/CHW.16/6/Add.1, annex.

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compounds, and perfluorohexane sulfonic acid (PFHxS), its salts and PFHxS-related compounds (updated version of 1 December 2022).[7]

9. The Open-ended Working Group requested the Secretariat to work with the consultant retained for this purpose to revise the drafts, taking into account the discussions during the meeting.[8]

10. The revised versions of the technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants prepared by the consultant have been made available to the Conference of the Parties in documents UNEP/CHW.16/INF/7 and UNEP/CHW.16/INF/8.

11. The Open-ended Working Group invited comments from Parties and observers on the revised versions of the technical guidelines as prepared by the consultant by 31 March 2023. The comments received will be made available on the website of the Convention for consideration by the Conference of the Parties at its sixteenth meeting.[9]

(b) Technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention

12. The Open-ended Working Group took note of the note by the Secretariat on technical guidelines,[10] which sets out progress in the implementation of decision BC-15/7 on technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention.

(c) Technical guidelines on the environmentally sound management of plastic wastes

13. The Open-ended Working Group considered the draft updated version of 10 February 2023 of the technical guidelines on the environmentally sound management of plastic wastes.[11] The draft updated version of 23 February 2023 of the technical guidelines on the environmentally sound management of plastic wastes,[12] reflecting the outcome of the thirteenth meeting of the Open-ended Working Group, is available to the Conference of the Parties in the annex to document UNEP/CHW.16/INF/11.

14. The Open-ended Working Group requested the small intersessional working group to prepare a further revised version of the technical guidelines, taking into account the discussions during the meeting, and to make them available to the Conference of the Parties for its consideration at its sixteenth meeting.

15. The Conference of the Parties may wish to consider using as the basis for its work the version of the technical guidelines as prepared by the small intersessional working group subsequent to the thirteenth meeting of the Open-ended Working Group, to be made available during its sixteenth meeting.

(d) Technical guidelines on the environmentally sound management of waste lead-acid batteries

16. The Open-ended Working Group considered the draft updated version of 31 January 2023 of the technical guidelines on the environmentally sound management of waste lead-acid batteries.[13] It requested the Secretariat to work with the co-leads and the consultant retained for that purpose to revise the draft, taking into account the discussions during the meeting.

17. The draft updated version of 13 March 2023 of the technical guidelines on the environmentally sound management of waste lead-acid batteries, as prepared by the co-leads and the consultant, is available to the Conference of the Parties in the annex to document UNEP/CHW.16/INF/12.

18. The Open-ended Working Group invited comments from Parties and observers on the revised version of the technical guidelines as prepared by the co-leads and the consultant by 31 March 2023.

[7] UNEP/CHW/OEWG.13/INF/6, annex. Also contained in UNEP/CHW.16/6/Add.2, annex.

[8] See UNEP/CHW/OEWG.13/INF/5/Rev.1, annex and UNEP/CHW/OEWG.13/INF/6/Rev.1, annex.

[9] www.basel.int/Implementation/POPsWastes/TechnicalGuidelines/tabid/5052/Default.aspx.

[10] UNEP/CHW/OEWG.13/4.

[11] UNEP/CHW/OEWG.13/INF/7, annex.

[12] UNEP/CHW/OEWG.13/INF/7/Rev.1, annex.

[13] UNEP/CHW/OEWG.13/INF/8, annex.

The comments received will be made available on the website of the Convention for consideration by the Conference of the Parties at its sixteenth meeting.[14]

(e) Technical guidelines on the environmentally sound management of used and waste pneumatic tyres

19. The Open-ended Working Group considered the synthesis of the comments on the scope of work for updating the technical guidelines on the environmentally sound management of used and waste pneumatic tyres,[15] as received from the small intersessional working group. The same information is available to the Conference of the Parties in the annex to document UNEP/CHW.16/INF/14.

20. The Open-ended Working Group invited comments from Parties and observers on the scope of work for updating the technical guidelines on the environmentally sound management of used and waste pneumatic tyres by 31 March 2023. The comments received will be made available on the website of the Convention for consideration by the Conference of the Parties at its sixteenth meeting.[16]

(f) Consideration of whether to develop technical guidelines on the environmentally sound management of rubber wastes (entry B3040) and waste parings and scrap of rubber (entry B3080)

21. The Open-ended Working Group considered whether to develop technical guidelines on the environmentally sound management of rubber wastes (entry B3040) and waste parings and scrap of rubber (entry B3080) and invited comments thereon from Parties and observers by 31 March 2023. The comments received will be made available on the website of the Convention for consideration by the Conference of the Parties at its sixteenth meeting.[17]

2. Electronic approaches to the notification and movement documents

22. The Open-ended Working Group considered the note by the Secretariat on recommendations on the next steps regarding the work on electronic approaches to the notification and movement documents of the Basel Convention.[18] The same recommendations are available to the Conference of the Parties in document UNEP/CHW.16/INF/17.

23. The Open-ended Working Group invited comments from Parties and observers on the report with recommendations on the next steps regarding the work on electronic approaches to the notification and movement documents by 31 March 2023. The comments received will be made available on the website of the Convention for consideration by the Conference of the Parties at its sixteenth meeting.[19]

3. Further consideration of plastic waste

24. The Open-ended Working Group considered the draft of possible further activities that could be conducted under the Convention in response to developments in scientific knowledge and environmental information and health impacts related to plastic waste as a source of land pollution, marine plastic litter and microplastics[20] and invited comments thereon from Parties and others by 31 March 2023. The comments received will be made available on the website of the Convention for consideration by the Conference of the Parties at its sixteenth meeting.[21]

25. The Open-ended Working Group requested the Secretariat to suggest possible further activities that could be conducted under the Convention, taking into consideration the comments received, the work undertaken in follow-up to resolution 5/14 of the United Nations Environment Assembly of the United Nations Environment Programme, as appropriate, and the discussions during the Working Group meeting, for possible consideration by the Conference of the Parties at its sixteenth meeting.

[14] www.basel.int/Implementation/Wastebatteries/Technicalguidelines/tabid/9418/Default.aspx.

[15] UNEP/CHW/OEWG.13/INF/9, annex.

[16] http://www.basel.int/Implementation/Wastetyres/Technicalguidelines/tabid/9423/Default.aspx.

[17] www.basel.int/Implementation/Wastetyres/Technicalguidelines/CommentsBC1515rubberwastes/tabid/9458/Default.aspx.

[18] UNEP/CHW/OEWG.13/INF/10.

[19] www.basel.int/Implementation/Controllingtransboundarymovements/eapproachesfornotificationandmovement/Overview/CommentsBC1411decision/tabid/8359/Default.aspx.

[20] UNEP/CHW/OEWG.13/INF/11, annex.

[21] www.basel.int/Implementation/Plasticwaste/Callforinformation/FollowuptoOEWG13/tabid/9505/Default.aspx.

26. The revised draft of possible further activities that could be conducted under the Basel Convention in response to developments in scientific knowledge and environmental information and health impacts related to plastic waste as a source of land pollution, marine plastic litter and microplastics is available to the Conference of the Parties in document UNEP/CHW.16/INF/18.

4. Waste containing nanomaterials

27. The Open-ended Working Group took note of the oral report by the Secretariat on activities aimed at addressing issues related to waste containing nanomaterials.

5. Amendments to Annexes II, VIII and IX on e-waste

28. The Open-ended Working Group considered a note by the Secretariat on an assessment of the need to update existing guidance, technical guidelines and factsheets in order to reflect adjustments consequential to the adoption of the e-waste amendments.[22] The same information is available to the Conference of the Parties in annex I to document UNEP/CHW.16/INF/19.

29. The Open-ended Working Group invited comments on the draft recommendations contained in annex II to document UNEP/CHW.16/INF/19 from Parties and others by 31 March 2023. The comments received have been made available on the website of the Convention for consideration by the Conference of the Parties at its sixteenth meeting.[23]

C. Providing further legal clarity

30. The Open-ended Working Group considered the proposal by the European Union to amend Annex IV and certain entries in Annexes II and IX to the Convention and the recommendations and findings of the expert working group regarding the review of Annex IV[24] and the progress made by the expert working group in its review of Annexes I and III.[25] The proposal by the European Union to amend Annex IV and certain entries in Annexes II and IX to the Convention and the recommendations and findings of the expert working group regarding the review of Annex IV and draft recommendations prepared by the expert working group regarding the review of Annexes I and III are made available to the Conference of the Parties respectively in documents UNEP/CHW.16/INF/26 and UNEP/CHW.16/INF/27. These versions are identical to those submitted to the Open-ended Working Group at its thirteenth meeting in documents UNEP/CHW/OEWG.13/INF/13 and UNEP/CHW/OEWG.13/INF/14, respectively.

31. The Open-ended Working Group adopted decision OEWG-13/1, which recommends action to be taken by the Conference of the Parties at its sixteenth meeting. Decision OEWG-13/1 is set out in the annex to the present note.

32. The Conference of the Parties may wish to consider proceeding on the basis of the recommendations of the Open-ended Working Group.

D. International cooperation and coordination

1. Basel Convention Partnership Programme

(a) Follow-up partnership to the Partnership for Action on Computing Equipment

33. The Open-ended Working Group considered the draft tables of contents for the draft guidance document on the environmentally sound refurbishment and repair of used and waste equipment of television screens, audio and video equipment and on the environmentally sound management of waste equipment of television screens, audio and video equipment[26] and for the draft guidance document on the environmentally sound refurbishment and repair of used and waste equipment of refrigerators, cooling and heating equipment and on the environmentally sound management of waste equipment of refrigerators cooling and heating equipment;[27] and the draft programme of work of the

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[22] UNEP/CHW/OEWG.13/INF/12, annex I.

[23] www.basel.int/Implementation/Ewaste/TechnicalGuidelines/DevelopmentofTGs/tabid/2377/Default.aspx.

[24] UNEP/CHW/OEWG.13/INF/13.

[25] UNEP/CHW/OEWG.13/INF/14.

[26] UNEP/CHW/OEWG.13/INF/15, annex I.

[27] UNEP/CHW/OEWG.13/INF/15, annex II.

working group of the Partnership for Action on Challenges relating to E-waste (PACE II) for the biennium 2024–2025.[28]

34. The tables of contents for the draft guidance documents on the environmentally sound refurbishment and repair of used and waste equipment and on the environmentally sound management of waste equipment have been made available to the Conference of the Parties in document UNEP/CHW.16/INF/31. The draft programme of work of the working group of the Partnership for Action on Challenges relating to E-waste (PACE II) for the biennium 2024–2025 is set out in the annex to document UNEP/CHW.16/19/Add.1. These versions are identical to those submitted to the Open-ended Working Group at its thirteenth meeting in document UNEP/CHW/OEWG.13/INF/15.

35. The Open-ended Working Group invited comments on the tables of contents for the draft guidance documents and the draft programme of work from Parties and observers by 31 March 2023. The comments received are available on the website of the Convention for consideration by the Conference of the Parties at its sixteenth meeting.[29]

(b) Household Waste Partnership

36. The Open-ended Working Group took note of the oral report by the Secretariat on the implementation of the workplan of the working group of the Household Waste Partnership.[30]

(c) Plastic Waste Partnership

37. The Open-ended Working Group considered the draft workplan of the working group of the Plastic Waste Partnership for the biennium 2024–2025.[31]

38. The draft workplan of the working group of the Plastic Waste Partnership for the biennium 2024–2025 is available to the Conference of the Parties in the annex to document UNEP/CHW.16/19/Add.3. The draft workplans of the four project groups established by the Plastic Waste Partnership working group for the biennium 2024–2025, on which the draft workplan of the Partnership working group is based, have been made available in the annex to document UNEP/CHW.16/INF/57. These versions are identical to those submitted to the Open-ended Working Group at its thirteenth meeting in document UNEP/CHW/OEWG.13/INF/16.

39. The Open-ended Working Group invited comments on the draft workplan from Parties and observers by 31 March 2023. The comments received have been made available on the website of the Convention for consideration by the Conference of the Parties at its sixteenth meeting.[32]

2. Cooperation with the World Customs Organization on the Harmonized Commodity Description and Coding System

40. The Open-ended Working Group considered progress in the work of the World Customs Organization on the Harmonized System related to the Basel Convention.[33]

41. The report on the status of the work of the World Customs Organization on the Harmonized Commodity Description and Coding System in relation to the Basel Convention is available to the Conference of the Parties in document UNEP/CHW.16/INF/15. This version is identical to the one submitted to the Open-ended Working Group at its thirteenth meeting in document UNEP/CHW/OEWG.13/INF/17.

42. The Open-ended Working Group recommended that at its sixteenth meeting the Conference of the Parties:

(a) Invite Parties and others to provide information to the Secretariat with a view to assisting it in facilitating the inclusion of waste covered by the Basel Convention in the Harmonized System pursuant to decision BC-14/9;

(b) Request the Secretariat to take into account the information received in preparing proposals to amend the Harmonized System and in facilitating the review of such proposals by the World Customs Organization.

[28] UNEP/CHW/OEWG.13/INF/15, annex III.

[29] www.basel.int/Implementation/TechnicalAssistance/Partnerships/PACEII/Programmeofwork/tabid/9305/Default.aspx.

[30] UNEP/CHW/OEWG.13/9.

[31] UNEP/CHW/OEWG.13/INF/16, annex I.

[32] www.basel.int/Implementation/Plasticwastes/PlasticWastePartnership/tabid/8096/Default.aspx.

[33] UNEP/CHW/OEWG.13/INF/17, annex I.

43. The Conference of the Parties may wish to consider proceeding on the basis of the recommendations of the Open-ended Working Group.

E. Work programme of the Open-ended Working Group for 2024–2025

44. The Open-ended Working Group took note of the oral report by the Secretariat on the preparation of the work programme of the Open-ended Working Group for 2024–2025.

45. The work programme of the Open-ended Working Group for 2024–2025 is available to the Conference of the Parties in document UNEP/CHW.16/20.

III. Proposed action

46. When considering the items on the agenda of its sixteenth meeting, the Conference of the Parties may wish to consider the information set out in the present note and, where relevant,[34] proceed on the basis of the recommendations of the Open-ended Working Group at its thirteenth meeting as outlined in the present document.

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[34] This applies to the following items on the provisional agenda of the sixteenth meeting of the Conference of the Parties: 4 (a) (ii) on improving the functioning of the prior informed consent procedure; 4 (c) (ii) on providing further legal clarity; 4 (b) (ii) on the classification and hazard characterization of wastes.

Annex

Decision OEWG-13/1: Providing further legal clarity

The Open-ended Working Group

1. *Welcomes* the progress made by the expert working group on the review of Annexes I, III and IV in the review of Annexes I and III[1] and takes note of the draft recommendations and findings developed by the group;[2]

2. *Recommends* that the Conference of the Parties at its sixteenth meeting request the expert working group:

(a) To consider the proposals by the European Union to amend Annex IV and certain entries in Annexes II and IX to the Basel Convention[3] and the recommendations and findings of the expert working group,[4] taking into account decision BC-15/19, the discussions at the fifteenth meeting of the Conference of the Parties, the discussions at the thirteenth meeting of the Open-ended Working Group and the discussions at the sixteenth meeting of the Conference of the Parties, and develop revised amendment proposals for consideration by the Open-ended Working Group at its fourteenth meeting;

(b) To continue to develop draft recommendations on the review of Annexes I and III, taking into account the discussions at the thirteenth meeting of the Open-ended Working Group and the discussions at the sixteenth meeting of the Conference of the Parties, for consideration by the Open-ended Working Group at its fourteenth meeting.

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[1] UNEP/CHW/OEWG.13/8.

[2] UNEP/CHW/OEWG.13/INF/14, annexes.

[3] UNEP/CHW.15/13/Add.1.

[4] UNEP/CHW/OEWG.13/INF/13, annexes.

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BASEL CONVENTION

Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
Sixteenth meeting
Geneva, 1–12 May 2023
Item 4 (a) (ii) of the provisional agenda*

Matters related to the implementation of the Convention: strategic issues: improving the functioning of the prior informed consent procedure

Compilation and synthesis of information received from Parties and observers on challenges in the implementation of the prior informed consent procedure and on best practices, possible approaches, initiatives and views to improve the functioning of the procedure

Note by the Secretariat

1. As is mentioned in the note by the Secretariat on improving the functioning of the prior informed consent procedure (UNEP/CHW.16/4), the annex to the present note sets out a compilation and synthesis of information received from Parties and observers on challenges in the implementation of the prior informed consent procedure and on best practices, possible approaches, initiatives and views to improve the functioning of the procedure prepared by Secretariat. The annex set out in the present note is identical to that which was submitted to the Open-ended Working Group at its thirteenth meeting in document UNEP/CHW/OEWG.13/INF/4.

2. As is mentioned in the note on the outcomes of and follow up to the thirteenth meeting of the Open-ended Working Group (UNEP/CHW.16/20/Add.1), the Open-ended Working Group recommended action on this topic for consideration by the Conference of the Parties at its sixteenth meeting.

3. The present note including its annex, has not been formally edited.

* UNEP/CHW.16/1.

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Annex

Compilation and synthesis of information received from Parties and observers on challenges in the implementation of the prior informed consent procedure and on best practices, possible approaches, initiatives and views to improve the functioning of the procedure

I. Submissions by Parties

1. Six submissions[1] were received from Parties, including one on behalf of a regional integration organization and its Member States, on challenges in the implementation of the prior informed consent (PIC) procedure and on best practices, possible approaches, initiatives and views to improve the functioning of the procedure.[2]

2. At the outset, it was noted that the Basel Convention sets out a detailed PIC procedure with strict requirements for transboundary movements of hazardous wastes and other wastes.

A. Challenges

3. Parties mentioned a number of challenges in the implementation of the PIC procedure, which they remarked could render it difficult to move waste across borders in accordance with the Convention and hamper its environmentally sound management.

4. Several Parties referred to problems with delays and uncertainty with timeframes, including delays in handling of documents required under the PIC procedure and in obtaining responses and consent from States. Such delays were viewed as being caused, for instance, by the lack of efficient timelines in the Convention or non-compliance with them, the use of mail and hardcopy for carrying out the PIC procedure, varying information and documentation requirements between countries, and the lack of response from competent authorities in States of import and transit. Some Parties also mentioned the lack of acknowledgement of receipt of notifications by competent authorities as a challenge, resulting in delays and issues determining whether this was due to incorrect contact information or whether the processing of a notification was still ongoing.

5. Several Parties mentioned specific issues with States of transit, including the lack of harmonization amongst Parties regarding the term "State of transit", the growing number of transit countries required to provide consent, excessively demanding accompanying information requirements, and unclear or short timeframes on consents.

6. Several Parties underlined the challenge of determining the appropriate country contacts and of incorrect, incomplete, or outdated contact information provided to the Secretariat by Parties on competent authorities and focal points, which hampered efficient communication.

7. Another challenge mentioned was the refusal by sea carriers to take onboard hazardous waste or other wastes due to fear of the shipment being later blocked. In addition, it was expressed that there were insufficient monitoring mechanisms to effectively track illegal movements of hazardous wastes across borders. Facility information was also considered to be insufficient, as State consent might not guarantee that waste would be dealt with in an environmentally sound manner.

B. Best practices, possible approaches, initiatives and views to improve the functioning of the procedure

8. Regarding best practices, possible approaches, initiatives and views to improve the functioning of the PIC procedure, several Parties noted that some specific work thereon had been ongoing, for example in the small intersessional working group on electronic approaches to the notification and movement documents to the Basel Convention, as well as in the Implementation and Compliance Committee regarding transit and the question of whether a common interpretation of the meaning of "State of transit" might be agreed upon. Nonetheless, several Parties expressed a need to more comprehensively address improving the functioning of the PIC procedure.

[1] The submissions are available at: basel.int/Implementation/Controllingtransboundarymovements/ImprovingthePICprocedure/tabid/9319/Default.aspx.

[2] Australia, Canada, the European Union and its Member States, the Gambia, New Zealand, and the United Kingdom of Great Britain and Northern Ireland.

9. A number of items were suggested for consideration in this context, including better defining the procedural steps and establishing efficient timelines for the handling of the PIC procedure, such as the option of longer permits, as well as adapting the PIC procedure to facilitate transboundary movements of waste destined to "pre-consented" facilities, for example modelled on the approach of the OECD.[3] It was also noted that further information was needed on reasons behind competent authorities being delayed in or not responding, whereby Parties could report to the Secretariat on such incidents. In addition, it was submitted that an acknowledgement of receipt of notification from the competent authority could be beneficial and inform an exporting Party that a notification had been submitted to the correct authority and was being processed. It was also suggested that a specific timeframe regarding notification and response from exporting and importing States could be established, while the implementation of timelines for acknowledgement and consent in domestic legislation was also mentioned as an option, including powers to extend a decision period when required consents had not been obtained. The acceptance of email and scanned versions of documents was also encouraged.

10. Regarding States of transit, several Parties suggested considering the use of tacit consent by States of transit as well as discussing and agreeing on a common interpretation of the meaning of "State of transit". Some Parties additionally recommended reducing or clarifying transit consents required, aligning transit consents automatically with the consent dates of the State of import, or limiting the information a State of transit could request.

11. With respect to country contacts, several Parties underlined the need to address the lack of response by competent authorities in States of import and transit and incorrect or incomplete contact information provided by Parties, as well as the importance of updating such contact information when it was outdated. In this regard, a number of Parties urged the use of a generic or group email for correspondence, not specific to only one individual, which could likewise decrease the need for the Secretariat to continually update contacts. The option was also put forward of introducing a system of regular checking and updating of email addresses, including competent authorities reporting issues and the Secretariat following up thereupon as well as reporting back at each COP, possibly as part of the discussions of the Implementation and Compliance Committee or the electronic approaches to the notification and movement document working group.

12. The issue of differing financial guarantee calculations was mentioned, as included also within the mandate of the Implementation and Compliance Committee, and it was suggested to develop further guidance to ensure the coverage of all potential costs in case of repatriation.

13. Regarding route changes, it was submitted that the PIC procedure did not reflect the operational realities of the shipping industry, and that flexibility should be allowed in very limited cases with advance agreement of competent authorities. To harmonize the levels and types of information requested, it was suggested to invite Parties to provide information on the issues experienced with differing information requests and how this impacted the efficiency and effectiveness of the PIC process.

14. The need was also expressed for more support and mediation from the Secretariat when a dispute arose on whether a permit was required.

15. In terms of further specific actions, several Parties proposed the establishment of an intersessional expert working group with the mandate to identify common challenges and problems with regard to the PIC procedure. In order to address the root causes of the problems related to the PIC procedure, those Parties proposed that such a working group could also be mandated to provide recommendations on how to improve the implementation of the PIC provisions and, in case challenges could not be addressed within the current framework of the Convention, recommendations on alternative ways forward.

16. Some Parties proposed that an electronic system be implemented including for submitting applications and requests for permission to ship as well as notification and movement forms, while it was recognized that a full transition to an electronic system was a long-term goal and should be reflected as such in the revised Strategic Framework.

17. One Party recommended that a small umbrella group be established to oversee all PIC improvement-related activities undertaken by existing working groups and committees or that, alternatively, the Secretariat could undertake this function removing the need for a new small intersessional working group and the resourcing it would require.

[3] Referring to: OECD Decision of the Council on the Control of Transboundary Movements of Wastes Destined for Recovery Operations (OECD-Legal-0266).

II. Submissions by observers

18. Ten observers, including one State, submitted information on challenges in the implementation of the prior informed consent procedure and on best practices, possible approaches, initiatives and views to improve the functioning of the procedure.[4]

19. Support was expressed for efforts to improve the PIC procedure to facilitate transboundary movement of hazardous waste and other waste to facilities that could manage the waste in an environmentally sound manner (ESM).

A. Challenges

20. Challenges observers mentioned included, among others, delays in the handling of notifications and lack of response, the impacts of the expansion of covered wastes in Annex II, lack of investment in the implementation of the procedure, exclusion of stakeholders, persistent use of hardcopy, and different waste classifications amongst countries.

B. Best practices, possible approaches, initiatives and views to improve the functioning of the procedure

21. Observers made various different proposals with a view to improving the functioning of the procedure. A number of observers proposed establishing an electronic approach for exchanging notifications between countries, such as by email or through an electronic data exchange. An observer encouraged the establishment of a shared email inbox, accessible by a team reviewing and processing notifications. In this connection, the use and acceptance of electronic signatures on notifications was also encouraged.

22. To address the lack of response to notifications, the use of conditional tacit consent to transit was highlighted as an option, insofar as a proposed importing country consented and while reserving the ability to request additional information or object to a notification.

23. It was also encouraged to facilitate communication on the requirements for notifications to be considered compliant with national laws and regulations, including by making this information available and easily accessible to competent authorities. It was proposed to undertake an information-gathering exercise to identify the national requirements that countries may have for notifications to be considered complete. A need was also expressed for the review of potentially protectionist policies that could undermine the effectiveness of the procedure, possibly through a study initiated by the Secretariat.

24. Other proposals to improve the procedure included enhancing coordination between national institutions and supporting national capacity building initiatives.

25. Some observers suggested establishing a Protocol to the Convention. They also underlined the importance of setting timeframes for response and acknowledgement of notifications, lodging of copies of notifications with the Secretariat, setting up a database of national requirements and facilities, and gathering further data regarding impacts of the recent plastic and e-waste amendments.

26. Another observer suggested exploring the adoption of a new legal arrangement or agreement under Article 11 to improve the procedure for material recovery flows for achieving a low-carbon, sustainable, and more circular economy, involving an "opt-in" to a control system for high value recoverable materials ensuring ESM, trade facilitating measures (e.g., electronic and tacit consent procedures and pre-approved recycling facilities), and increased transparency. Another observer made reference to a discussion paper focused on the topic.[5]

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[4] State: United States of America. Other observers: Association of European Automotive and Industrial Batteries Manufacturers (EUROBAT), Bureau of International Recycling (BIR), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), FUKUTOMI Recycling, Hazardous Waste Europe (HWE), Information Technology Industry Council (ITI), TES, Welfare Togo, and World Business Council for Sustainable Development (WBCSD). The submissions are available at: basel.int/Implementation/Controllingtransboundarymovements/ImprovingthePICprocedure/tabid/9319/Default.aspx.

[5] Discussion Paper – Practical Experiences with the Basel Convention: Challenges, Good Practice and Ways to Improve Transboundary Movements of E-Waste in Low and Middle Income countries – A Collaboration between PREVENT and StEP (Publisher: PREVENT Waste Alliance, c/o Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH).

United Nations Environment Programme

Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
Sixteenth meeting
Geneva, 1–12 May 2023
Agenda item 4 (a) (ii)

Matters related to the implementation of the Convention: strategic issues: improving the functioning of the prior informed consent procedure

Draft decision BC-16/[--]: Work to improve the prior informed consent procedure

Submission by the contact group on strategic matters

The Conference of the Parties

1. *Takes note* of the compilation and synthesis of information received from Parties and observers on challenges in the implementation of the prior informed consent procedure of the Basel Convention and on best practices, possible approaches, initiatives and views to improve the functioning of the procedure;[1]

2. *Decides* to establish a small intersessional working group open to all Parties, with the aim of balanced representation of the five regional groups of the United Nations, to identify challenges in the implementation of the prior informed consent procedure under the Basel Convention and best practices, possible approaches and initiatives to improve its functioning, taking into account the compilation and synthesis of information received from Parties and observers set out in document UNEP/CHW.16/INF/6, the discussion during the thirteenth meeting of the Open-ended Working Group, views expressed at the sixteenth meeting of the Conference of the Parties, and ongoing work under the Convention, and to develop recommendations for improving the functioning of the procedure, avoiding duplication of work and ensuring consistency;

3. *Invites* Parties and observers to nominate experts with relevant knowledge of and expertise in the implementation of the prior informed consent procedure to participate in the small intersessional working group, and to inform the Secretariat of their nominations by 30 September 2023;

4. *Invites* Parties to consider serving as lead countries for the work referred to in paragraph 2 of the present decision and to inform the Secretariat by 30 September 2023 of their willingness to do so;

5. *Invites* Parties and others to submit to the Secretariat by 30 September 2023 information on challenges in the implementation of the prior informed consent procedure and on best practices, possible approaches and initiatives to improve its functioning;

[1] UNEP/CHW.16/INF/6, annex.

6. *Requests* the Secretariat to make available the information received pursuant to paragraph 5 of the present decision on the website of the Convention and prepare a compilation of the information received, subject to the availability of resources, for consideration by the Open-ended Working Group at its fourteenth meeting;

7. *Requests* the lead country or countries or, in the absence of a lead country, the Secretariat, subject to the availability of resources and in consultation with the small intersessional working group, to prepare a report on challenges in the implementation of the prior informed consent procedure and best practices, possible approaches and initiatives to improve its functioning, as well as options for possible ways forward, for consideration by the Open-ended Working Group at its fourteenth meeting;

8. *Decides* that the small intersessional working group will operate by electronic means and, subject to the availability of resources, will also hold face-to-face meetings;

9. *Requests* the Secretariat to report on the implementation of the present decision to the Open-ended Working Group at its fourteenth meeting and to the Conference of the Parties at its seventeenth meeting.

UNITED NATIONS

UNEP/CHW.16/9

BASEL CONVENTION

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9 January 2023

Original: English

Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
Sixteenth meeting
Geneva, 1–12 May 2023
Item 4 (b) (iv) of the provisional agenda*

Matters related to the implementation of the Convention: scientific and technical matters: electronic approaches to the notification and movement documents

Electronic approaches to the notification and movement documents

Note by the Secretariat

I. Introduction

1. In paragraph 2 of decision BC-15/14, on electronic approaches to the notification and movement documents, the Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal decided to establish a small intersessional working group, operating by electronic means, to look further into electronic approaches to the notification and movement documents, taking into account the report of the first consultative workshop on electronic approaches to the notification and movement documents of the Basel Convention,[1] including the elements for further discussion set out therein, and previous reports prepared on that topic.[2]

2. In paragraphs 3 to 5 of the decision, the Conference of the Parties invited Parties and observers to nominate experts to participate in the established working group, invited Parties to consider serving as lead countries, and requested the lead country or countries or, if there was no lead country or countries identified, the Secretariat, subject to the availability of resources, in consultation with the small intersessional working group, to prepare a report with recommendations on the next steps regarding the work on electronic approaches to the notification and movement documents for consideration by the Open-ended Working Group of the Basel Convention at its thirteenth meeting.

3. In paragraph 6 of the decision, the Conference of the Parties invited Parties willing to do so to work on pilot projects on electronic approaches to the notification and movement documents, taking into account the experiences of other Parties and of non-Parties, and the work carried out by other international organizations, and to submit their lessons learned to the Secretariat.

* UNEP/CHW.16/1.

[1] www.basel.int/Implementation/Controllingtransboundarymovements/eapproachesfornotificationandmovement/Meetings/WorkshopOnlineJan2021/tabid/8741/Default.aspx.

[2] UNEP/CHW/CC.12/11/Add.2, UNEP/CHW/OEWG.11/INF/21 and UNEP/CHW.15/INF/62.

II. Implementation

4. The list of members of the small intersessional working group is available on the website of the Convention.[3]

5. On 22 September 2022, the working group held its first online meeting and agreed that the Secretariat would work with a smaller group of experts from the working group on preparing a report containing a first set of recommendations on the steps regarding the work on electronic approaches to the notification and movement documents, for consideration by the Open-ended Working Group at its thirteenth meeting.

6. At its thirteenth meeting, the Open-ended Working Group is expected to take note of the report, including its recommendations on the next steps regarding the work on electronic approaches to the notification and movement documents (UNEP/CHW/OEWG.13/INF/10), and to invite Parties and observers to submit comments thereon by 31 March 2023. The outcomes of the thirteenth meeting of the Open-ended Working Group will be set out in document UNEP/CHW.16/20/Add.1. Comments received by the 31 March 2023 deadline on the report and its recommendations[4] are available on the website of the Convention.[5] The report, including recommendations on the next steps regarding the work on electronic approaches to the notification and movement documents, is reproduced in document UNEP/CHW.16/INF/17.

7. As at 22 December 2022, the Secretariat had not yet received information on pilot projects on electronic approaches to the notification and movement documents.

III. Proposed action

8. The Conference of the Parties may wish to adopt a decision along the following lines:

The Conference of the Parties,

Welcoming with appreciation the work of the small intersessional working group established pursuant to paragraph 2 of decision BC-15/14,

1. *Takes note* of the report with recommendations on the next steps regarding the work on electronic approaches to the notification and movement documents prepared by the Secretariat in consultation with the small intersessional working group;[6]

2. *Reiterates* its invitation to Parties and observers willing to do so to work on pilot projects on electronic approaches to the notification and movement documents, taking into account the experiences of other Parties and of non-Parties, and the work carried out by other international organizations, and to submit their lessons learned to the Secretariat;

3. *Decides* to extend the mandate of the small intersessional working group established pursuant to paragraph 2 of decision BC-15/14;

4. *Requests* the small intersessional working group to advance the work and to prepare a report with further recommendations on electronic approaches to the notification and movement documents, taking into account the experiences of Parties and non-Parties, including from pilot projects, the report with recommendations on the next steps regarding the work on electronic approaches to the notification and movement documents prepared by the Secretariat in consultation with the small intersessional working group,[7] the comments received thereon,[8] the report of the first consultative workshop on electronic approaches to the notification and movement documents of the Basel Convention,[9] and the discussions at the

[3] http://www.basel.int/Implementation/Controllingtransboundarymovements/eapproachesfornotificationandmovement/Overview/tabid/7375/Default.aspx.

[4] UNEP/CHW/OEWG.13/INF/10.

[5] http://www.basel.int/Implementation/Controllingtransboundarymovements/eapproachesfornotificationandmovement/Overview/CommentsBC1411decision/tabid/8359/Default.aspx.

[6] UNEP/CHW.16/INF/17.

[7] Ibid.

[8] http://www.basel.int/Implementation/Controllingtransboundarymovements/eapproachesfornotificationandmovement/Overview/CommentsBC1411decision/tabid/8359/Default.aspx.

[9] UNEP/CHW.15/INF/62.

thirteenth meeting of the Open-ended Working Group[10] and the sixteenth meeting of the Conference of the Parties;

5. *Requests* the Secretariat:

(a) To organize, subject to the availability of resources, and in collaboration with relevant stakeholders, technical assistance activities and awareness-raising events in order to help Parties advance the work on electronic approaches to the notification and movement documents of the Basel Convention;

(b) To make available on the website of the Convention lessons learned and information about pilot projects as referred to in paragraph 2 of the present decision;

(c) To report to the Open-ended Working Group at its fourteenth meeting and to the Conference of the Parties at its seventeenth meeting on progress in the implementation of the present decision.

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[10] UNEP/CHW.16/20/Add.1.

UNITED NATIONS

UNEP/CHW.16/5

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Item 4 (a) (iii) of the provisional agenda*

Matters related to the implementation of the Convention: strategic issues: development of guidelines for environmentally sound management

Developing guidelines for environmentally sound management

Note by the Secretariat

I. Introduction

1. In paragraph 3 of decision BC-15/5, on developing guidelines for environmentally sound management, the Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal invited Parties and others to provide the Secretariat with information on the environmentally sound management of hazardous wastes and other wastes, in particular, activities, initiatives and case studies that might promote implementation and complement the toolkit on environmentally sound management, and requested the Secretariat to make such information available on the website of the Basel Convention.

2. In paragraph 4, the Secretariat was requested, subject to the availability of resources, to undertake activities to promote and disseminate the toolkit on environmentally sound management.

3. In paragraph 5, the Conference of the Parties recalled decision BC-13/3, in which it invited Parties and others to submit to the Secretariat further good practices and examples with regard to waste prevention and minimization, extended that invitation to 31 December 2022, and requested the Secretariat to make all information received available on the website of the Convention.

4. Finally, in paragraph 6, the Secretariat was requested, subject to the availability of resources, and as part of its technical assistance activities on waste prevention and minimization, to work with developing-country Parties and Parties with economies in transition to consider existing good practices and examples received in response to paragraph 5 of decision BC-15/5 and to develop examples of practices that might address their particular circumstances, building on existing guidance under the Convention.

* UNEP/CHW.16/1.

II. Implementation

5. In response to paragraphs 3 and 5 of decision BC-15/5, the Secretariat received one submission from Parties and others by the deadline. The information contained in that submission and any subsequently received was posted on the website of the Convention.[1]

6. Promotion and dissemination of the toolkit on environmentally sound management are embedded in the training and capacity development activities under the Basel Convention. In particular, the toolkit has constituted useful reference material for the technical assistance activities being undertaken by the Secretariat with respect to specific waste streams, such as plastic waste. Further information on such activities is available in the report on the implementation of the technical assistance plan for 2022–2023.[2] The toolkit, with enhanced design and accessibility features, is available on the website of the Convention.[3]

7. Finally, in response to paragraph 6 of decision BC-15/5, the Secretariat continues, as part of its technical assistance activities, to work with both developing-country Parties and Parties with economies in transition on waste prevention and minimization. Activities relating to plastic waste prevention and minimization also constitute one of the main workstreams under the Plastic Waste Partnership working group. Such activities include, for example, the collection of information, best practices and lessons learned regarding:

(a) Measures taken to prevent and reduce plastic waste, in particular on single-use plastic waste and packaging waste;

(b) Improving the design of plastic products to increase their durability, reusability, repairability and recyclability, as well as to reduce hazardous constituents in plastic products;

(c) Reuse of plastic products, especially packaging, including on identification of infrastructure development needs related to reuse, such as refill systems.

8. In undertaking this work, and in accordance with the project group workplans, the Partnership working group duly considers geographical, local, national and regional conditions and circumstances, including those of developing countries and small island developing States. Outcomes of the work of the Plastic Waste Partnership are disseminated widely and made available on the website of the Convention.[4] Further information on the work of the Plastic Waste Partnership is available in document UNEP/CHW.16/19 on the Basel Convention Partnership Programme.

III. Proposed action

9. The Conference of the Parties may wish to take note of the information provided. It may also wish to request Parties and others to continue to provide information to the Secretariat in accordance with decision BC-15/5.

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[1] www.basel.int/Implementation/CountryLedInitiative/EnvironmentallySoundManagement/Overview/tabid/3615/Default.aspx.

[2] UNEP/CHW.16/INF/28–UNEP/FAO/RC/COP.11/INF/17–UNEP/POPS/COP.11/INF/25.

[3] www.basel.int/Implementation/CountryLedInitiative/EnvironmentallySoundManagement/ESMToolkit/Overview/tabid/5839/Default.aspx.

[4] www.basel.int/Implementation/Plasticwaste/PlasticWastePartnership/tabid/8096/Default.aspx.

UNITED NATIONS

UNEP/CHW.16/6

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Matters related to the implementation of the Convention: scientific and technical matters: technical guidelines

Technical guidelines

Note by the Secretariat

I. Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants

A. Introduction

1. In paragraph 2 of decision BC-15/6, the Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal adopted three technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants (UNEP/CHW.15/6/Add.1/Rev.1, UNEP/CHW.15/6/Add.2/Rev.1, UNEP/CHW.15/6/Add.3/Rev.1).

2. In paragraph 7 of the decision, the Conference of the Parties invited Parties and observers to submit to the Secretariat, by 30 October 2022, comments on the low persistent organic pollutant content values included in the general technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants[1] ("the general technical guidelines") and other technical guidelines, as appropriate, and related information, including on studies, taking into account relevant information available in the Stockholm Convention on Persistent Organic Pollutants. In paragraph 12, the Conference of the Parties requested the Secretariat to prepare a compilation of the comments and information received for consideration by the Open-ended Working Group at its thirteenth meeting.

3. In paragraph 8 of the decision, the Conference of the Parties invited Parties and observers to provide to the Secretariat, by 30 October 2022, comments on the parts enclosed in square brackets in section IV.G.2 (e) and on additional guidance for section IV.G.4 of the general technical guidelines, and information on further or updated examples of national legislation for inclusion in annex II to the general technical guidelines, including on any concentration limits, as well as links to online sources where such legislation can be found.

* UNEP/CHW.16/1.

[1] UNEP/CHW.15/6/Add.1/Rev.1.

4. In paragraph 9 of the decision, the Conference of the Parties decided, among other things, that the updating of the general technical guidelines, and the preparation or updating of specific technical guidelines with regard to the chemicals listed in Annex A to the Stockholm Convention by decision SC-10/13 of the Conference of the Parties to the Stockholm Convention, should be included in the work programme of the Open-ended Working Group for the biennium 2022–2023.

5. Furthermore, in paragraph 11 of the decision, the Conference of the Parties invited the lead country or countries or lead organization or organizations for the technical guidelines, or, if there was no lead country or countries or lead organization or organizations, requested the Secretariat, subject to the availability of resources and in consultation with the small intersessional working group on persistent organic pollutant wastes, to prepare the draft updated technical guidelines referred to in paragraph 4 of the present note for consideration by the Open-ended Working Group at its thirteenth meeting.

6. In paragraph 12 (d) of the decision, the Conference of the Parties requested the Secretariat to report on the implementation of the decision to the Open-ended Working Group at its thirteenth meeting and to the Conference of the Parties at its sixteenth meeting.

B. Implementation

7. The three technical guidelines adopted by the Conference of the Parties in decision BC-15/6 are available on the website of the Basel Convention, in English only, while translations are being prepared.[2]

8. No Party or organization has indicated its willingness to take the lead in updating the general technical guidelines and specific technical guidelines with regard to the chemicals listed in Annex A to the Stockholm Convention by decision SC-10/13. The Secretariat is therefore facilitating the work of the small intersessional working group and has engaged consultants to update the technical guidelines in accordance with decision BC-15/6.

9. The list of members of the small intersessional working group is available on the website of the Convention.[3]

10. As at 19 December 2022, the small intersessional working group had held one online consultation, on 16 September 2022, and one online meeting, from 14 to 18 November 2022.[4]

11. The following draft technical guidelines have been prepared for consideration by the Conference of the Parties at its sixteenth meeting:

(a) General technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants, which are set out in document UNEP/CHW.16/6/Add.1 (draft updated version of December 2022);

(b) Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF) and perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds, including perfluorohexane sulfonic acid (PFHxS), its salts and PFHxS-related compounds, which are set out in document UNEP/CHW.16/6/Add.2 (draft updated version of December 2022).

12. At its thirteenth meeting, the Open-ended Working Group is expected to consider the two above-mentioned draft updated technical guidelines. The outcomes of the thirteenth meeting of the Open-ended Working Group, including recommendations for consideration by the Conference of the Parties, are set out in document UNEP/CHW.16/20/Add.1. Revised versions of the draft technical guidelines reflecting the outcome of the thirteenth meeting are expected to be made available, respectively, in documents UNEP/CHW.16/INF/7 and UNEP/CHW.16/INF/8.

13. The Secretariat has posted a compilation of the comments and information received on the low persistent organic pollutant content values included in the general technical guidelines pursuant to paragraph 7 of decision BC-15/6 on the website of the Convention.[5]

[2] http://www.basel.int/TheConvention/ConferenceoftheParties/Meetings/COP15/tabid/8392/Default.aspx.

[3] http://www.basel.int/Implementation/POPsWastes/SmallIntersessionalWorkingGroup/tabid/6305/Default.aspx.

[4] http://www.basel.int/Implementation/POPsWastes/Meetings/tabid/4348/Default.aspx.

[5] http://www.basel.int/Implementation/POPsWastes/TechnicalGuidelines/CommentsfromCOP15Oct2022/tabid/9368/Default.aspx.

14. The Secretariat, in consultation with the small intersessional working group, has also prepared a draft analysis of candidate persistent organic pollutants recommended for listing in annexes A, B and/or C to the Stockholm Convention by the Persistent Organic Pollutants Review Committee, which identifies which technical guidelines will need to be updated or developed for consideration by the Conference of the Parties at its sixteenth meeting. The analysis is set out in document UNEP/CHW.16/INF/9.

C. Proposed action

15. The Conference of the Parties may wish to adopt a decision along the following lines:

The Conference of the Parties

1. *Welcomes with appreciation* the contributions made by the small intersessional working group established by paragraph 9 of decision OEWG-I/4 to the tasks pertaining to technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants;

2. *Adopts* the following technical guidelines:

(a) General technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants; [6]

(b) Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF) and perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds, including perfluorohexane sulfonic acid (PFHxS), its salts and PFHxS-related compounds; [7]

3. *Requests* the Secretariat to disseminate the technical guidelines referred to in paragraph 2 of the present decision to Parties and others in the six official languages of the United Nations;

4. *Decides* to extend the mandate of the small intersessional working group established by paragraph 9 of decision OEWG-I/4 to provide for the group to monitor and assist in the review, updating and preparation, as appropriate, of technical guidelines regarding persistent organic pollutants, working in particular by electronic means and, subject to the availability of resources, through face-to-face meetings;

5. *Recognizes* that in some cases provisional low persistent organic pollutant content values have been established at previous meetings of the Conference of the Parties and that in other cases knowledge limitations have posed challenges to the setting of such values and that therefore a review of provisional low persistent organic pollutant content values would be timely;

6. *Decides* to continue working towards a review of provisional low persistent organic pollutant content values in the technical guidelines referred to in paragraph 2 (a) of the present decision, and other technical guidelines, as appropriate, before the seventeenth meeting of the Conference of the Parties;

7. *Invites* Parties and observers to submit to the Secretariat, by 30 October 2023, comments on the low persistent organic pollutant content values included in the technical guidelines referred to in paragraph 2 (a) of the present decision, and other technical guidelines, as appropriate, and related information, including on studies, taking into account relevant information available in the Stockholm Convention on Persistent Organic Pollutants;

8. *Decides* that the updating of the general technical guidelines referred to in paragraph 2 (a) of the present decision and the preparation or updating of specific technical guidelines with regard to the chemicals listed in Annex A to the Stockholm Convention by decisions [SC-11/…] of the Conference of the Parties to the Stockholm Convention should be included in the work programme of the Open-ended Working Group for 2024–2025, including with regard to the following:

(a) Establishment of the levels of destruction and irreversible transformation for the chemicals necessary to ensure that, when disposed of, they do not exhibit the

[6] UNEP/CHW.16/6/Add.1/Rev.1.

[7] UNEP/CHW.16/6/Add.2/Rev.1.

characteristics of persistent organic pollutants specified in paragraph 1 of Annex D to the Stockholm Convention;

(b) Determination of which disposal methods constitute environmentally sound disposal as referred to in paragraph 1 (d) (ii) of Article 6 of the Stockholm Convention;

(c) Establishment, as appropriate, of the concentration levels of the chemicals in order to define for them the low persistent organic pollutant content referred to in paragraph 1 (d) (ii) of Article 6 of the Stockholm Convention;

9. *Invites* Parties to indicate to the Secretariat by 31 August 2023 their willingness to take the lead in updating the general technical guidelines referred to in paragraph 2 (a) of the present decision and in developing or updating specific technical guidelines, taking into account decisions [SC-10/…] and in accordance with paragraph 8 of the present decision;

10. *Invites* the lead Parties for the technical guidelines referred to in paragraph 9 of the present decision, if any, and requests the Secretariat, if there is no lead Party, in consultation with the small intersessional working group, to prepare draft technical guidelines in accordance with paragraph 9 of the present decision, taking into account the comments and information provided pursuant to paragraph 7 of the present decision, for consideration by the Open-ended Working Group at its fourteenth meeting;

11. *Requests* the small intersessional working group to prepare a draft analysis of candidate persistent organic pollutants recommended for listing in annexes A, B and/or C to the Stockholm Convention by the Persistent Organic Pollutants Review Committee in order to identify whether technical guidelines will need to be updated or developed for consideration by the Conference of the Parties at its seventeenth meeting;

12. *Requests* the Secretariat:

(a) To prepare a compilation of the comments and information received pursuant to paragraph 7 of the present decision, for consideration by the Open-ended Working Group at its fourteenth meeting;

(b) To continue to provide, subject to the availability of resources, training to developing-country Parties and other Parties in need of assistance in using the adopted technical guidelines, organizing such activities in cooperation with the Basel Convention regional and coordinating centres or by other appropriate means;

(c) To report on the implementation of the present decision to the Open-ended Working Group at its fourteenth meeting and to the Conference of the Parties at its seventeenth meeting.

II. Technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention

A. Introduction

16. In paragraph 2 of decision BC-15/7, the Conference of the Parties decided to extend the mandate of the expert working group established by paragraph 4 of decision BC-13/5. In paragraph 3 of the decision, the Conference of the Parties invited each regional group to reconsider their nominations for the group.

17. In paragraph 4 of the decision, the Conference of the Parties invited Parties and others to use and test, on a pilot basis, the technical guidelines adopted on an interim basis by decision BC-14/5 and to submit, not later than 31 October 2022, the results of their use and/or testing of the technical guidelines to the Secretariat for consideration by the expert working group.

18. Furthermore, in paragraph 5 of the decision, the Conference of the Parties requested the expert working group, taking into account, inter alia, the comments received in accordance with paragraph 4 of decision BC-15/7, to prepare updated technical guidelines, taking into consideration the amendments to Annexes II, VIII and IX to the Basel Convention adopted in decision BC-15/18 and paragraph 4 of decision BC-14/5, and to submit them for consideration by the Conference of the Parties at its sixteenth meeting.

B. Implementation

19. Any comments received pursuant to paragraph 4 of decision BC-15/7 will be made available on the website of the Convention.[8]

20. The list of members of the expert working group is available on the website of the Convention.[9]

21. The expert working group held an online consultation on 26 September 2022. Further information is available on the website of the Convention.[10]

22. The Secretariat, in consultation with the expert working group, has prepared draft updated technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention, which are set out in document UNEP/CHW.16/INF/10. The updates are aimed at reflecting the amendments to Annexes II, VIII and IX to the Basel Convention on e-waste adopted by decision BC-15/18.

C. Proposed action

23. The Conference of the Parties may wish to adopt a decision along the following lines:

The Conference of the Parties

1. *Welcomes with appreciation* the contributions made by the expert working group established by paragraph 4 of decision BC-13/5 to the tasks pertaining to the technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention;

2. *Takes note* of the draft updated technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention, prepared by the Secretariat in consultation with the expert working group;[11]

3. *Decides* to extend the mandate of the expert working group established by paragraph 4 of decision BC-13/5;

4. *Invites* Parties and others to continue to use and/or test, on a pilot basis, the technical guidelines adopted on an interim basis by decision BC-14/5 and to submit, not later than 31 October 2023, the results of their use and/or testing of the technical guidelines to the Secretariat for consideration by the expert working group;

5. *Requests* the expert working group, taking into account, inter alia, the comments received in accordance with paragraph 4 of the present decision, to prepare updated technical guidelines and to submit them for consideration by the Conference of the Parties at its seventeenth meeting;

6. *Requests* the Secretariat*:*

(a) To continue to undertake, subject to the availability of resources, technical assistance activities to support developing-country Parties and other Parties in need of assistance in using the technical guidelines adopted by decision BC-14/5, organizing such activities in cooperation with the Basel Convention regional and coordinating centres or by other appropriate means;

(b) To report on the implementation of the present decision to the Open-ended Working Group at its fourteenth meeting and to the Conference of the Parties at its seventeenth meeting.

[8] http://basel.int/Implementation/Ewaste/TechnicalGuidelines/DevelopmentofTGs/tabid/2377/Default.aspx.

[9] http://www.basel.int/Implementation/Ewaste/TechnicalGuidelines/ExpertWorkingGroup/tabid/8232/Default.aspx.

[10] http://www.basel.int/Implementation/Ewaste/TechnicalGuidelines/Meetings/tabid/4235/Default.aspx.

[11] UNEP/CHW.16/INF/10.

III. Technical guidelines on the environmentally sound management of plastic wastes

A. Introduction

24. In paragraph 2 of decision BC-15/10, the Conference of the Parties underscored the importance of the timely updating of the technical guidelines on the environmentally sound management of plastic wastes and noted the progress achieved during the fifteenth meeting of the Conference of the Parties towards the finalization of the updated guidelines, as reflected in the draft updated technical guidelines on the environmentally sound management of plastic wastes.[12]

25. In paragraph 5 of the decision, the Conference of the Parties invited Parties and observers to submit to the Secretariat, by 16 September 2022, general comments and textual proposals on the draft updated technical guidelines, referring to specific paragraphs and tables, together with related rationales, if possible and as appropriate, and requested the Secretariat to make the general comments and the proposals available on the Convention website.

26. In paragraph 6 of the decision, the Conference of the Parties invited the Governments of China, Japan and the United Kingdom of Great Britain and Northern Ireland, as co-lead countries, in consultation with the small intersessional working group established pursuant to paragraph 20 of decision BC-14/13, to prepare a further updated version of the technical guidelines on the environmentally sound management of plastic wastes, taking into account the discussion during the fifteenth meeting of the Conference of the Parties and the general comments and textual proposals received pursuant to paragraph 5 of decision BC-15/10, for consideration by the Open-ended Working Group at its thirteenth meeting.

27. In paragraph 8 of the decision, the Conference of the Parties requested the Secretariat to transmit the decision, and to report on the progress regarding the draft updated technical guidelines on the environmentally sound management of plastic wastes, to the Executive Director of the United Nations Environment Programme and to the intergovernmental negotiating committee established pursuant to United Nations Environment Assembly resolution 5/14, entitled “End plastic pollution: towards an international legally binding instrument”.

B. Implementation

28. The Governments of China, Japan and the United Kingdom of Great Britain and Northern Ireland confirmed their willingness to continue to take the lead in updating the technical guidelines on the environmentally sound management of plastic wastes.

29. In a letter dated 20 July 2022, the Secretariat transmitted decision BC-15/10 to the Executive Director of the United Nations Environment Programme. Information from the Basel, Rotterdam and Stockholm conventions, as requested by the conferences of the Parties, and other information that could be of relevance to the intergovernmental negotiating committee established pursuant to United Nations Environment Assembly resolution 5/14, entitled “End plastic pollution: towards an international legally binding instrument”, was made available to the committee in document UNEP/PP/INC.1/INF/5. Further information on the participation of the Secretariat in the intergovernmental negotiating committee is set out in document UNEP/CHW.16/22–UNEP/FAO/RC/COP.11/17–UNEP/POPS/COP.11/23, on international cooperation and coordination with other organizations.

30. The list of members of the small intersessional working group is available on the website of the Convention.[13]

31. The Secretariat has posted comments received pursuant to paragraph 5 of decision BC-15/10 on the website of the Convention.[14]

[12] UNEP/CHW.15/6/Add.7/Rev.1.

[13] http://www.basel.int/Implementation/Plasticwaste/Technicalguidelines/Smallintersessionalworkinggroup/tabid/8160/Default.aspx.

[14] http://www.basel.int/Implementation/Plasticwaste/Technicalguidelines/CommentsofSept2022/tabid/9293/Default.aspx.

32. As at 19 December 2022, the small intersessional working group had held an online consultation, on 5 October 2022, and a face-to-face meeting in Geneva, from 8 to 10 December 2022.[15]

33. The draft updated technical guidelines on the environmentally sound management of plastic wastes, prepared in consultation with the small intersessional working group for consideration by the Conference of the Parties at its sixteenth meeting, are set out in document UNEP/CHW.16/6/Add.3.

34. At its thirteenth meeting, the Open-ended Working Group is expected to consider the above-mentioned draft updated technical guidelines on the environmentally sound management of plastic wastes. The outcomes of the thirteenth meeting of the Open-ended Working Group, including recommendations for consideration by the Conference of the Parties, are set out in document UNEP/CHW.16/20/Add.1. A revised version of the draft updated technical guidelines reflecting the outcome of the thirteenth meeting is expected to be made available in document UNEP/CHW.16/INF/11.

C. Proposed action

35. The Conference of the Parties may wish to adopt a decision along the following lines:

The Conference of the Parties

1. *Welcomes with appreciation* the contributions made by the Governments of China, Japan and the United Kingdom of Great Britain and Northern Ireland, as co-lead countries, and the small intersessional working group established pursuant to paragraph 20 of decision BC-14/13 to the tasks pertaining to the technical guidelines on the environmentally sound management of plastic wastes;

2. *Adopts* the technical guidelines on the environmentally sound management of plastic wastes;[16]

3. *Notes* that the small intersessional working group established pursuant to paragraph 20 of decision BC-14/13 has successfully completed its work, and decides to disband it;

4. *Requests* the Secretariat:

(a) To disseminate the technical guidelines referred to in paragraph 2 of the present decision to Parties and others in the six official languages of the United Nations;

(b) To undertake, subject to the availability of resources, technical assistance activities to support developing-country Parties and other Parties needing assistance in using the adopted technical guidelines, organizing such activities in cooperation with the Basel Convention regional and coordinating centres or by other appropriate means.

IV. Technical guidelines on the environmentally sound management of waste lead-acid batteries and on other waste batteries

A. Introduction

36. In paragraphs 2 and 3 of decision BC-15/11, the Conference of the Parties decided to update the technical guidelines on the environmentally sound management of waste lead-acid batteries, welcomed the offer of Uruguay to act as a lead country in the updating of the technical guidelines and invited other Parties to consider serving as a co-lead country and to inform the Secretariat by 31 July 2022 of their willingness to do so.

37. In paragraphs 4 and 5 of the decision, the Conference of the Parties decided that technical guidelines on the environmentally sound management of waste batteries other than waste lead-acid batteries should be developed and invited Parties to consider serving as a lead country in the development of the technical guidelines and to inform the Secretariat by 31 July 2022 of their willingness to do so.

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[15] http://www.basel.int/Implementation/Plasticwaste/Technicalguidelines/Meetings/tabid/8161/Default.aspx.

[16] UNEP/CHW.16/6/Add.3/Rev.1.

38. In paragraph 6 of the decision, the Conference of the Parties decided to establish a small intersessional working group, to undertake, as a priority and a matter of urgency, the updating of the technical guidelines on the environmentally sound management of waste lead-acid batteries, as well as to develop technical guidelines on the environmentally sound management of waste batteries other than waste lead-acid batteries.

39. In paragraph 9 of the decision, the Conference of the Parties requested the lead country or countries, with the assistance of the Secretariat, subject to the availability of resources, in consultation with the small intersessional working group, to prepare the updated technical guidelines on the environmentally sound management of waste lead-acid batteries for consideration by the Open-ended Working Group at its thirteenth meeting.

40. In paragraph 10 of the decision, the Conference of the Parties requested the lead country or countries or, if there was no lead country or countries, the Secretariat, subject to the availability of resources, in consultation with the small intersessional working group, to prepare a draft of the technical guidelines on the environmentally sound management of waste batteries other than waste lead-acid batteries for consideration by the Conference of the Parties at its sixteenth meeting.

B. Implementation

41. China and the European Union and its Member States offered to serve as co-leads, together with Uruguay, on the updating of the technical guidelines on the environmentally sound management of waste lead-acid batteries and the development of the technical guidelines on other types of batteries.

42. The list of members of the small intersessional working group is available on the website of the Convention.[17]

43. As at 19 December 2022, the small intersessional working group had held two online consultations, on 14 September 2022 and 21 November 2022. Further information is available on the website of the Convention.[18]

44. The following draft technical guidelines have been prepared for consideration by the Conference of the Parties at its sixteenth meeting:

(a) Draft updated technical guidelines on the environmentally sound management of waste lead-acid batteries are set out in document UNEP/CHW.16/INF/12;

(b) Draft technical guidelines on the environmentally sound management of other waste batteries are set out in document UNEP/CHW.16/INF/13.

45. At its thirteenth meeting, the Open-ended Working Group is expected to consider the draft updated technical guidelines on the environmentally sound management of waste lead-acid batteries. The outcomes of the thirteenth meeting of the Open-ended Working Group, including recommendations for consideration by the Conference of the Parties, are set out in document UNEP/CHW.16/20/Add.1. The draft updated technical guidelines reflecting the outcome of the thirteenth meeting are expected to be made available in document UNEP/CHW.16/INF/12.

C. Proposed action

46. The Conference of the Parties may wish to adopt a decision along the following lines:

The Conference of the Parties

1. *Welcomes with appreciation* the contributions made by the Governments of China and Uruguay and by the European Union and its Member States, as co-leads, and the small intersessional working group established pursuant to paragraph 6 of decision BC-15/11 to the tasks pertaining to the technical guidelines on the environmentally sound management of waste lead-acid batteries and other waste batteries;

2. *Takes note* of the draft updated technical guidelines on the environmentally sound management of waste lead-acid batteries and of the draft technical guidelines on the environmentally sound management of other waste batteries;[19]

3. *Decides* to extend the mandate of the small intersessional working group;

[17] http://www.basel.int/Implementation/Wastebatteries/Smallintersessionalworkinggroup/tabid/9417/Default.aspx.

[18] http://www.basel.int/Implementation/Wastebatteries/Technicalguidelines/tabid/9418/Default.aspx.

[19] UNEP/CHW.16/INF/12/Rev.1 and UNEP/CHW.16/INF/13/Rev.1.

4. *Invites* Parties and others to nominate additional experts to participate in the small intersessional working group and to inform the Secretariat of their nominations by 31 August 2023;

5. *Also invites* Parties and others to submit to the Secretariat by 31 August 2023 comments on the draft updated technical guidelines on the environmentally sound management of waste lead-acid batteries and of the draft technical guidelines on the environmentally sound management of other waste batteries referred to in paragraph 2 of the present decision, and requests the Secretariat to make the comments available on the Convention website;

6. *Invites* the co-leads, in consultation with the small intersessional working group, to prepare draft updated technical guidelines on the environmentally sound management of waste lead-acid batteries and draft updated technical guidelines on the environmentally sound management of other waste batteries, taking into account the discussion during the sixteenth meeting of the Conference of the Parties and the comments received pursuant to paragraph 5 of the present decision, for consideration by the Open-ended Working Group at its fourteenth meeting;

7. *Requests* the Secretariat to report on the implementation of the present decision to the Open-ended Working Group at its fourteenth meeting and to the Conference of the Parties at its seventeenth meeting.

V. Technical guidelines on the environmentally sound management of used and waste pneumatic tyres

A. Introduction

47. In paragraphs 3 to 6 of decision BC-15/15, the Conference of the Parties decided to update the technical guidelines on the environmentally sound management of used and waste pneumatic tyres, invited Parties to consider serving as lead countries for the updating of the guidelines, established a small intersessional working group to undertake the updating of the guidelines, and invited Parties and others to nominate experts to the working group by 31 July 2022.

48. In paragraph 7 of the decision, the Conference of the Parties requested the lead country, or, in the absence of a lead country, the Secretariat, subject to the availability of resources, to prepare the draft updated technical guidelines, in consultation with the small intersessional working group, for consideration by the Open-ended Working Group at its thirteenth meeting.

B. Implementation

49. No Party indicated its willingness to take the lead on the updating of the guidelines. The Secretariat therefore facilitated the work of the small intersessional working group.

50. The list of members of the small intersessional working group is available on the website of the Convention.[20]

51. The small intersessional working group held an online consultation on 27 September 2022. The working group agreed to initiate its work by defining the scope of work for updating the guidelines and to gather comments from working group members in that regard. The comments received were made available on the website of the Convention[21] and a synthesis of those comments is set out in document UNEP/CHW.16/INF/14.

52. At its thirteenth meeting, the Open-ended Working Group is expected to consider document UNEP/CHW/OEWG.13/INF/9 setting out the comments received on the scope of work for updating the technical guidelines on the environmentally sound management of used and waste pneumatic tyres. The outcomes of the thirteenth meeting of the Open-ended Working Group, including recommendations for consideration by the Conference of the Parties, are set out in document UNEP/CHW.16/20/Add.1.

[20] http://www.basel.int/Implementation/Wastetyres/Smallintersessionalworkinggroup/tabid/9422/Default.aspx.

[21] http://www.basel.int/Implementation/Wastetyres/Technicalguidelines/CommentsBC1515wastetyres/tabid/9457/Default.aspx.

C. Proposed action

53. The Conference of the Parties may wish to adopt a decision along the following lines:

The Conference of the Parties

1. *Welcomes with appreciation* the contributions made by the small intersessional working group established pursuant to paragraph 5 of decision BC-15/15 to the tasks pertaining to the technical guidelines on the environmentally sound management of used and waste pneumatic tyres;

2. *Takes note* of the comments received on the technical guidelines on the environmentally sound management of used and waste pneumatic tyres;[22]

3. *Decides* to extend the mandate of the small intersessional working group established pursuant to paragraph 5 of decision BC-15/15;

4. *Invites* Parties and others to nominate additional experts to participate in the small intersessional working group and to inform the Secretariat of their nominations by 31 August 2023;

5. *Invites* the small intersessional working group to prepare draft updated technical guidelines on the environmentally sound management of used and waste pneumatic tyres, taking into account the discussion during the sixteenth meeting of the Conference of the Parties, for consideration by the Open-ended Working Group at its fourteenth meeting;

6. *Requests* the Secretariat to report on the implementation of the present decision to the Open-ended Working Group at its fourteenth meeting and to the Conference of the Parties at its seventeenth meeting.

VI. Technical guidelines on the environmentally sound management of rubber wastes

A. Introduction

54. In paragraph 8 of decision BC-15/15, the Conference of the Parties invited Parties and others to provide comments to the Secretariat, by 31 October 2022, on whether technical guidelines on the environmentally sound management of rubber wastes (entry B3040) and waste parings and scrap of rubber (entry B3080) should be developed. The comments received were made available on the website of the Convention.[23]

55. In paragraph 9 of decision BC-15/15, the Conference of the Parties requested the Secretariat to prepare a compilation of the comments received for consideration by the Open-ended Working Group at its thirteenth meeting.

56. The outcomes of the thirteenth meeting of the Open-ended Working Group, including recommendations for consideration by the Conference of the Parties, are set out in document UNEP/CHW.16/20/Add.1.

B. Proposed action

57. The Conference of the Parties may wish to adopt a decision along the following lines:

The Conference of the Parties

1. *Takes note* of the comments received on whether technical guidelines on the environmentally sound management of rubber wastes (entry B3040) and waste parings and scrap of rubber (entry B3080) should be developed;[24]

[22] http://www.basel.int/Implementation/Wastetyres/Technicalguidelines/CommentsBC1515wastetyres/tabid/9457/Default.aspx.

[23] http://www.basel.int/Implementation/Wastetyres/Technicalguidelines/CommentsBC1515rubberwastes/tabid/9458/Default.aspx.

[24] http://www.basel.int/Implementation/TechnicalMatters/DevelopmentofTechnicalGuidelines/Overview/tabid/2374/Default.aspx.

2. *Decides* to develop technical guidelines on the environmentally sound management of rubber wastes (entry B3040) and waste parings and scrap of rubber (entry B3080);

3. *Invites* Parties to consider serving as lead countries for the development of the guidelines referred to in paragraph 2 of the present decision, and to inform the Secretariat by 31 July 2023 of their willingness to do so;

4. *Decides* to establish a small intersessional working group, operating by electronic means and, subject to the availability of resources, through face-to-face meetings, to undertake the development of the guidelines;

5. *Invites* Parties and others to nominate experts to participate in the small intersessional working group and to inform the Secretariat of their nominations by 31 July 2023;

6. *Requests* the lead country, or, in the absence of a lead country, the Secretariat, subject to the availability of resources and in consultation with the small intersessional working group, to prepare the draft technical guidelines on the environmentally sound management of rubber wastes (entry B3040) and waste parings and scrap of rubber (entry B3080) for consideration by the Open-ended Working Group at its fourteenth meeting;

7. *Requests* the Secretariat to report on the implementation of the present decision to the Open-ended Working Group at its fourteenth meeting and to the Conference of the Parties at its seventeenth meeting.

VII. Technical guidelines on hazardous waste physico-chemical treatment (D9) and biological treatment (D8)

A. Introduction

58. At its fifteenth meeting, the Conference of the Parties agreed not to include consideration of whether to update the technical guidelines on physico-chemical treatment (D9) and biological treatment (D8) adopted in decision BC-V/26 in the work programme of the Open-ended Working Group for the biennium 2022–2023, but to reconsider the issue at the sixteenth meeting of the Conference of the Parties.

B. Proposed action

59. The Conference of the Parties is invited to consider whether to update the technical guidelines on physico-chemical treatment (D9) and biological treatment (D8).

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BASEL CONVENTION

Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
Sixteenth meeting
Geneva, 1–12 May 2023
Item 4 (b) (i) of the provisional agenda**

Matters related to the implementation of the Convention: scientific and technical matters: technical guidelines

Technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention

Note by the Secretariat

1. As is mentioned in the note by the Secretariat on technical guidelines (UNEP/CHW.16/6), the annex to the present note sets out the revised version of the updated technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention, adopted, on an interim basis, by decision BC-14/5, reflecting the outcomes of the intersessional work carried out by the expert working group, established by paragraph 4 of decision BC-13/5, and pursuant to decision BC-15/7. The updates are aimed at reflecting the amendments to Annexes II, VIII and IX to the Basel Convention on e-waste adopted by decision BC-15/18. The changes made to the technical guidelines adopted on an interim basis by the Conference of the Parties at its fourteenth meeting have been tracked so that the revisions can be easily identified. The Secretariat made some non-substantive editorial changes to correct the formatting where needed.

2. The present note, including its annex, has not been formally edited.

* Reissued for technical reasons on 3 April 2023.

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Annex

Technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention

(Version of 9 March 2023)

Contents

Abbreviations and acronyms

BFR	brominated flame retardant
CFCs	chlorofluorocarbons
CMR	Convention Relative au Contrat de Transport International de Marchandises par Route (Convention on the Contract for the International Carriage of Goods by Road)
COP	Conference of the Parties
CRT	cathode ray tubes
EC	European Community
ESM	environmentally sound management
EU	European Union
HS	Harmonized Commodity Description and Coding System (“Harmonized System” for short) (developed by WCO)
ILO	International Labour Organization
kg	kilogram
LCD	liquid crystal display
mg	milligram
MPPI	Mobile Phone Partnership Initiative
OECD	Organisation for Economic Co-operation and Development
OHS	occupational health and safety
OHSAS	occupational health and safety assessment series
PACE	Partnership for Action on Computing Equipment
PBBs	polybrominated biphenyls
PC	personal computer
PCBs	polychlorinated biphenyls
PCNs	polychlorinated naphthalenes
PCTs	polychlorinated terphenyls
POPs	persistent organic pollutants
PVC	polyvinyl chloride
RoHS	Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive)
StEP	Solving the e-waste problem (international initiative)
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNU	United Nations University
TBM	transboundary movement
WCO	World Customs Organization
WEEE	waste electrical and electronic equipment

I. Introduction

A. Scope

1. The present technical guidelines provide guidance on transboundary movements of ~~waste~~ electrical and electronic ~~equipment~~waste ~~(hereinafter referred to as “e-waste”)~~ and used electrical and electronic equipment (used equipment) that may or may not be ~~e-~~waste, in particular on the distinction between waste and non-waste, pursuant to decisions IX/6, BC-10/5, BC-11/4, BC-12/5, BC-13/5, ~~and~~, BC-14/5, ~~of~~ ~~of~~~~and~~ BC-15/7, BC-15/18 and BC-16/[ ][1] of the Conference of the Parties to the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal (hereinafter referred to as “the Convention”).

2. The present guidelines focus on clarifying aspects related to transboundary movements of electrical and electronic ~~-~~waste and used equipment that may or may not be waste. Countries define and evaluate the distinction between waste and non-waste in different manners when considering used equipment destined, e.g., for direct reuse or extended use by the original owner for the purpose for which it was conceived, or for failure analysis, repair and refurbishment. Certain parties may consider used equipment destined for failure analysis, repair or refurbishment to be waste, while others may not. Further, the present guidelines consider which electrical and electronic ~~e-~~waste is hazardous waste or ~~“~~other waste~~”~~ and therefore would fall under the provisions of the Convention. Such distinctions will be helpful for enforcement agencies to assess if the provisions of the Basel Convention on transboundary movements apply, as the Convention only applies to hazardous wastes and other wastes.

3. Only the transboundary transport of whole used equipment and components that can be removed from equipment, be tested for functionality and subsequently be directly reused, sent for failure analysis or reused after repair or refurbishment is considered in the present guidelines. For the purpose of these guidelines, the term “equipment” also covers such components.[2] Transboundary movements of materials that have been removed or that derive from the dismantling or recycling of waste electrical and electronic equipment or waste components of electrical and electronic equipment ~~e-waste~~ and are waste, such as metals, plastics, PVC-coated cables or activated glass, are not addressed in the present guidelines, ~~regardless of~~ although they may be in the scope of the entries Y49 and A1181 ~~whether or not they fall under the provisions of the Convention.~~

4. The present guidelines provide:

(a) Information on the relevant provisions of the Convention applicable to transboundary movements of electrical and electronic ~~e-~~waste (section II);

(b) Guidance on the distinction between waste and non-waste when used equipment is moved across borders (section III);

(c) Guidance on the distinction between hazardous waste and non-hazardous waste when used equipment is moved across borders (section IV.B); ~~and~~

(d) General guidance on transboundary movements of ~~hazardous e-~~ electrical and electronic waste and used equipment and enforcement of the control provisions of the Convention (section IV.A and section V);~~.~~ ~~and~~

~~(d)~~(e) Guidance related to facilities for conducting failure analysis, repair or refurbishment (section VI).

5. The present guidelines are intended for government agencies, including enforcement agencies, that wish to implement, control and enforce legislation and provide training regarding transboundary movements. They are also intended to inform all actors involved in the management of ~~e~~electrical and electronic ~~-~~waste and used equipment so they can be aware of the application of the Basel Convention and other considerations when preparing or arranging for transboundary movements of such items.

6. Their application should help reduce transboundary movements of ~~e~~electrical and electronic waste in the scope of the Convention to the minimum consistent with the environmentally sound and efficient management of such waste and reduce the environmental burden of electrical and electronic ~~e-~~waste that currently may be exported to countries and facilities that cannot handle it in an environmentally sound manner.

[1] Pursuant to decision BC-15/18, entry A1180 is effective until 31 December 2024, and the entries Y49 and A1181 will become effective on 1 January 2025.

[2] For definitions and explanations of the terms used in the present guidelines, see appendix I (glossary of terms).

7. The present guidelines do not address other aspects of environmentally sound management (ESM) of ~~e-~~ electrical and electronic wastes, such as collection, treatment, disposal or extended producer responsibility (EPR). These aspects are covered in other guidance documents developed under the Basel Convention. There are documents covering ESM generally, including the ESM toolkit,[3] for example a practical manual on EPR. There is also a series of guidelines developed in the context of the following two public-private partnership initiatives under the Basel Convention (See decisions BC-10/20, BC-10/21, BC-11/15 and BC-13/12 by the Conference of the Parties regarding these initiatives):

(a) Mobile Phone Partnership Initiative (MPPI):

(i) Revised guidance document on the environmentally sound management of used and end-of-life mobile phones (UNEP/CHW.10/INF/27/Rev.1);

(ii) Guideline on awareness raising-design considerations (MPPI, 2009a);

(iii) Guideline on the collection of used mobile phones (MPPI, 2009b);

(iv) Guideline for the transboundary movement of collected mobile phones (MPPI, 2009c);

(v) Guideline on the refurbishment of use mobile phones (MPPI, 2009d);

(vi) Guideline on material recovery and recycling of end-of-life phones (MPPI, 2009e);

(b) Partnership for Action on Computing Equipment (PACE):

(i) Guidance document on the environmentally sound management of used and end-of-life computing equipment (UNEP/CHW.13/INF/31/Rev.1, annex I);

(ii) Environmentally sound management criteria recommendations (PACE, 2009);

(iii) Guideline on environmentally sound testing, refurbishment and repair of used computing equipment (PACE, 2013a);

(iv) Guideline on environmentally sound material recovery and recycling of end-of-life computing equipment (PACE, 2013b).

B. About electrical and electronic -waste

8. The volume of electrical and electronic waste~~e-waste~~ being generated is growing rapidly due to the widespread use of electrical and electronic equipment in both developed and developing countries. The total amount of global e-waste[4] generated in 2005 was estimated to be 40 million tonnes (StEP, 2009). The latest estimates indicate that in 2016 44.7 million metric tonnes of e-waste were generated globally (The Global E-waste Monitor 2017). The amount of e-waste generated in the European Union was estimated at between 8.3 million and 9.1 million tonnes in 2005 (United Nations University, 2007). The latest estimation of the total e-waste generation in Europe in 2016 was 12.3 million tonnes (Global E-waste Monitor 2017). Currently electrical and electronic ~~e-~~waste is exported to countries that are not likely to possess the infrastructure and societal safety nets to prevent harm to human health and the environment, due to factors such as exports being less expensive than managing the waste domestically, the availability of markets for raw materials or recycling facilities, and the location of manufacturers of electrical and electronic equipment. However, there are also examples of formal recycling facilities in developing countries and economies in transition that are repairing, refurbishing and recycling used equipment and electrical and electronic ~~e-~~waste in an environmentally sound manner. However, in some cases the practices outside such facilities, e.g., downstream waste management, may not constitute environmentally sound management.

9. As a result of the EU Directive on Restrictions of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive)[5] and similar national legislation elsewhere, the

[3] http://basel.int/Implementation/CountryLedInitiative/EnvironmentallySoundManagement/ESMToolkit/Overview/tabid/5839/Default.aspx.

[4] E-waste is an often used but undefined term that refers to waste, which may or may not cover the same scope of the entries Y49 and A1181. These reports preceded the adoption of the amendments to Annexes II, VIII and IX, pursuant to decision BC-15/18, and their scope may be different from the current definition of electrical and electronic waste from the Basel Convention.

[5] Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. OJ L 174, 1.7.2011, pp. 88-110 (see http://ec.europa.eu/environment/waste/rohs_eee/legis_en.htm).

use of hazardous substances in various kinds of electrical and electronic equipment has been greatly reduced or eliminated in recent years. However, certain types of electrical and electronic ~~e-~~waste may still contain hazardous substances such as lead, cadmium, mercury, POPs, asbestos and CFCs that pose risks to human health and the environment when improperly disposed of or recycled and that require specific attention to ensure their environmentally sound waste management. In most developing countries and countries with economies in transition, the capacity to manage hazardous substances in electrical and electronic ~~e-~~waste is lacking. As an example, there is clear evidence that the informal recovery industry in Asia exploited women and child labourers who cooked circuit boards, burned cables and submerged equipment in toxic acids to extract precious metals such as gold (Schmidt, 2006), and subjected them and their communities to damaged health and a degraded environment. Moreover, the techniques used by the informal sector are not only damaging human health and the environment, but often they also perform poorly in recovering valuable resources, thereby squandering precious resources such as critical metals for future use. Even management of non-hazardous wastes can cause significant harm to human health and the environment if not undertaken in an environmentally sound manner. As a further example, there is evidence that there is extensive lead contamination in both ambient air and topsoil at the Agbogbloshie ~~e-waste~~ recycling/disposal site for electrical and electronic waste in Accra, Ghana, and that the potential for human health impact both to workers and local residents is substantial given the urban nature of this site ~~e~~ as well as the large adjacent food distribution market (Caravanos J. et al., 2013). This shows that environmentally sound management of electrical and electronic ~~e-~~waste poses challenges, in particular in developing countries and countries with economies in transition, both for hazardous ~~e-waste~~ and non-hazardous electrical and electronic- waste.

10. Electrical and electronic ~~E-~~waste often contains valuable materials that can be recovered for recycling, including iron, aluminium, copper, gold, silver, platinum, palladium, indium, gallium and rare earth metals, and thereby contribute to sustainable resource management, since the extraction of these metals from the Earth has significant environmental impacts. The recovery and use of such materials as raw materials after they have become waste can increase the efficiency of their use and lead to the conservation of energy and a reduction in greenhouse gas emissions when adequate technologies and methods are applied.

11. Direct reuse of equipment or reuse after repair or refurbishment can contribute even more to sustainable development. By extending the life of equipment, reuse reduces the environmental footprint of the resource-intensive processes involved in producing the equipment. Reuse may also facilitate the availability of equipment to groups in society that otherwise would not have access to it, since the cost of used equipment is lower than that of new equipment. In many instances, there are regional facilities that are specialized and have trained personnel in order to properly repair or refurbish used equipment. Since these facilities are not present in all countries, used equipment destined for repair or refurbishment may need to be moved across borders prior to reuse.

12. Failure to handle equipment properly can have negative impacts and often entails disposal when parts are replaced and discarded. The lack of clarity in defining when used equipment is waste and when it is not has led to a number of situations where such equipment is exported to, in particular, developing countries ostensibly for reuse but where a large percentage of the exported equipment is in fact not suitable for further use or is not marketable and must be disposed of as waste in recipient countries.

II. Relevant provisions of the Basel Convention

A. General provisions of the Basel Convention

13. The Basel Convention aims to protect human health and the environment against the adverse effects resulting from the generation, management, transboundary movements and disposal of hazardous and other wastes.

14. Article 2 ("Definitions"), paragraph 1, of the Convention defines wastes as "substances or objects which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law". Paragraph 4 of that article defines disposal as "any operation specified in Annex IV" to the Convention. Paragraph 8 of the same article defines the environmentally sound management of hazardous wastes or other wastes as "taking all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner which will protect human health and the environment against the adverse effects which may result from such wastes."

15. Article 4 ("General obligations"), paragraph 1, establishes the procedure by which parties exercising their right to prohibit the import of hazardous wastes or other wastes for disposal shall

inform the other parties of their decision. Paragraph 1 (a) states: "Parties exercising their right to prohibit the import of hazardous or other wastes for disposal shall inform the other Parties of their decision pursuant to Article 13." Paragraph 1 (b) states: "Parties shall prohibit or shall not permit the export of hazardous or other wastes to the parties which have prohibited the import of such wastes when notified pursuant to subparagraph (a) above."

16. Article 4, paragraphs 2 (a)-(e) and 2 (g), contains key provisions of the Basel Convention pertaining to environmentally sound management, transboundary movement, waste minimization and waste disposal practices aimed at mitigating adverse effects on human health and the environment:

"Each Party shall take the appropriate measures to:

(a) Ensure that the generation of hazardous wastes and other wastes within it is reduced to a minimum, taking into account social, technological and economic aspects;

(b) Ensure the availability of adequate disposal facilities, for the environmentally sound management of hazardous wastes and other wastes, that shall be located, to the extent possible, within it, whatever the place of their disposal;

(c) Ensure that persons involved in the management of hazardous wastes or other wastes within it take such steps as are necessary to prevent pollution due to hazardous wastes and other wastes arising from such management and, if such pollution occurs, to minimize the consequences thereof for human health and the environment;

(d) Ensure that the transboundary movement of hazardous wastes and other wastes is reduced to the minimum consistent with the environmentally sound and efficient management of such wastes, and is conducted in a manner which will protect human health and the environment against the adverse effects which may result from such movement;

(e) Not allow the export of hazardous wastes or other wastes to a State or group of States belonging to an economic and/or political integration organization that are Parties, particularly developing countries, which have prohibited by their legislation all imports, or if it has reason to believe that the wastes in question will not be managed in an environmentally sound manner, according to criteria to be decided on by the Parties at their first meeting;

(g) Prevent the import of hazardous wastes and other wastes if it has reason to believe that the wastes in question will not be managed in an environmentally sound manner."

17. Hazardous wastes and other wastes should, as far as is compatible with environmentally sound and efficient management, be disposed of in the country where they were generated (preambular paragraph 8). Transboundary movements of such wastes from the country of their generation to any other country should be permitted only when conducted under conditions that do not endanger human health and the environment (preambular paragraph 9). In addition, transboundary movements of hazardous wastes and other wastes are permitted only if:

(a) Such wastes, if exported, are managed in an environmentally sound manner in the country of import or elsewhere (Article 4, paragraph 8); and

(b) One of the following conditions is met (Article 4, paragraph 9):

- (i) The country of export does not have the technical capacity and the necessary facilities, capacity or suitable disposal sites to dispose of the wastes in question in an environmentally sound and efficient manner; or
- (ii) The wastes in question are required as a raw material for recycling or recovery industries in the country of import; or
- (iii) The transboundary movement in question is in accordance with other criteria decided by the parties.

B. Control procedure for transboundary movements of waste

18. The Ban Amendment entered into force on 5 December 2019, and it provides that Parties listed in Annex VII to the Convention (members of the EU, OECD and Liechtenstein) shall prohibit transboundary movements to States not listed in Annex VII of hazardous wastes which are destined for operations according to Annex IV.A and hazardous wastes under Article 1.1(a) which are destined for operations according to Annex IV.B[6] Any transboundary movement of hazardous and other wastes is

[6] For information on the status of individual Parties in relation to the amendment, please see the Status of Ratifications page on the Basel Convention website.

subject to prior written notification from the exporting country and prior written consent from the importing country and, if appropriate, transit countries (Article 6, paragraphs 1-4). Parties shall prohibit the export of hazardous wastes and other wastes if the country of import prohibits the import of such wastes (Article 4, paragraph 1 (b)). ~~Some countries have implemented national prohibitions, *inter alia* following Decision III/1 of the Conference of the Parties, which contains an amendment to the Convention that has not yet entered into force and bans the export of hazardous wastes from the countries listed in Annex VII (OECD and EU countries and Liechtenstein) to non-Annex VII countries.~~ The Basel Convention also requires that information regarding any proposed transboundary movement of hazardous and other wastes be provided to the countries concerned using the accepted notification form (Article 4, paragraph 2 (f)) and that the approved shipment be accompanied by a movement document from the point at which the transboundary movement commences to the point of disposal (Article 4, paragraph 7 (c)).

19. Furthermore, hazardous wastes and other wastes subject to transboundary movements should be packaged, labelled and transported in conformity with international rules and standards (Article 4, paragraph 7 (b)).[7]

20. When transboundary movements of hazardous and other wastes to which consent of the countries concerned has been given cannot be completed, the country of export shall ensure that the wastes in question are taken back into the country of export if alternative arrangements cannot be made for their disposal in an environmentally sound manner (Article 8, first sentence). In the case of illegal traffic (as defined in Article 9, paragraph 1) as a result of conduct on the part of the exporter or generator, the country of export shall ensure that the wastes in question are:

(a) Taken back by the exporter or the generator or, if necessary, by itself into the country of export, or, if impracticable;

(b) Otherwise disposed of in accordance with the provisions of the Convention (Article 9, paragraph 2).

21. No transboundary movements of hazardous wastes and other wastes are permitted between a party and a non-party to the Convention (Article 4, paragraph 5) unless a bilateral, multilateral or regional arrangement exists, as required under Article 11 of the Convention.

C. Definitions of wastes, ~~and~~ hazardous wastes and other wastes

22. The Convention defines wastes as “substances or objects which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law” (Article 2, paragraph 1). It defines disposal in Article 2, paragraph 4, as “any operation specified in Annex IV to this Convention.” It is important to note that national provisions concerning the definition of waste may differ and, therefore, the same material may be regarded as waste in one country but as non-waste in another country.

23. Hazardous wastes are defined in Article 1, paragraphs 1(a) and 1(b), of the Convention as “(a) wastes that belong to any category contained in Annex I, unless they do not possess any of the characteristics contained in Annex III (“List of hazardous characteristics”); and (b) wastes that are not covered under paragraph 1(a) but are defined as, or considered to be, hazardous wastes by the domestic legislation of the Party of export, import or transit.” The definition of hazardous waste therefore incorporates domestic law such that material regarded as a hazardous waste in one country but not another is defined as hazardous waste under the Convention. The Convention also requires that parties inform the other parties, through the Secretariat of the Convention, of their national definitions (Article 3). Providing detailed and specific information on the national definitions of hazardous waste can promote compliance and avoid ambiguity concerning the applicability of national definitions.

~~23.~~ 23-bis Other wastes are defined in Article 1 paragraph 2 of the Convention as wastes that belong to any category contained in Annex II that are subject to transboundary movement. ~~This annex contains categories of waste requiring special consideration. In relation to transboundary movement this implies that they would be subject to the control procedure, regardless if they are hazardous according to Article 1 paragraph 1 of the Convention or not.~~

24. To help parties to distinguish hazardous wastes from non-hazardous wastes for the purpose of Article 1, paragraph 1 (a), two annexes have been added to the Convention. Annex VIII lists wastes

[7] In this connection, the United Nations Recommendations on the Transport of Dangerous Goods Model Regulations (UNECE, 2015 – see appendix V, references) of 2015, or later versions, should be used.

considered to be hazardous according to Article 1, paragraph 1 (a), of the Convention unless they do not possess any of the characteristics of Annex III ("List of hazardous characteristics"). Annex II contains categories of waste requiring special consideration, in relation to transboundary movement and this implies that they would be subject to the control procedure, regardless whether they are hazardous according to Article 1 paragraph 1 of the Convention or not. ~~Annex IX lists wastes that are not covered by Article 1, paragraph 1 (a), unless they contain Annex I material to an extent that causes them to exhibit an Annex III characteristic~~]~~.~~ The distinction between hazardous waste and non-hazardous waste is essential to determine which treatment technologies are appropriate and therefore is vital when considering intended transboundary movements of electrical and electronic waste. ~~when giving consent to a proposed transboundary movement of waste. Both Annex~~Both Annexes II, and VIII ~~and Annex IX~~ list an entry on electrical and electronic waste namely entry Y49 in Annex II, and entry A1181 in Annex VIII. ~~various types of e-waste. and wastes arising from the processing of e-waste.~~ More information on the distinction between hazardous and non-hazardous electrical and electronic ~~e-~~waste is included in section IV.B of the present guidelines.

III. Guidance on the distinction between waste and non-waste

A. General considerations

25. To determine if used equipment is waste it may be necessary to examine all circumstances, including the history of an item and its proposed fate, on a case-by-case basis. However, there are characteristics of used equipment that are likely to indicate whether or not the equipment is waste.

26. Without prejudice to paragraph 32 below, when the person who arranges the transport of used equipment claims that the transport is or is intended to be a transboundary transport of used equipment for direct reuse, or extended use by the original owner, for the originally intended purpose of the equipment (see paragraph 32 (a) below), or for failure analysis, repair or refurbishment (see paragraph 32 (b) below), and is not a transport of electrical and electronic ~~e-~~waste, the evidence required in paragraph 32 should be provided or be in place to support this claim upon the request of the authorities (both prior to and during transport).

27. A party wishing not to allow the import or export of used electrical and electronic equipment destined for failure analysis, repair or refurbishment is fully entitled to do so provided that it complies with applicable international, regional and national legal instruments, and it must notify the Secretariat of the Basel Convention in accordance with Article 3 ("National definitions of hazardous wastes") and Article 13 ("Transmission of information"), paragraph 2, of the Convention, as appropriate.

28. Used equipment is waste in a country if it is defined as or considered to be waste under the provisions of that country's national legislation. Furthermore, any party wishing to apply criteria in addition to those mentioned in paragraphs 31 and 32, for example in relation to the age or residual lifetime of equipment, obsolete technologies, equipment containing cathode ray tubes or the management of residual waste generated during failure analysis, repair or refurbishment, is fully entitled to do so provided that it complies with applicable international, regional and national legal instruments.

29. When a party considers used electrical and electronic equipment~~, its components or materials arising from the processing of equipment~~ to be ~~hazardous~~ electrical and electronic waste, both the exporting and importing parties should comply with the Basel Convention provisions, including those pertaining to the prior informed consent (PIC) procedure.

30. Without prejudice to paragraph 32 below, a party wishing to import used electrical and electronic equipment destined for failure analysis, repair or refurbishment should notify the Secretariat of the Basel Convention, as appropriate, that it does not consider such used equipment to be waste when destined for:

(a) Facilities that perform such operations in its country; or

(b) Facilities they have specifically identified, but not to any other facilities.

B. Situations where used equipment should normally be considered waste, or not be considered waste

31. Without prejudice to paragraph 32, used equipment should normally be considered waste if:

(a) The equipment is destined for disposal or recycling, instead of failure analysis or reuse, or its fate is uncertain;

(b) The equipment is not complete - essential parts are missing and the equipment cannot perform its key functions;

(c) The equipment shows a defect that materially affects its functionality and fails relevant functionality tests;

(d) The equipment shows physical damage that impairs its functionality or safety, as defined in relevant standards, and cannot be repaired at a reasonable cost;

(e) The protection against damage during transport, loading and unloading operations is inappropriate, e.g., the packaging or stacking of the load is insufficient;

(f) The equipment is particularly worn or damaged in appearance and its appearance reduces its marketability;

(g) The equipment:

- has among its constituent part(s) a hazardous component that, or
- contains hazardous substances to an extent that the equipment

is required to be disposed of, is prohibited to be exported or is prohibited for use in such equipment under national legislation, specific multilateral environmental agreements and relevant international standards and guidelines;[8]

(h) There is no regular market for the equipment to be reused, including where the equipment contains a cathode ray tube, except when there is a regular market for equipment for professional use containing a cathode ray tube;

(i) The equipment is destined for disassembly and cannibalization (to gain spare parts); or

(j) The price paid for the equipment is significantly lower than would be expected for fully functional equipment intended for reuse.

32. Used equipment should normally not be considered waste:

(a) When it is not destined for any of the operations listed in Annex IV of the Convention (recovery or disposal operations) and it is destined for **direct reuse, or extended use by the original owner** for the purpose for which it was originally intended and the following is provided or is in place both prior to and during transport:

(i) A copy of the invoice and contract relating to the sale and/or transfer of ownership of the used equipment, and documentation accompanying the equipment in accordance with paragraphs 33, 42 and appendix II below;

(ii) Evidence of evaluation or testing[9] in the form of a copy of records (certificate of testing – proof of functionality) on every item within the shipment and a protocol containing all recorded information (see section III.C below);

(iii) A declaration made by the person who arranges the transport of the equipment that none of the equipment within the shipment is defined as or is considered to be waste in any of the countries involved in the transport (countries of export and import and, if applicable, countries of transit);

(iv) Each piece of equipment is individually protected against damage and to prevent hazards during transportation, loading and unloading, in particular through sufficient packaging and stacking of the load.

(b) When the person who arranges the transport of the used equipment claims that the equipment is destined for **failure analysis, or for repair or refurbishment** with the intention of reuse, or extended use by the original owner, for its originally intended purpose, provided that the criteria set out in sub-paragraphs (a) (iii) and (a) (iv) of paragraph 32 above and all of the following conditions are met:

(i) The documentation described in paragraph 33 and appendix III below accompanies the equipment;

[8] For instance, asbestos, POPs, mercury and ozone depleting substances.

[9] Testing of used equipment should be performed before shipment in the country of export.

(ii) A valid contract[10] exists between the person who arranges the transport and the legal representative of the facility where the equipment is to be repaired or refurbished or undergo failure analysis. The contract should contain a minimum set of provisions, including the following:

a. The intention of the transboundary transport (failure analysis, repair or refurbishment);

b. Provisions to ensure that any residual hazardous waste and other wastes generated through the failure analysis, repair or refurbishment activities ~~is~~are managed in an environmentally sound manner, either in the country where the facility is located or in another country (see first sentence of Article 4(8)[11]) and a provision to allocate responsibility for such environmentally sound waste management;

c. A provision stating the responsibility of the person who arranges the transport to comply with applicable national legislation and international rules, standards and Basel Convention guidelines. To ensure such ~~c~~compliance, the following provisions should be included:

i. A provision allocating responsibility to specific persons throughout the whole process, from export until the equipment is either analysed or repaired or refurbished to be fully functional, including cases where the equipment is not accepted by a facility and has to be taken back;

~~i.~~ii. A provision requiring the facility to provide the person who arranged the transport with a feedback report on the failure analysis, repair or refurbishment activities that were performed on the equipment and on the management of any residual hazardous waste and other wastes that may have been generated from such activities. If appropriate, the contract may include the possibility of a review of the feedback report by the person who arranged the transport, or by a third party.

33. The documentation accompanying a shipment of used equipment falling under paragraph 32 should contain the following information:

(a) For both sub-paragraphs 32(a) and (b):

(i) Name (including contact details) of the person who arranges the transport;

(ii) Description of the equipment (e.g., name);

(iii) Name of the producer, if available;

(iv) Identification number, if applicable and/or if available;

(v) Year of production, if available;

(vi) Year of earlier repair or refurbishment and kind of repair or refurbishment (optional);

(vii) Under warranty (yes/no) and if yes, remaining duration of warranty;

(viii) Quantity of equipment;

(ix) Starting date of the transport;

(x) Countries concerned;

(xi) Signed declaration made in accordance with paragraph 32 (a) (iii) above and that he/she will provide additional information to authorities upon request.

(b) For paragraph 32(a) the information referred to in paragraph 42 and, in addition to subparagraph (a) above, the following:

[10] Or equivalent document, in cases where there is no change of ownership of the equipment.

[11] "Each Party shall require that hazardous wastes or other wastes, to be exported, are managed in an environmentally sound manner in the State of import or elsewhere."

(i) Name (including contact details) of the company responsible for evidence of functionality (if different than person who arranges for the transport);

(ii) Name (including contact details) of the user or, where this is not possible, the retailer or distributor

(iii) Date of functionality testing;

(iv) Kind of tests performed and results of test;

(v) Signed declaration that indicates that the equipment has been tested and is destined for direct reuse and fully functional;

(c) For paragraph 32(b), in addition to subparagraph (a) above, the following:

(i) Name (including contact details) of the receiving facility;

(ii) Purpose of the transboundary transport (e.g., failure analysis, repair, refurbishment);

(iii) Signed declaration by the person who has arranged the transport of the equipment affirming the existence of a contract fulfilling the requirements specified in paragraph 32(b) (ii).

34. For the documentation accompanying a shipment of used equipment falling under sub-paragraphs 32 (a) and (b), appendix II and III to the present guidelines, respectively, contain recommended forms.[12]

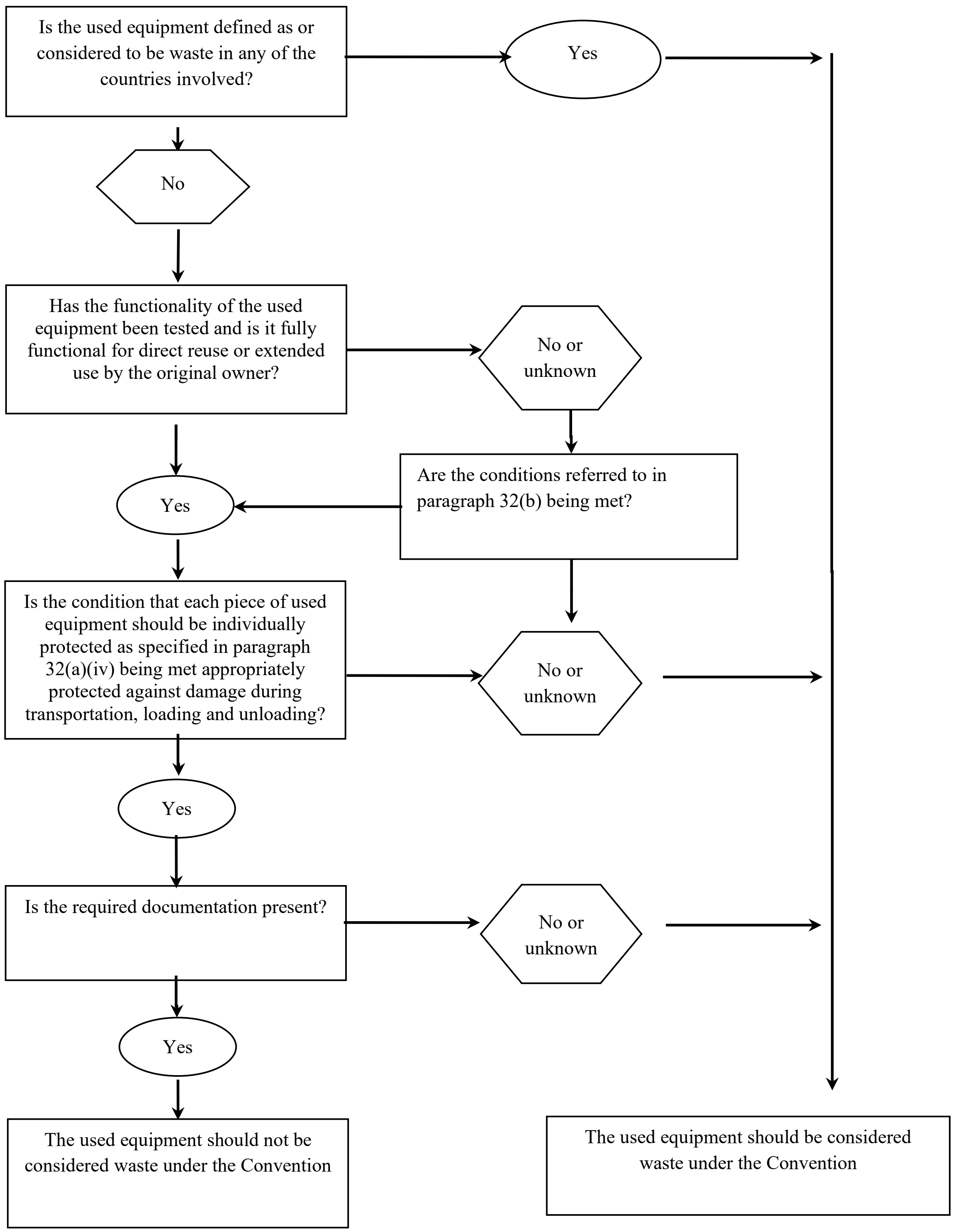
35. Upon receipt of the shipment, the receiving facility should provide a signed declaration of receipt.

36. Persons who arrange the transport should retain the documentation referred to in paragraphs 33-35 for a period of one year following the date a transboundary transport commences.

37. Figure 1 summarizes the decision steps described in this section.

[12] Insofar as the information relating to a single shipment is identical for all equipment in that shipment, a single form may be used to provide such information.

Figure 1: Decision steps described in sub-paragraphs 32(a) and (b)



C. Evaluation and testing of used equipment destined for direct reuse

38. When preparing the transboundary transport of used equipment destined for direct reuse covered by paragraph 32 (a), rather than of electrical and electronic ~~e-~~waste, the person who arranges for the transport should take the following steps:

Step 1: evaluation and testing

39. The tests to be conducted depend on the kind of equipment in question. Equipment functionality should be tested and the presence of hazardous substances or components in the equipment should be evaluated. The completion of a visual inspection of the equipment without testing its functionality is unlikely to be sufficient. For most of equipment, a functionality test of key functions is sufficient. Section IV.B of the present guidelines provides guidance on evaluation for the presence of hazardous substances and components. A list of examples of functionality tests for certain categories of used equipment is provided in appendix IV to the present document.

40. Testing should be conducted by a qualified, certified or trained technician.

Step 2: recording

41. Results of evaluation and testing should be recorded. The record should contain the following information:

(a) Name of the item;

(b) Name of the producer (if available);

(c) Identification number of the item (type No.), where applicable;

(d) Year of production (if available);

(e) Name and address of the company responsible for evidence of functionality;

(f) Result of tests described in step 1 (e.g., naming of defective parts and defects or indication of full functionality), including date of the functionality test;

(g) Kind of tests performed;

(h) Signed declaration by the company responsible for evidence of functionality.

42. The record should accompany the shipment and be fixed securely but not permanently either on the used equipment itself (if not packaged) or on the packaging so that it can be read without unpacking the equipment. A recommended form for recording the results of evaluation and testing, including the declaration referred to in paragraph 33(b)(v) above, is contained in appendix II to the present guidelines.

IV. Guidance on transboundary movements of electrical and electronic ~~e-~~waste

A. General considerations

43. When electrical and electronic ~~e-~~waste is considered to be hazardous waste according to Article 1, paragraph 1 (a), of the Convention, or to national legislation (Article 1, paragraph 1 (b)), national import or export prohibitions must be respected. When no such national prohibitions exist, the control procedure described in section II. B of the present guidelines applies. ~~For e~~Electrical and electronic ~~-~~waste that is not considered to be hazardous is covered by entry Y49 in Annex II ~~other wastes in Annex II~~ and therefore the control procedure described in section II B also applies to it. However, the Ban A~~a~~mendment as included in Article 4 A of the Convention does not apply to wastes in Annex II.~~,~~ ~~, the Basel Convention does not contain a specific procedure. However, some parties have developed procedures to deal with such cases, such as those applicable to transboundary movements of "green-~~

~~listed" waste under European Union legislation,[13] or the procedure for pre-movement inspection of recycling materials applicable in China.[14]~~

44. ~~In cases where the competent authority of a country involved in a transboundary movement of e-waste considers a specific item to be hazardous waste according to that country's national law, while other authorities would not, the control procedure for hazardous waste described in Article 6, paragraph 5 of the Convention would apply. The same mechanism is suggested inini~~In cases where there are differences of opinion between competent authorities as to whether or not a piece of equipment constitutes waste~~.~~. ~~In those cases,~~ the procedures applicable to transboundary movements of waste would apply. If this approach is taken and the applicable procedures are not followed, the movement would be regarded as illegal.

45. Some parties may consider used equipment destined for failure analysis, repair or refurbishment to be waste, while others may not. In accordance with the principles of the Convention, if one of the countries concerned considers used equipment to be waste the procedures on transboundary movement of electrical and electronic ~~e-~~waste, as indicated in paragraph 44 above, should be followed. Note that in some cases, the decision to classify used equipment destined for failure analysis, repair or refurbishment as ~~hazardous~~ electrical and electronic waste could result in the imposition of a ban on the export or import of such equipment under national legislation or pursuant to the Convention's prohibition on trade with non-parties.

B. Distinction between hazardous waste and non-hazardous waste

46. Electrical and electronic ~~E-~~waste is included in Annex VIII to the Convention under the following entry for hazardous waste:[15]

A1181	**Electrical and electronic waste (note the related entry Y49 in Annex II):** • Waste electrical and electronic equipment – containing or contaminated with cadmium, lead, mercury, organohalogen compounds or other Annex I constituents to an extent that the waste exhibits an Annex III characteristic, or – with a component containing or contaminated with Annex I constituents to an extent that the component exhibits an Annex III characteristic, including but not limited to any of the following components: ▪ glass from cathode-ray tubes included on list A ▪ a battery included on list A ▪ a switch, lamp, fluorescent tube or a display device backlight which contains mercury ▪ a capacitor containing PCBs ▪ a component containing asbestos ▪ certain circuit boards ▪ certain display devices ▪ certain plastic components containing a brominated flame retardant • Waste components of electrical and electronic equipment containing or contaminated with Annex I constituents to an extent that the waste components exhibit an Annex III characteristic, unless covered by another entry on list A • Wastes arising from the processing of waste electrical and electronic equipment or waste components of electrical and electronic equipment, and containing or contaminated with Annex I constituents to an extent that the waste exhibits an Annex III characteristic (e.g., fractions arising from shredding or dismantling), unless covered by another entry on list A

~~[13] Regulation (EC) No. 1013/2006 on shipments of waste and Regulation (EC) No. 1418/2007 concerning the export for recovery of certain waste listed in annex III or IIIA to Regulation (EC) No. 1013/2006 to certain countries to which the OECD decision on the control of transboundary movements of wastes does not apply (see: http://ec.europa.eu/environment/waste/shipments/legis.htm).~~

~~[14] Pre-movement inspections for recycling materials are established by the General Administration of Quality Supervision, Inspection and Quarantine of China (AQSIQ). Information on the procedure can be found on the website of the China Certification & Inspection Group (CCIC), which is authorized to handle this procedure in various countries worldwide, e.g., in Europe, from: http://www.ccic-europe.com.~~

[15] The replacement of entry A1180 by entry A1181 in Annex VIII, the inclusion of ~~e~~Entry Y49 in Annex II and the deletion of entries B1110 and B4030 in Annex IX become effective as of 1 January 2025.~~Entry A1180 is under review in accordance with decision BC-14/16.~~

~~"A1180 Waste electrical and electronic assemblies or scrap[16] containing components such as accumulators and other batteries included on list A, mercury-switches, glass from cathode-ray tubes and other activated glass and PCB-capacitors, or contaminated with Annex I constituents (e.g., cadmium, mercury, lead, polychlorinated biphenyl) to an extent that they possess any of the characteristics contained in Annex III (note the related entry on list B B1110)."[17]~~

47. Non-hazardous ~~E~~ electrical and electronic ~~e-~~waste is ~~also~~ included in Annex ~~IX~~II~~X~~ to the Convention under the following entry for ~~non-hazardous waste~~ other wastes:[18]

Y49	**Electrical and electronic waste:** • Waste electrical and electronic equipment – not containing and not contaminated with Annex I constituents to an extent that the waste exhibits an Annex III characteristic, and – in which none of the components (e.g., certain circuit boards, certain display devices) contain or are contaminated with Annex I constituents to an extent that the component exhibits an Annex III characteristic • Waste components of electrical and electronic equipment (e.g., certain circuit boards, certain display devices) not containing and not contaminated with Annex I constituents to an extent that the waste components exhibit an Annex III characteristic, unless covered by another entry in Annex II or by an entry in Annex IX • Wastes arising from the processing of waste electrical and electronic equipment or waste components of electrical and electronic equipment (e.g.,~~,~~ fractions arising from shredding or dismantling), and not containing and not contaminated with Annex I constituents to an extent that the waste exhibits an Annex III characteristic, unless covered by another entry in Annex II or by an entry in Annex IX

47bis~~8~~ Entry A1181 contains all hazardous electrical and electronic ~~e-~~waste and entry Y49 contains all non-hazardous electrical and electronic ~~e-~~wastes. These two entries ~~work as mirror entries~~ cover~~ing~~ all electrical and electronic ~~e-~~waste and therefore follow ~~have~~ the same structure. They indicate that electrical and electronic ~~e-~~waste covered by the entry consists of three~~3~~ subcategories:

- Waste electrical and electronic equipment, meaning whole equipment;
- Waste components of electrical and electronic equipment: these are parts of the equipment that have been separated or removed from equipment. ~~The component sections of~~ Eentries A1181 and Y49 ~~cover all components that are not specifically listed elsewhere in the annexes II, VIII or IX. However, they~~ do not cover components that are specifically listed in ~~these~~ annexes II, VIII or IX. Examples are~~e.g.~~ hazardous batteries (covered by entry A1170) or non-hazardous batteries (covered by entry B1090);
- Wastes arising from the processing of waste electrical and electronic equipment or waste components of electrical and electronic equipment~~and components~~: this covers ~~materials~~waste that is derived ~~that derive~~ from the processing of electrical and electronic ~~e-~~waste but are neither components nor whole equipment. One example is the outcome of the shredding of equipment or components~~Equipment that is shredded~~ prior to further ~~subsequent~~ treatment ~~would be an example of such wastes~~. Wastes ~~Materials~~ that have been processed to an extent that they are covered ~~they would be covered~~ by specific other ~~material~~ entries in ~~a~~Annexes II, VIII or IX are not considered electrical and electronic waste~~would no longer be e-waste~~. Examples are ~~This would be the case for e.g.~~ metal waste as covered by either entries A1010 or B1010 or plastic wastes as covered by either entries A3020, B3011 or Y48.

47ter To determine if electrical and electronic- waste is hazardous the following general considerations are important:

~~[16] This entry does not include scrap assemblies from electric power generation.~~

~~[17] PCBs are at a concentration level of 50 mg/kg or more.~~

~~[18] Entry B1110 is under review in accordance with decision BC-14/16.~~

(a) If the waste electrical and electronic equipment, waste component of such waste equipment or waste arising from processing contains Annex I constituents to an extent the waste exhibits an Annex III characteristic it is considered to be hazardous;

(b) If the waste electrical and electronic equipment contains at least one component that is hazardous due to presence of Annex I constituents to an extent the component exhibits an Annex III characteristic, the waste electrical and electronic equipment is considered to be hazardous;

(c) Entry A1181 contains a non-exhaustive list of examples of components that could render equipment to be hazardous. Some of these components are always hazardous such as glass from cathode ray tubes and PCB capacitors. Other components may be hazardous in certain cases, but non-hazardous in other cases, depending on the presence of constituents to an extent that they exhibit an Annex III characteristic. Examples of the latter are printed circuit boards, display devices and plastic components containing brominated flame retardants. For these components the exporter may be required to demonstrate that the components are non-hazardous based on specific information about their composition.

~~47.~~ Kept for consistency of paragraphs' numbers.~~"B1110 Electrical and electronic assemblies:~~

48.

- ~~Electronic assemblies consisting only of metals or alloys;~~
- ~~Waste electrical and electronic assemblies or scrap[19] (including printed circuit boards) not containing components such as accumulators and other batteries included on list A, mercury-switches, glass from cathode-ray tubes and other activated glass and PCB-capacitors, or not contaminated with Annex I constituents (e.g., cadmium, mercury, lead, polychlorinated biphenyl) or from which these have been removed, to an extent that they do not possess any of the characteristics contained in Annex III (note the related entry on list A A1180);~~
- ~~Electrical and electronic assemblies (including printed circuit boards, electronic components and wires) destined for direct reuse,[20] and not for recycling or final disposal."[21]~~

~~48. Equipment will often contain hazardous components or substances, examples of which are listed in entry A1180 of Annex VIII. E-waste containing such components or substances may qualify as hazardous waste if the waste exhibits the hazardous characteristics listed in Annex III. However, the presence of such a component or substance in equipment should not necessarily cause the equipment as a whole to be deemed hazardous waste under the Convention.~~

49. E~~E~~lectrical and electronic ~~-~~waste should ~~therefore~~ be presumed to be hazardous waste unless it can be shown either that it does not exhibit hazardous characteristics or that it does not contain hazardous components or substances, in particular:[22]

(a) Lead-containing glass from cathode ray tubes (CRTs) and imaging lenses, which fall under Annex VIII entries A118~~0~~1 and A2010 ("glass from cathode ray tubes and other activated glass") and Annex I category Y31 ("Lead; lead compounds") and are likely to possess Annex III hazardous characteristics H6.1, H11, H12 and H13;

(b) Nickel-cadmium batteries and batteries containing mercury, which fall under Annex VIII entry A1170 ("unsorted waste batteries…") and Annex I categories Y26 ("Cadmium; cadmium compounds") and Y29 ("Mercury, mercury compounds") and are likely to possess Annex III hazardous characteristics H6.1, H11, H12 and H13;

(c) Selenium drums, which fall under Annex VIII entry A1020 ("selenium; selenium compounds") and Annex I category Y25 ("Selenium; selenium compounds") and are likely to possess Annex III hazardous characteristics H6.1, H11, H12 and H13;

(d) Printed circuit boards, which fall under Annex VIII entries A118~~0~~1 ~~("waste electrical and electronic assemblies…")~~) and A1020 ("antimony; antimony compounds" and "beryllium; beryllium compounds") and contain brominated compounds and antimony oxides as flame retardants, lead in solder and beryllium in copper alloy connectors. They also fall under Annex I categories Y31 ("Lead; lead compounds"), Y20 ("Beryllium, beryllium compounds"), Y27 ("Antimony, antimony

~~[19] This entry does not include scrap from electrical power generation.~~

~~[20] Reuse can include repair, refurbishment or upgrading, but not major reassembly.~~

~~[21] In some countries these materials, when destined for direct reuse, are not considered wastes.~~

[22] The hazardous components and constituents listed in this paragraph are provided as examples; the list provided here is therefore not exhaustive.

compounds") and Y45 ("organohalogen compounds other than substances referred to" elsewhere in Annex I) and are likely to possess Annex III hazardous characteristics H6.1, H11, H12 and H13;

(e) Fluorescent tubes and backlight lamps from liquid crystal displays (LCD), which contain mercury and therefore fall under Annex VIII entry A1030 ("Mercury; mercury compounds") and Annex I category Y29 ("Mercury; mercury compounds") and are likely to possess Annex III hazardous characteristics H6.1, H11, H12 and H13;

(f) Plastic components containing brominated flame retardants (BFRs), in particular BFRs that are persistent organic pollutants according to the Stockholm Convention, may in some cases fall under Annex VIII entries A3210 or~~y~~ A3180 ("Wastes, substances and articles containing, consisting of or contaminated with polychlorinated biphenyl (PCB), polychlorinated terphenyl (PCT), polychlorinated naphthalene (PCN) or polybrominated biphenyl (PBB), or any other polybrominated analogues of these compounds, at a concentration of 50 mg/kg or more"). In general, wastes containing BFRs also fall under Annex I category Y45 ("organohalogen compounds other than substances referred to" elsewhere in Annex I) and, if antimony compounds are used as synergists of the BFRs, under category Y27 ("Antimony, antimony compounds"). Depending on the concentration and the chemical properties of the BFRs and their synergists, plastic components containing BFRs may possess Annex III hazardous characteristics H6.1, H11, H12 and H13.

(g) Other components containing or contaminated with mercury, such as mercury switches, contacts and thermometers, which fall under Annex VIII entries A1010, A1030 and A118~~0~~1 and Annex I category Y29 ("Mercury; mercury compounds") and are likely to possess Annex III hazardous characteristics H6.1, H11, H12 and H13;

(h) Oils/liquids, which fall under Annex VIII entry A4060 ("Waste oil/water, hydrocarbons/water mixtures, emulsions") and Annex I categories Y8 ("Waste mineral oils unfit for their originally intended use") and Y9 ("Waste oil/water, hydrocarbons/water mixtures, emulsions") and are likely to possess hazardous characteristics H3, H11, H12and H13; and

(i) Components containing asbestos, such as wires, cooking stoves and heaters, which fall under Annex VIII entry A2050 ("Waste asbestos (dusts and fibres)") and Annex I category Y36 ("Asbestos (dust and fibres)") and are likely to possess Annex III hazardous characteristic H11.

50. Further guidance on and examples of hazardous and non-hazardous equipment and hazardous components that may be found in electrical and electronic equipment are contained in appendix IV to the present document.

V. Guidance on the enforcement of provisions regarding transboundary movements of electrical and electronic ~~e-~~waste and used equipment

51. Inspections should be undertaken by competent bodies of State authorities (e.g., police, customs and environmental inspectors) at facilities and during movements.

52. Persons who arrange the transport of used equipment should ensure that the equipment is accompanied by appropriate documentation in accordance with paragraphs 32, 33, 41, 42 and 53 of the present guidelines and that it is appropriately protected against damage during transportation, loading and unloading, in particular through sufficient packaging or appropriate stacking of the load in order to demonstrate that the items concerned are not electrical and electronic ~~e-~~waste. Sample photographs of illegal shipments[23] and examples of documentation could be used and/or developed to help educate officers at borders, ports and other inspection points on how to identify illegal shipments.

53. For practical reasons of control, every load of used equipment should also be accompanied by a declaration of the liable person affirming his/her responsibility and by the relevant transport document,

[23] Examples of sample photographs include manuals developed in Austria that are available at: ~~https://www.wko.at/branchen/information-consulting/entsorgungs-ressourcenmanagement/Handbuch_Leitfaden_Abfall_versus_Gebrauchtware_-_de-eng_e_2.pdf~~https://www.wko.at/branchen/information-consulting/entsorgungs-ressourcenmanagement/Handbuch_Leitfaden_Abfall_versus_Gebrauchtware_-_de-eng_e_2.pdf (in English and German) and ~~https://www.bmnt.gv.at/dam/jcr:93f32c3f-a978-44fe-8f47-c8a71848b56b/Manual%20Abfallverbringung%202012%20neu%20-%20Web.pdf~~https://www.bmnt.gv.at/dam/jcr:93f32c3f-a978-44fe-8f47-c8a71848b56b/Manual%20Abfallverbringung%202012%20neu%20-%20Web.pdf (only in German).

e.g., a waybill or a CMR document,[24] where applicable. The transport document should contain a description of the goods transported using the Harmonized Commodity Description and Coding System (normally referred to as the "Harmonized System") developed by the World Customs Organization (WCO).

54. In the absence of proof that an item is used equipment and not ~~e-waste~~ waste electrical and electronic equipment through appropriate documentation issued in accordance with paragraphs 32, 33, 41, 42 and 53 of the present guidelines and appropriate protection against damage during transportation, loading and unloading, in particular through sufficient packaging and appropriate stacking of the load by the person who arranges the transport, the relevant State authorities (e.g., customs, police or environmental inspectors) should consider the item to be ~~potentially hazardous e-waste~~ waste electrical and electronic equipment and, in the absence of consent provided in accordance with the requirements of the Basel Convention, should presume that the export constitutes a case of illegal traffic under Article 9 of the Convention. In such circumstances, the relevant competent authorities must comply with the provisions of Article 9. The parties consider that illegal traffic in hazardous wastes or other wastes is criminal (Article 4, paragraph 3, of the Convention).

55. When electrical and electronic ~~e-~~waste is exported~~ as hazardous waste~~, the documentation required under the control procedure of the Convention should accompany each shipment.

56. The Secretariat of the Basel Convention has cooperated with WCO to create a table providing an overview of which codes of the Harmonized System contain materials found in annexes VIII and IX to the Basel Convention.[25] This table can facilitate a comparison of CMR documents with the documents that should accompany shipments of used equipment or electrical and electronic ~~e-~~waste in accordance with the procedures described in the present guidelines. While the table may be a useful tool, transboundary shipments should be evaluated on a case-by-case basis and hazardous waste determinations should be based on all available information.

57. Health and safety issues and potential risks for enforcement agents (such as customs officers) are important for any inspection of shipments of electrical and electronic ~~e-~~waste or used equipment. Enforcement officers should have specific training before conducting such inspections. Particular care should be applied when opening containers. In particular, if the shipment consists of waste, the items may not have been stacked in a stable way and items may fall out of the container when the container is opened for inspection. The load may also contain hazardous substances that could be released when the load is inspected. Further information regarding health and safety aspects of inspections is contained in appendix IV to the present document.

VI. Guidance related to facilities for conducting failure analysis, repair and refurbishment

58. At facilities receiving used equipment that is not waste and is intended for failure analysis, repair or refurbishment, inspections should be undertaken to verify if the relevant national provisions for environmental protection, including waste-related provisions, and any environmental permits or licenses have been followed. The *Guideline on environmentally sound testing, refurbishment and repair of used computing equipment* developed under PACE (PACE, 2011a) can be used by countries to help ensure that any such operation is environmentally sound. In addition, compliance with the conditions set out in paragraph 32 (b) of the present guidelines should be checked.

59. It is recommended to facilities receiving used equipment that is not waste and is intended for failure analysis, repair or refurbishment to, as appropriate, include provisions in the contract with the person who arranges the transport that:

(a) Used equipment that was destined for failure analysis, repair or refurbishment, but for which no failure analysis, repair or refurbishment has been conducted and that is still non-waste, is returned to the person who arranges the transport or a facility in another country~~,~~; and

[24] Document containing the information required under the Convention on the Contract for the International Carriage of Goods by Road (CMR Convention). Although the use of a particular form to present the information is not mandatory, it is recommended that the parties use standard CMR forms to facilitate communication with inspection authorities in case of a control.

[25] The latest version of the table can be found on the WCO website at: ~~http://www.wcoomd.org/en/topics/nomenclature/instrument-and-tools/interconnection-table.aspx.~~ http://www.wcoomd.org/en/topics/nomenclature/instrument-and-tools/interconnection-table.aspx. The table contains correlations between the WCO Harmonized System codes and the products covered by a number of international conventions, including the Basel Convention.

(b) The waste generated during failure analysis, repair or refurbishment is returned to the person who arranges the transport, or is disposed of in an environmentally sound manner. In case of non-availability of environmentally sound management in the country where the failure analysis, repair or refurbishment was conducted, such waste should be managed in an environmentally sound manner in another country.

60. It is recommended, as appropriate, that facilities receiving used equipment that is not waste and is intended for failure analysis, repair or refurbishment require, as part of the contract with the person who arranges the transport or on the basis of applicable national legislation, the person who arranges the transport to ensure that the equipment is returned to the country of export or a facility in another country at their expense, in the case that used equipment did not undergo failure analysis, repair or refurbishment in the country of import.

61. A party is fully entitled to require a financial guarantee from facilities receiving used equipment that is not waste and is intended for failure analysis, repair or refurbishment located in their country to cover costs related to environmentally sound management of waste, including for cases of bankruptcy and abandonment. In addition, a party is fully entitled to require a financial guarantee from the person who arranges the transport to cover costs to ensure that used equipment that did not undergo failure analysis, repair or refurbishment in the country of import is returned to the country of export or a facility in another country.

62. For example, some developing countries where facilities conduct failure analysis, repair and refurbishment activities have implemented policies that require those facilities to assure that all of the used equipment that they receive will be exported after failure analysis, repair or refurbishment. In addition, in these countries all the waste generated by such activities must be exported[26] to facilities that meet ESM standards. These requirements are part of the environmental operating permits of these facilities and assure that the activities of the facilities will not result in unwanted imports of equipment that would need to be managed as electrical and electronic- waste. They also assure that the waste generated by those activities will not burden the national waste management infrastructure of importing countries and will be managed in accordance with ESM standards.

[26] In accordance with the provisions of the contract for the shipment.

Appendix I

Glossary of terms

Note: Some of the descriptions and definitions of the terms listed below were developed for the purpose of the present guidelines and should not be considered as having been agreed to internationally. Their purpose is to assist readers to better understand the present guidelines. Insofar as appropriate, the use of these terms has been aligned with terms used in other guidelines and guidance documents developed under the Basel Convention.

Terminology	Description/definition
Basel Convention	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, adopted on March 22, 1989 and entered into force in 1992.
Component	Element with electrical or electronic functionality designed to be connected together with other components, including by soldering to a printed circuit board, to create an electric or electronic circuit with a particular function (for example, as an amplifier, radio receiver, monitor, hard-drive, motherboard or battery).
Direct reuse	The using again of fully functional equipment that is not waste, for the same purpose for which it was conceived, without the necessity of repair or refurbishment.
Disposal	Any operation specified in Annex IV to the Basel Convention (Article 2, paragraph 4, of the Convention).
Environmentally sound management	Taking all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner that will protect human health and the environment against the adverse effects that may result from such wastes (Article 2, paragraph 8, of the Convention).
Equipment	Electrical and electronic equipment that is dependent on electric currents or electromagnetic fields in order to work properly, including components that can be removed from equipment and can be tested for functionality and either be subsequently directly reused or reused after repair or refurbishment.
Equipment for professional use	Equipment that is designed to be used solely by professional users. Equipment that can be used either by private household or by professional users is not equipment for professional use.
Key function	The essential function of a unit of equipment that will satisfactorily enable the equipment to be used as originally intended.
Failure analysis	Test performed by the original manufacturer or a party on his/her behalf, collecting and analyzing data to determine the cause of a failure. Root cause analysis (RCA) is a particular kind of failure analysis.
Fully functional	Equipment is fully functional if it has been tested and demonstrated to be capable of performing the key functions that it was designed to perform.
Other wastes	Wastes listed in Annex II to the Convention.
Non-waste	A substance or object that does not meet the definition of "waste".
Person who arranges the transport	The natural or legal person that, if required, submits the customs declaration and is, if required, located in the country of export, and that assumes the responsibility to ensure that the conditions to be met when equipment should normally not be considered waste mentioned in paragraph 32 are met.
Recycling	Relevant operations specified in Annex IVB to the Basel Convention.
Recovery	Commonly used to refer to operations specified in Annex IVB to the Basel Convention.
Refurbishment	Modification of used equipment to increase or restore its performance and/or functionality or to meet applicable technical standards or regulatory requirements, with the result of making it a fully functional product to be used for a purpose that is at least the one for which it was originally intended, including through such activities as cleaning and data sanitization.

Repair	Fixing a specified fault in used equipment that is a waste or a product and/or replacing defective components of equipment in order to make the equipment a fully functional product to be used for its originally intended purpose.
Reuse	The using again of fully functional equipment that is not waste for the same purpose for which it was conceived, possibly after repair or refurbishment.
Wastes	Substances or objects that are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law (Article 2, paragraph 1, of the Basel Convention).
Waste electrical and electronic equipment	Electrical or electronic equipment that is waste, including all components, sub-assemblies and consumables that are part of the equipment at the time the equipment becomes waste.

Appendix II

Information accompanying transboundary transports of used equipment falling under paragraph 32 (a), including on recording the results of evaluation and testing of used equipment

<table>
<tr><td colspan="3">1. Person who arranges the transport (responsible for testing):
Name:
Address:
Contact person:
Tel:
E-mail:</td><td colspan="2">2. Company responsible for evidence of functionality (if different than person who arranges for the transport):
Name:
Address:
Contact person:
Tel:
E-mail:</td><td>3. ☐ User or, where this is not possible, ☐ retailer or ☐ distributor:
Name:
Address:
Contact person:
Tel:
E-mail:</td></tr>
<tr><td colspan="6">4. Countries/States concerned:</td></tr>
<tr><td colspan="3">Export/dispatch</td><td colspan="2">Transit</td><td>Import/destination</td></tr>
<tr><td colspan="6">5. Start date of the transport</td></tr>
<tr><td colspan="6">6. Declaration:
I, the person who conducted the evaluation and testing, declare that the results of evaluation and testing are complete and correct, to the best of my knowledge.

Name: Function: Date: Signature:

I, the person who arranges the transport of the equipment listed below, declare that I am entitled to represent my company and that:

a) Prior to export the used equipment listed below was tested and is fully functional.[1]
b) This equipment is not defined as or considered to be waste in any of the countries involved in the transport and is destined for direct reuse[2] and not for recovery or disposal operations.
c) A contract according to paragraph 32(a) (i) of the Basel Convention Technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention, is in place.</td></tr>
</table>

[1] Equipment is “fully functional” if it has been tested and demonstrated to be capable of performing the key functions that it was designed to perform.

[2] The using again of fully functional equipment that is not waste for the same purpose for which it was conceived without the necessity of repair or refurbishment.

d) Upon request from the relevant authorities, I will make available underlying documentation (e.g., contracts or equivalent documents) that can be used to verify the statements contained in subparagraphs (a), (b) and (c) above.

e) The above information is complete and correct, to the best of my knowledge.

Name: Function: Date: Signature:

7. Description of the equipment (e.g. name)[3]	**8. Name of the producer (if available)**	**9. Identification number (type No.) (if applicable and/or if available)**	**10. Year of production (if available)**	**11. Year of earlier repair or refurbishment and kind of repair or refurbishment (optional)**	**12. Under warranty (yes/no) and if yes, remaining duration of warranty**	**13. Quantity of equipment**	**14. Date of functionality testing**	**15. Kind of tests performed and results of test (e.g. indication of full functionality or indication of defective parts and defect)**[4]

[3] List the equipment for which the information in the boxes 1 to 3 is the same and that is intended to be moved together, and identify the names of the equipment, such as PC, refrigerator, printer, TV, etc.

[4] Attach details if necessary.

Appendix III

Information accompanying transboundary transports of used equipment falling under paragraph 32 (b)

<table>
<tr><td>1. Person who arranges the transport
Name:
Address:
Contact person:
Tel.:
Fax:
E-mail:</td><td colspan="2">2. Receiving facility
Name:
Address:
Contact person:
Tel.:
Fax:
E-mail:</td><td>3. Purpose of the transport:[1]
☐ Failure analysis
☐ Repair
☐ Refurbishment</td></tr>
<tr><td colspan="4">4. Start date of the transport:</td></tr>
<tr><td colspan="4">5. Countries/States concerned:</td></tr>
<tr><td>Export/dispatch</td><td>Transit</td><td colspan="2">Import/destination</td></tr>
<tr><td colspan="4">6. Declaration of the person who arranges the transport of the equipment:
I declare that I am entitled to represent my company and that:

a) The equipment in this transport is equipment that is not defined as or considered to be waste in any of the countries involved in the transport.
b) A contract fulfilling the conditions set out in paragraph 32(b) (ii) of the Basel Convention Technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention, is in place.
c) Upon request from the relevant authorities, I will make available underlying documentation (e.g., contracts or equivalent documents) that can be used to verify the statements contained in subparagraphs (a) and (b) above.
d) The above information is complete and correct, to the best of my knowledge.

Name: Function: Date: Signature:</td></tr>
</table>

[1] If multiple options apply to the equipment, please indicate them all.

7. Description of the equipment (e.g. name)[2]	8. Name of the producer (if available)	9. Identification number (type No.) (if applicable and/ or if available)	10. Year of production (if available)	11. Year of earlier repair or refurbishment and kind of repair or refurbishment (optional)	12. Under warranty (yes/no) and if yes, remaining duration of warranty	13. Quantity of equipment
TO BE COMPLETED BY THE RECEIVING FACILITY						
14. Movement received at the receiving facility: **Quantity/volume received:** Name: Date: Signature:						

[2] List the equipment for which the information in the boxes 1 to 3 is the same and that is intended to be moved together, and identify the names of the equipment, such as PC, refrigerator, printer, TV, etc.

Appendix IV

Reference materials

The present appendix contains references to information on functionality testing for certain categories of used equipment (paragraph 39), hazardous and non-hazardous equipment and hazardous components that can be found in such equipment (paragraph 49), and information regarding health and safety aspects of inspections (paragraph 57).

1. Functionality testing or evaluation

This section contains references to functionality tests of electrical and electronic equipment and related procedures. The examples are not meant to be exhaustive but illustrate procedures as they are applied by some parties or recommended in other guidance documents developed under the Basel Convention. Testing procedures and protocols for other categories of used equipment are not yet available.

References from parties

Australia

Criteria for the export and import of used electronic equipment (DEH, 2005). Available at: http://pandora.nla.gov.au/pan/51666/20050902-0000/www.deh.gov.au/settlements/publications/chemicals/hazardous-waste/electronic-paper.html.

Annex B of the document contains parameters that may be used when testing the functionality of certain types of equipment.

European Union

Correspondents' Guidelines No. 1 on shipments of waste electrical and electronic equipment (WEEE) (2020~~17~~). Available from: https://environment.ec.europa.eu/topics/waste-and-recycling/waste-shipments/waste-shipments-correspondents-guidelines_en~~http://ec.europa.eu/environment/waste/shipments/guidance.htm.~~

Appendix 1 to these guidelines contains parameters that may be used when testing the functionality of certain types of equipment.

Malaysia

Guidelines for the classification of used electrical and electronic equipment in Malaysia. (DOE, 2008). Available at: http://www.doe.gov.my/portal/wp-content/uploads/2010/07/ECTRICAL_AND_ELECTRONIC_EQUIPMENTIN_MALAYSIA.pdf.

Paragraph 7 of these guidelines contains parameters that may be used when testing functionality of certain types of equipment.

Norway

A guide for exporters of used goods, Norwegian Pollution Control Authority (2009). Available at: http://www.miljodirektoratet.no/old/klif/publikasjoner/2516/ta2516.pdf.

Example images of criteria on pages 4-8 can be used when evaluating the functionality of used goods.

References from guidance documents produced under the Basel Convention

MPPI - Mobile phones

The guidance document on the environmentally sound management of used and end-of-life mobile phones adopted by the Conference of the Parties at its tenth session (UNEP/CHW.10/INF/27/Rev.1) contains a number of proposed tests on functionality for mobile phones in section 5.2.1.4.

PACE - Computing equipment

The guidance document on environmentally sound management of used and end-of-life computing equipment adopted at the eleventh session of the Conference of the Parties (UNEP/CHW.13/INF/31/Rev.1, annex I) contains in appendix IV a set of functionality tests for used computing equipment.

PACE - Laptop batteries

The guidance document on environmentally sound management of used and end-of-life computing equipment that was adopted at the eleventh session of the Conference of the Parties (UNEP/CHW.13/INF/31/Rev.1, annex I) contains in appendix V a testing methods for laptop batteries.

Basel Convention Regional Centre for South-East Asia (BCRC-SEA)

The annexes to the Technical Guidelines on the Reduce, Reuse, Recycle (3R) of End-of-Life Electronic Products developed by BCRC-SEA contain a number of functionality tests for different types of equipment The annexes provide for specific tests for refrigeration systems, twin-tub washing machines, automatic washing machines, TVs, audio systems and PCs. The guidelines are available from: http://www.bcrc-sea.org/?content=publication&cat=2.

2. Hazardous and non-hazardous equipment and hazardous components that can be found in such equipment

Section IV.B of the present guidelines contains information about the distinction between hazardous and non-hazardous electrical and electronic- waste. Additional guidance and examples of hazardous and non-hazardous equipment and on hazardous components that can be found in equipment can be found in the following reference materials:

Switzerland

Exporting consumer goods: Second-hand articles or waste?", No UD-1042-E, 2nd updated edition, April 2016 , Federal Office for the Environment (FOEN) Switzerland, www.bafu.admin.ch →→ waste:
~~https://www.bafu.admin.ch/bafu/en/home/topics/waste/publicationsstudies/publications/exporting-consumer-goods.html~~
~~https://www.bafu.admin.ch/bafu/en/home/topics/waste/publicationsstudies/publications/exporting-consumer-goods.html~~

https://www.bafu.admin.ch/bafu/en/home/topics/waste/info-specialists/waste-policy-and-measures/transboundary-movements-of-waste--valid-for-the-principality-of-/information-on-the-export-of-used-goods.html

Sweden

See "Recycling and disposal of electronic waste – health hazards and environmental impacts", report No. 6417, March 2011, Swedish Environmental Protection Agency: http://www.naturvardsverket.se/Documents/publikationer6400/978-91-620-6417-4.pdf.

3. Health and safety aspects of inspections

Section V of the present guidelines provides information for controls of transboundary movements of used equipment and electrical and electronic~~e-~~ waste. One of the issues to be taken into account when carrying out such controls is the health and safety of enforcement agents. Additional information on how to take these issues into account can be found in the following reference materials:

Standardization bodies

OHSAS 18001 Standards for Occupational Health and Safety Management Systems. The standards are available from national standards institutions, such as the British Standards Institution at: www.bsigroup.com.

International Labour Organization (ILO)

The ILO guidelines on occupational safety and health management systems (ILO-OSH 2001) are available at: http://www.ilo.org/safework/info/standards-and-instruments/WCMS_107727/lang--en/index.htm.

ILO has also developed an electronic tool kit on occupational health and safety that includes standards and advice. It is available for a fee of $395 from: http://www.ohsas-18001-occupational-health-and-safety.com/ohsas-18001-kit.htm.

Basel Convention Regional Centre for South-East Asia (BCRC-SEA)

A guidance on occupational safety and health aspects specifically developed as guidance for hazardous materials/waste inspection, titled “Panduan Singkat Pengelolaan Limbah B3 Dalam Rangka Pelaksanaan Konvensi Basel - Segi Keselamatan Dalam Inspeksi Bahan Berbahaya” (“Brief guidance for hazardous waste management under the Basel Convention implementation – safety aspects in hazardous materials inspection”), was written by D. Wardhana Hasanuddin Suraadiningrat, former Senior Technical Advisor to the BCRC-SEA, in 2008. Because the guidance was prepared for the Directorate General of Customs and Excise of Indonesia, it was written in Bahasa Indonesia (Malay language) and may thus need translation. For further information, contact baseljakarta@bcrc-sea.org.

Ireland

Ireland’s Health and Safety Authority provides advice through an online directory on how to develop an occupational health and safety (OHS) management system for a number of different occupations and industries. While waste management is not yet included in the directory, the site contains some useful videos covering elements of an OHS system (as per Irish legislation) and risk assessment, which can be viewed at:

http://vimeo.com/19383449 (on the online system)

http://vimeo.com/19971075 (on risk assessment)

http://vimeo.com/19970831 (on safety statement)

The guidance on risk assessment and the development of safety policy and a safety statement could be adapted for use by enforcement agents.

United Kingdom of Great Britain and Northern Ireland

The United Kingdom Health and Safety Executive has developed online guidance on occupational health and safety in the waste industry specifically pertaining to waste electrical and electronic equipment. Information is available from:

http://www.hse.gov.uk/waste/index.htm.

http://www.hse.gov.uk/waste/waste-electrical.htm.

Appendix V

References

Basel Action Network, 2002. "Exporting harm: The high-tech trashing of Asia." Available from: http://svtc.org/wp-content/uploads/technotrash.pdf

Basel Convention Mobile Phone Partnership Initiative (MPPI), 2009a. *Guideline on Awareness Raising-Design Considerations*. Revised and approved text, 25 March 2009. Available from: http://basel.int/Implementation/TechnicalAssistance/Partnerships/MPPI/MPPIGuidelinesandGlossaryofTerms/tabid/3251/Default.aspx

Basel Convention Mobile Phone Partnership Initiative (MPPI), 2009b. *Guideline on the Collection of Used Mobile Phones*. Revised and approved text, 25 March 2009. Available from: http://basel.int/Implementation/TechnicalAssistance/Partnerships/MPPI/MPPIGuidelinesandGlossaryofTerms/tabid/3251/Default.aspx

Basel Convention Mobile Phone Partnership Initiative (MPPI), 2009c. *Guideline for the Transboundary Movement of Collected Mobile Phones*. Revised and approved text, 25 March 2009. Available from: http://basel.int/Implementation/TechnicalAssistance/Partnerships/MPPI/MPPIGuidelinesandGlossaryofTerms/tabid/3251/Default.aspx

Basel Convention Mobile Phone Partnership Initiative (MPPI), 2009d. *Guideline on the Refurbishment of Used Mobile Phones*. Revised and approved text, 25 March 2009. Available from: http://basel.int/Implementation/TechnicalAssistance/Partnerships/MPPI/MPPIGuidelinesandGlossaryofTerms/tabid/3251/Default.aspx

Basel Convention Mobile Phone Partnership Initiative (MPPI), 2009e. *Guideline on Material Recovery and Recycling of End-of-Life Mobile Phones*. Revised and approved text, 25 March 2009. Available from: http://basel.int/Implementation/TechnicalAssistance/Partnerships/MPPI/MPPIGuidelinesandGlossaryofTerms/tabid/3251/Default.aspx

Basel Convention Mobile Phone Partnership Initiative (MPPI), *Guidance document on the environmentally sound management of used and end-of-life mobile phones*. Available from: http://basel.int/Implementation/TechnicalAssistance/Partnerships/MPPI/MPPIGuidanceDocument/tabid/3250/Default.aspx

Basel Convention Partnership on Action for Computing Equipment (PACE), 2009. *Environmentally sound management criteria recommendations.* Revised 15 March 2011. Available from: http://basel.int/Implementation/TechnicalAssistance/Partnerships/PACE/PACEGuidelines,ManualandReports/tabid/3247/Default.aspx

Basel Convention Partnership on Action for Computing Equipment (PACE), 2013a. *Guideline on Environmentally Sound Testing, Refurbishment and Repair of Used Computing Equipment.* Revised 10 May 2013. Available from: http://basel.int/Implementation/TechnicalAssistance/Partnerships/PACE/PACEGuidelines,ManualandReports/tabid/3247/Default.aspx

Basel Convention Partnership on Action for Computing Equipment (PACE), 2013b. *Guideline on Environmentally Sound Material Recovery and Recycling of End-of-Life Computing Equipment.* Revised in 10 May 2013. Available from: http://basel.int/Implementation/TechnicalAssistance/Partnerships/PACE/PACEGuidelines,ManualandReports/tabid/3247/Default.aspx

Basel Convention Partnership on Action for Computing Equipment (PACE), *Guidance document on environmentally sound management of used and end-of-life computing equipment*. Available from: http://basel.int/Implementation/TechnicalAssistance/Partnerships/PACE/PACEGuidanceDocument/tabid/3246/Default.aspx

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Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
Sixteenth meeting
Geneva, 1–12 May 2023
Item 4 (b) (i) of the provisional agenda*

Matters related to the implementation of the Convention: scientific and technical matters: technical guidelines

Technical guidelines

Addendum

Technical guidelines on the environmentally sound management of plastic wastes

Note by the Secretariat

1. As is mentioned in the note by the Secretariat on technical guidelines (UNEP/CHW.16/6), the annex to the present note sets out the draft updated technical guidelines on the environmentally sound management of plastic wastes (draft updated version of 16 December 2022) prepared by the Governments of China, Japan and the United Kingdom of Great Britain and Northern Ireland, as co-lead countries, in consultation with the small intersessional working group on plastic wastes for consideration by the Conference of the Parties at its sixteenth meeting.

2. At its thirteenth meeting, the Open-ended Working Group is expected to consider the draft updated technical guidelines on the environmentally sound management of plastic wastes, as contained in document UNEP/CHW/OEWG.13/INF/7. A revised version of the draft technical guidelines reflecting the outcome of the thirteenth meeting is expected to be made available in document UNEP/CHW.16/INF/11.

3. The present note, including its annex, has not been formally edited.

* UNEP/CHW.16/1.

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Annex

Technical guidelines on the environmentally sound management of plastic wastes

(Updated version of 16 December 2022)

Contents

Abbreviations

ABS	acrylonitrile butadiene styrene
AHEG	ad hoc expert group
ASTM	American Society for Testing and Materials
BAT	best available techniques
BEP	best environmental practices
BFRs	brominated flame retardants
CEN	European Committee for Standardization
CiP	Chemicals in Products Programme
c-octaBDE	commercial octabromodiphenyl ether
c-pentaBDE	commercial pentabromodiphenyl ether
decaBDE	decabromodiphenyl ether
DRS	deposit-and-return system
ELV	end of life vehicles
EN	European norm
EPR	extended producer responsibility
EPS	expandable polystyrene
ESM	environmentally sound management
EU	European Union
FEP	perfluoroethylene /propylene
GHG	greenhouse gas
HBCD	hexabromocyclododecane
HDPE	high-density polyethylene
HFCs	hydrofluorocarbons
HIPS	high impact polystyrene
IATA	International Air Transport Association
ICCM	International Conference on Chemical Management
IMO	International Maritime Organization
INC	intergovernmental negotiating committee
ISO	International Organization for Standardization
LDPE	low-density polyethylene
MF	melamine formaldehyde
MFA	tetrafluoroethylene/perfluoromethyl vinyl ether
MSW	municipal solid waste
NA	neutralisation agent
NIR	near-infrared
ODS	ozone depleting substances
OECD	Organisation for Economic Co-operation and Development
PA	polyamide
PBS	polybutylene succinate
PBT	polybutylene terephthalate
PC	polycarbonate
PCB	polychlorinated biphenyls
PCL	polycaprolactone
PE	polyethylene
PET	polyethylene terephthalate
PF	phenol formaldehyde
PFA	perfluoroalkanes
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonic acid
PLA	polylactic acid

POP	persistent organic pollutants
POP-BDE	brominated diphenyl-ethers listed in the Stockholm Convention: tetra-BDE, penta-BDE, hexa-BDE, hepta-BDE, deca-BDE
PP	polypropylene
PS	polystyrene
PTFE	polytetrafluoroethylene
PUR	polyurethane
PVC	polyvinyl chloride
PVDF	polyvinylidene fluoride
PVOH	polyvinyl alcohol
PVF	polyvinyl fluoride
QA	quality assurance
QC	quality control
RDF	refuse derived fuel
SAICM	Strategic Approach to International Chemical Management
UNEA	United Nations Environmental Assembly
UNEP	United Nations Environment Programme
UNECE	United Nations Economic Commission for Europe
UF	urea-formaldehyde
UV	ultraviolet
VIS	visual spectrometry
WEEE	waste electrical and electronic equipment
XPS	extruded polystyrene
XRF	X-ray fluorescence
XRT	X-ray transmission

Units of measurement

kg	kilogram
mg/kg	milligram(s) per kilogram.
mg	milligram
ppm	parts per million
tonne	1000 kg

I. Introduction

A. Scope

1. The present technical guidelines provide guidance on the environmentally sound management (ESM) of plastic wastes, pursuant to decisions BC-14/13 and BC-15/10 and BC-16 [to be completed post COP16] of the Conference of the Parties to the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal. This document supersedes the technical guidelines for the identification and environmentally sound management of plastic wastes and for their disposal of December 2002.

2. Plastic wastes, in the context of these guidelines, covers plastic wastes classified by entries Y48 in Annex II, A3210 in Annex VIII and B3011 in Annex IX to the Basel Convention. Furthermore, the guidelines cover plastic wastes extracted and/or separated from other waste streams that have plastic components or consist partially or fully of plastic (e.g., wastes collected from households (Y46), waste electrical and electronic equipment (WEEE), waste vehicles, waste cables, waste lead-acid batteries and waste textiles for which there are separate related entries in Annexes VIII and IX).

3. It should be noted that several other technical guidelines also provide guidance on plastic wastes, as follows:

(a) For specific guidance on plastic wastes containing or contaminated with persistent organic pollutants (POPs), see the Basel Convention general technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with Persistent Organic Pollutants (UNEP, 2022a) and the Basel Convention specific technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with hexabromodiphenyl ether and heptabromodiphenyl ether, or tetrabromodiphenyl ether and pentabromodiphenyl ether or decabromodiphenyl ether (UNEP, 2019d), technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with hexachlorobutadiene (UNEP, 2015a), technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with short chain chlorinated paraffins (UNEP, 2019b), technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF) and perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds (UNEP, 2022b) and technical guidelines on the environmentally sound management of wastes containing or contaminated with unintentionally produced polychlorinated dibenzo-p-dioxins, polychlorinated dibenzofurans, hexachlorobenzene, polychlorinated biphenyls, pentachlorobenzene, polychlorinated naphthalenes or hexachlorobutadiene (UNEP, 2019e);

(b) For specific guidance on plastic wastes containing, or contaminated with mercury or mercury compounds, see the technical guidelines on the ESM of wastes consisting of, containing, or contaminated with mercury or mercury compounds (UNEP, 2022c);

(c) For specific guidance on the co-processing of plastic wastes in cement kilns, see the Basel Convention technical guidelines on the environmentally sound co-processing of hazardous wastes in cement kilns (UNEP, 2011);

(d) For specific guidance on the incineration of plastic wastes, see the technical guidelines on the environmentally sound incineration of hazardous wastes and other wastes as covered by disposal operations D10 and R1 (UNEP, 2022d);

(e) For specific guidance on the landfilling of plastic wastes, see the technical guidelines on the environmentally sound disposal of hazardous wastes and other wastes in specially engineered landfill (D5) (UNEP, 2022e).

B. About plastics and plastic wastes

4. Plastics started being made over 100 years ago from cellulose [(Bellis, 2021)]. They started to come into wider use in the 1950s and within a few years production had risen to a high rate. They are currently almost exclusively made from fossil fuels such as crude oil or gas. [In 2021, 90.2% of the world's plastics production was fossil-based. Post-consumer recycled plastics and bio-based/bio attributed plastics respectively accounted for 8.3% and 1.5% of world plastic production (Plastics Europe, 2022)]. Global production of plastic increased from 1.5 million tonnes in 1950 (Plastics Europe, 2008) to [390 million tonnes in 2021 (Plastics Europe, 2022)]

5. Plastics are lightweight with varying degrees of strength and durability. They can be both thermal and electrical insulators, can be moulded in various ways, and can offer a large range of

characteristics and colours achieved through additives. Plastics are most commonly used for packaging, food containers, building and construction, textiles, vehicles, electrical and electronic equipment, [agricultural] film and piping, healthcare equipment, sporting equipment and energy generation infrastructure.

6. [ALT However, hazardous additives from plastic wastes can have adverse effects on human health and the environment.]

However, plastic wastes can have adverse effects on human health and the environment. [Such effects are for example caused by the properties of polymers, and from hazardous substances in plastic, including the use of hazardous additives and processing aids, that may render the plastic waste hazardous, difficult to recycle or otherwise problematic.] [Such effects are for example caused by hazardous substances [that might exist] [contained] in plastic [wastes], including [some polymers and] certain additives and processing aids, that may render the waste hazardous or difficult to recycle [or otherwise problematic] [or other disposal operation]. [These additives have to be restricted from use in plastic to minimize any risk that can make their impact on plastic waste.] Attention to such effects has increased recently particularly, amongst other issues, due to the ubiquity of plastics and microplastics in marine, freshwater and terrestrial environments (UNEP, 2021a)[(Bank, 2022)]. This is a consequence of the leakage of plastic into the environment at every stage of its lifecycle, particularly if plastic wastes are not managed in an environmentally sound manner. The plastics lifecycle includes a full range of activities from extracting raw materials, production, distribution, use and disposal as waste. Environmental problems may be caused at any stage in the lifecycle of plastics, inter alia from point source emissions to air, water and soil from production processes, as well as from plastic wastes not managed in an environmentally sound manner. [Such impacts are for example caused by certain additives and processing aids that may render the waste hazardous or problematic.] The majority of plastics degrade very slowly in the environment.

7. The environmentally sound management of plastic wastes has been a constant challenge. [Of the 353 million tonnes of plastic waste generated globally in 2019, 9% was recycled, 19% was incinerated, almost 50% was disposed in landfills and 22% was disposed of in dumpsites, subjected to open burning or leaked into the environment (OECD, 2022)]

8. Landfilling of plastic wastes can have adverse effects on human health and the environment, in particular in non-engineered landfills or open dumpsites, such as the leaching of plastics additives, as well as leakage of microplastics and macroplastics into the wider environment. Gasification, pyrolysis and combustion, in particular open burning, of plastic wastes can also adversely affect human health and the environment due to emissions and releases of greenhouse gases and pollutants, such as unintentionally produced POPs and mercury.

9. The leakage of plastic and plastic wastes into the environment can occur from a variety of land-based and ocean-based sources in the form of macroplastics, microplastics and nano-size plastic particles. The sources include, but are not limited to, the uncontrolled dumping of waste, litter, wastewater, storm water run-off and sewers, microplastics intentionally added to products, loss of fishing gear and spillage of plastic pellets, as well as wear from the use of a variety of products containing plastics such as artificial turf, paints and synthetic textiles, unintentional releases from plastic materials in production processes and equipment[, potential microplastic releases from incinerator bottom ash,] and the fragmentation of oxo-degradable plastics [and failed dissolution of water-soluble plastics]. Leakages may notably be caused by insufficient and inefficient waste collection, transport and disposal systems, private consumer behaviour as well as business practices. Microplastic pollution is further compounded by the spreading on land of wastewater and sewage sludges that contain microplastic.

C. Types of plastics

1. What is plastic?

10. Plastic is a synthetic material or modified natural material, either a polymer or combination of polymers of high molecular mass modified or compounded with additives such as fillers, plasticizers, stabilizers, flame retardants and colourants. There are different definitions of plastic in current international or national documents. For example, according to the International Organization for Standardization (ISO) “plastic is a material which contains as an essential ingredient a high polymer

and which, at some stage in its processing into finished products, can be shaped by flow" (ISO, 2013). Other definitions are available, including from MARPOL[1].

11. Polymers are natural or synthetic substances composed of very large molecules, called macromolecules, that are multiples of simpler chemical units called monomers. There are a number of detailed definitions of the term "polymer", such as by the OECD[2].

2. Classification of polymers

12. Since polymer types are so diversified it is difficult to classify them in a comprehensive manner. One of the most common ways of classifying polymers is to separate them into thermoplastics and thermosets.

(a) Thermoplastics are polymers which soften when heated and solidify upon cooling, allowing them to be remoulded and recycled. Examples are polyethylene (PE), polypropylene (PP), and polystyrene (PS). Most common consumer plastics are thermoplastics;

(b) Thermosets are polymers that are set into a mould once, normally with a chemical reaction taking place, and cannot be re-softened or moulded again. Examples of thermosets include urea formaldehyde (UF) resins, phenol formaldehyde (PF) resins, and melamine formaldehyde (MF) resins. Thermosets are often used for high-heat applications such as electronic equipment, appliances, construction, and insulation.

13. Polymers can be produced either from materials produced from fossil fuels (fossil-based) or from biomass (bio-based). Both can be chemically identical and also have identical physical properties. Polymers can include additives to improve the base-polymer's physical properties.

14. Plastics can be biodegradable or non-biodegradable. Biodegradable plastics are broadly understood to refer to plastics that can be degraded under certain conditions, such as temperature, [UV radiation,] humidity, oxygen content and pH, by microorganisms in nature, such as bacteria, mould, and algae, and turn into water and carbon dioxide and other small molecules [(SAPEA, 2022)]. [When a plastic is claimed to be biodegradable, the producers should include information about the timeframe, the level of biodegradation, and the environmental condition required for biodegradation. – to be discussed with para 275] [The timeframe, the level of biodegradation, and the environment condition required for biodegradation need to be provided by the producer of the plastics, along with claim of biodegradability of plastics (European Bioplastics, 2018). Standard specifications or protocols are required for biodegradability of plastics. [Some of the available standard protocols] [Standards] for assessment of biodegradation of plastics include ISO/17556 for aerobic biodegradability of plastic materials in soil, ISO/15985 for anaerobic biodegradation under high-solids anaerobic-digestion conditions. Further considerations on biodegradable plastics can be found in European Commission, 2022].

15. [There is a need to recognize the environmental impacts related to the use of biodegradable plastics, its durability, affordability, and ESM of biodegradable plastic when its turns to waste especially there is a need to have a proper environmental conditions and capacity. "Producing plastics from primary biomass can lead to direct or indirect land-use change, which in turn can result in biodiversity loss, ecosystem degradation, deforestation and water scarcity, as well as competition with crops intended for human consumption" (European Commission 2022).]

16. [Both fossil-based plastic and bio-based plastic can be biodegradable or non-biodegradable under certain conditions. Examples of bio-based and fossil-based plastics as well as of biodegradable and non-biodegradable plastics are shown in Figure 1. [An example of] The [distinction] [classification] of plastics based on material and biodegradability is shown in Figure 1, where examples of some types of plastics are indicated.]

17. Compostable plastics are a subset of biodegradable plastics designed to biodegrade under controlled conditions (European Commission, 2022). Compostable plastics are considered those plastics which have been tested and adhere to international standards for biodegradation in an industrial composting facility[3]. In addition, compostability may be certified by a third party. While compostable plastic waste does not contribute to the soil quality of the compost, it can be composted

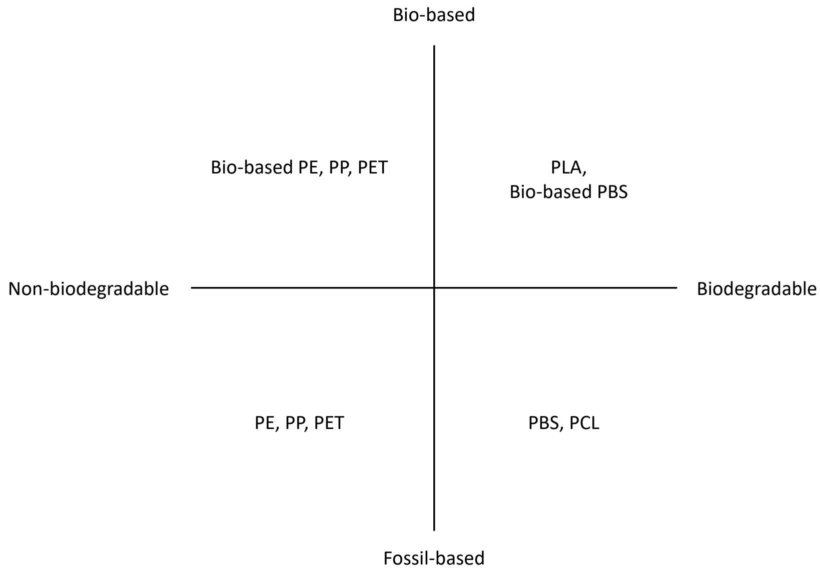
[[1] See MARPOL Annex V. Available from: https://www.imo.org/en/OurWork/Environment/Pages/Garbage-Default.aspx]

[2] https://www.oecd.org/env/ehs/oecddefinitionofpolymer.htm

[3] Examples of such standards include ISO 5413, ISO 17088, ISO 18606, American Society for Testing and Materials ASTM D6400-21 (ASTM, 2021) (in the U.S.), European Standard EN 13432:2000 (European Standard, 2000) and EN 14995:2006 (European Standard, 2006).

together with organic waste[4]. For compostable plastic waste to be fully composted together with organic waste, the composting must happen under specific conditions of temperature, moisture, oxygen level and microbial activity, normally found in controlled industrial composting facilities.

Figure 1: [Examples of bio-based and fossil-based plastics as well as of biodegradable and non-biodegradable plastics] [Example of] [the distinction] [Classification] of plastics based on material and biodegradability under certain conditions



Source: Adapted from European Bioplastics (2018)

[ALT 17A Compostable plastics are a type of biodegradable plastic that are designed to biodegrade in soil conditioning material (i.e. compost) under a certain set of conditions. Composting utilizes microorganisms, heat and humidity to yield carbon dioxide, water, inorganic componds, and biomass that is similar in characteristic to the rest of the finished compost product. For compostable plastics to be fully composted, disposal must happen under specific conditions of temperature, moisture, oxygen level and microbial activity, normally found in a controlled composting environment such as that found in industrial or commercial composting. Decomposition of the plastic must occur at a rate similar to the other elements of the material being composted (e.g. within 6 months) and leave no toxic residue that would adversely impact the ability of the finished compost to support plant growth. In order for a plastic to be labelled as commercially "compostable" it must have been tested and adhere to international standards for biodegradation in an industrial composting facility. Examples of such standards include the American Society for Testing and Materials ASTM D6400-21 and D6868 (ASTM, 2021) (in the U.S.) or European Standard EN 13432:2001 (European Standard, 2001) and EN 14995:2006 (European Standard, 2006) in Europe). In addition, compostability may be certified by a third party.]

[ALT 17B Compostable plastics are a subset of biodegradable plastics designed to biodegrade under controlled conditions (European Commission, 2022).] Compostable plastics are considered those plastics which have been tested and adhere to international standards [for biodegradation in an industrial composting facility[5].] [,such as] [Examples of such standards include] American Society for Testing and Materials ASTM D6400-21 (ASTM, 2021) (in the U.S.), [or] European Standard EN 13432:2000 (European Standard, 2000) and EN 14995:2006 (European Standard, 2006) in Europe), [for biodegradation in an industrial composting facility]. In addition, compostability may be certified by a third party. While compostable plastic waste does not contribute to the soil quality of the compost, it can be composted together with organic waste[6]][For compostable plastics [waste]to be fully composted, [together with organic waste] [disposal][the composting] must happen under specific

[4] It is noted that the term "bio-waste" is used as a synonym in some countries.

[[5] Examples of such standards include ISO 5413, ISO 17088, ISO 18606, American Society for Testing and Materials ASTM D6400-21 (ASTM, 2021) (in the U.S.), European Standard EN 13432:2000 (European Standard, 2000) and EN 14995:2006 (European Standard, 2006).]

[[6] It is noted that the term "bio-waste" is used as a synonym in some countries.]

conditions of temperature, moisture, oxygen level and microbial activity, normally found in controlled composting.

18. Oxo-degradable plastic are non-biodegradeable plastics that simulate biodegradeable and compostable plastics. They are made by blending a pro-degradant additive into the plastic during the extrusion process, which accelerates the fragmentation of plastics into plastic fragments under certain conditions. However, unlike biodegradeable and compostable plastics, once the product is buried in the soil, out of sunlight, the degradation process stops [slows significantly] and residual small plastic particles remain intact, causing the release of microplastics.

19. [Water-soluble plastics such as polyvinyl alcohol and its blends are used as protective films for laundry and dish[washing] detergents; sizing and finishing agents in the textile industry, and as thickening or coating agents for paints, glues, meat packaging, and pharmaceuticals in paper and food industries. While water-soluble plastics may dissolve in water under specific circumstances, these are not met in waste-water treatment plants, leading to significant water pollution with PVA microplastics, which concentrate environmental pollutants and amplify their uptake in the food chain. The discharge of PVA into water also triggers foaming and disrupts the oxygen exchange, harming aquatic life. Even when water-soluble plastics like PVA dissolve, their constituents (such as ethylene in the case of PVA) can remain intact in water, and harm aquatic fauna and flora.]

3. Common types of polymers

20. There are a wide range of polymers used in common plastics and they each have different properties which make them appropriate for different applications. Properties and typical applications of common polymer types, including those listed in entries Y48 and B3011 in Annex II and IX to the Basel Convention respectively, are shown in Table 1.

Table 1: Properties and typical applications of common polymer types including those listed in entries Y48 and B3011

Polymer Type	Labels (ASTM D7611)	Properties	Typical Applications
Polyethylene terephthalate (PET)	1 PETE	clear and resistant to heat, cold, and chemicals	plastic bottles (water, soft drinks etc.) food packaging film, strapping, carpets, vehicle tyre cords and fibres
High-density Polyethylene (HDPE)	2 HDPE	durable and resistant to shock and cold	packaging film, industrial film, bottles, tubs, cups, closures, toys, tanks, drums, cable insulation, pipes, gasoline tanks, shipping containers, seating and household goods
Polyvinyl chloride (PVC)	3 V	rigid or soft via plasticizers, resistant to water and solvents and flame retardant	piping, vinyl flooring, cabling insulation, window frames and roof sheeting
Low-density Polyethylene (LDPE)	4 LDPE	lightweight, flexible, and resistant to shock and cold	packaging film, cling-film, bags/sacks, lids, toys, coatings, flexible containers, tubing, irrigation pipes and vehicle dashboards

Polymer Type	Labels (ASTM D7611)	Properties	Typical Applications
Polypropylene (PP)	5 PP	lightweight and resistant to heat, water and chemicals	yoghurt pots, snack wrappers, packaging films, bottles/caps, automotive battery cases, parts and body components, electrical components, carpet pile and backing, drainage goods
Polystyrene (PS)	6 PS	lightweight, structurally weak, and easily thermoformed or expanded	packaging applications, dairy product containers, cups, coat hangers and electrical appliances
Acrylonitrile butadiene styrene (ABS)	7 OTHER	durable, stiff, hard and resistant to shock	computers, televisions, kitchen appliances, toys, musical instruments, electrical products and automobile component parts
Polycarbonates (PC)	7 OTHER	clear, resistant to shock and heat and flame retardant	electronic applications, products in construction industry (e.g., for dome lights, flat or curved glazing, and sound walls), CDs, Blu-ray discs, automotive, aircraft and railway parts
Polyethers	7 OTHER	resistant to heat, chemicals,flame retardants, oils, grease and abrasion	electrical components, medical equipment, and automobile components

Source: ASTM (2022)

4. Other types of polymers

(a) Cured resins, condensation products and fluorinated polymers

21. Entries Y48 and B3011 listed in Annexes II and IX to the Basel Convention, respectively, make special mention of plastic wastes consisting of cured resins, condensation products or fluorinated polymers. Cured resins are plastics formed by cross-linking polymer chains and include (but are not limited to) UF resins, PF resins, MF resins, epoxy resins and alkyd resins. Condensation products are plastics formed by the removal of water or alcohol during polymerization and the final molecular weight of the polymer is controlled by the equilibrium concentration of water or alcohols in the molten polymer at the end of the polymerization. Examples of such polymers are polyamides and polyester. Fluorinated polymers (fluoropolymers) are fluorocarbon-based polymers with multiple carbon–fluorine bonds and can come in many different forms (powders, granules etc.). Properties and typical applications of cured resins and fluorinated polymers listed in entries Y48 and B3011 are shown in Table 2 and 3 respectively.

Table 2: Properties and typical applications of cured resins listed in entries Y48 and B3011

Polymer type	Properties	Typical Application
Urea formaldehyde (UF) resin	stiff, hard, and resistant to heat and solvent	glue resins in particle board, medium density fibreboard, plywood used in building material and furniture and kitchen worktops
Phenol formaldehyde (PF) resin	resistant to heat, oils and chemicals and flame retardant	
Melamine formaldehyde (MF) resins	high tensile strength and resistant to water and shock	
Epoxy resins	resistant to heat, chemically stable, high mechanical strength and anti-corrosive	coating and glue resin, glass fibre resins
Alkyd resins	compatible to materials and resistant to corrosion	coating

Source: Copps Industries (2020)

Table 3: Properties and typical applications of fluorinated polymers listed in entries Y48 and B3011

Polymer type	Properties	Typical Application
Perfluoroethylene/propylene (FEP)	resistant to corrosion, chemicals and wear	wiring, coaxial cable, wiring for computer wires and technical gear
Tetrafluoroethylene/perfluoro alkyl vinyl ether (PFA)		extruded wire insulation, tubing, protective film, sheet linings, pump housings and non-stick materials
Tetrafluoroethylene/perfluoro methyl vinyl ether (MFA)		non-stick coatings and anticorrosion coatings
Polyvinylfluoride (PVF)	flame retardant and resistant to weather	encapsulant in PV applications, vacuum bagging, coating and lamination
Polyvinylidenefluoride (PVDF)	high tensile strength and resistant to chemicals	piping products, sheet, tubing, films, plate and an insulator for premium wire

Source: Fang Liu et al. (2013), Rodney et al. (2014)

(b) Polymers that are biodegradable under certain conditions

22. Typical applications of polymers that are biodegradable under certain conditions are listed in Table 4.

Table 4: Typical applications of polymers that are biodegradable under certain conditions

Polymer Type	Typical Application
Polyglycolic acid (PGA)	controlled drug releases, implantable composites, bone fixation parts [subcutaneous sutures, and intracutaneous closures in surgeries]
Polylactic acid (PLA)	packaging and paper coatings, sustained release systems for pesticides and fertilizers, mulch films, and compost bags
Polybutylene succinate (PBS)	food packaging (e.g., cups and plates) and agricultural mulch films
Polycaprolactone (PCL)	mulch and other agricultural films, fibres containing herbicides to control aquatic weeds, seedling containers and slow-release systems for drugs
Polyhydroxybutyrate (PHB)	products like bottles, bags, wrapping film and nappies, as a material for tissue engineering scaffolds and for controlled drug release carriers
Polyhydroxyvalerate (PHBV)	films and paper coatings, biomedical applications, therapeutic delivery of worm medicine for cattle, and sustained release systems for pharmaceutical drugs and insecticides
Polyvinyl alcohol (PVOH)	packaging applications which dissolve in water to release products such as laundry detergent, pesticides, and hospital washables
Polyvinyl acetate (PVAC)	adhesives, the packaging applications include boxboard manufacture, paper bags, paper lamination, tube winding and re-moistenable labels

Source: Shah et al. (2008)

5. Plastics in composites, plastic multilayers, and polymer blends

23. Composites may be made of plastics and non-plastics materials. The plastics may be bound to other materials to create multi-material packaging such as metal (e.g., metallized wrappers and sachets) or paper-based materials (e.g., in beverage cartons). Composite materials typically have properties superior to the individual materials themselves. Alternatively, the plastics and non-plastics materials may be integrated to produce a new material such as glass-fibre filled plastics which have superior physical mechanical properties or wood-plastics composites that look like wood but do not require the maintenance associated with wood. [Composites are used to improve durability and efficiency in a wide variety of applications in the aerospace, automotive, marine, energy,

infrastructure, and defense industries. For example, wind turbine blades are typically constructed of fibreglass-reinforced plastics. High performance carbon-fiber reinforced thermoset and thermoplastic composite materials are used in the aerospace industry.] Such composite materials tend to be significantly more difficult to deconstruct and recycle.

24. Plastic multi-layered materials consist of bonded layers of different polymers that together provide superior properties to the individual polymer types used on their own. Multi-layer polymers provide certain characteristic specific functions in the use-phase (e.g., oxygen and ultraviolet (UV)-light barrier layers, sealing layers and surface finish layers). For example, food packaging films may contain 7 layers of material (e.g., metallized crisp packet). Multilayer structures are also more difficult to recycle.

25. Polymer blends, sometimes referred to as polymer alloys, combine different polymer types that each contribute desired properties in specific applications. Miscibility and compatibility increase between polymers of the same family (e.g., PE and PP belong to the polyolefin family and PS and ABS belong to the styrenics family). Furthermore, compatibility can be enhanced by the use of an additive to bring polymers together in a physical blend (compatibilizer additive technology). Tolerances will be highly dependent on the specific polymers being used.

6. Typical additives and processing aids

26. Most plastics are a blend of polymers and additives. Additives are substances that are added to plastics to bring about certain changes to the characteristics of the plastics as desired and are usually included in the polymer matrix by blending in the melt phase but are not necessarily chemically bonded. [This leads to the potential for them to be released into the environment during their production, use and waste phase.]

27. Processing aids refers to several different classes of materials and are used to improve the processability and handling of high-molecular-weight polymers. [Two main groups of processing aids are lubricants and fluoropolymer-based additives. Fluoropolymers are a unique group of processing aids that] can make plastics virtually chemically inert, non-wetting, non-stick, and highly resistant to temperature, fire, and weather.

28. Functions and concentration ranges of typical additives in plastic are listed in Table 5.

Table 5: Functions and concentration ranges of typical additives.

Additives	Functions	Concentration range (%w/w)
Plasticizers (e.g., adipates, azelates, citrates, benzoates, ortho-phthalates, terephthalates, sebacates and trimellitates)	To impart plasticity (softness and flexibility) to the material into which they are incorporated. Typical polymers without plasticizers are too rigid for certain applications.	10-70[7]
Flame retardants (e.g., brominated flame retardants and organophosphate flame retardants)	To prevent ignition of the plastic material and to reduce flammability risks in products.	3–25 (for brominated flame retardants)
Stabilizers, antioxidants and UV stabilizers (e.g., Hindered Amine Light Stabilizers (HALS), benzotrialozes, benzophenones and organic nickel compounds)	To prolong the lifetime of the polymer by suppressing degradation that results from UV-light, oxidation, and other phenomena. Typical stabilizers absorb UV light or function as antioxidants.	0.05–[10]
Biocides (e.g., compounds based on tin, mercury, arsenic, copper and antimony)	Protecting plastics in certain applications from attack and degradation by microorganisms	0.001-1
Fillers (e.g., mica, talc, kaolin, clay, calcium carbonate, limestone and barium sulphate)	To improve performance or reduce production costs.	up to 70
Colourants (e.g., pigments, soluble azocolourants and processing oils)	To produce plastics products in various colours.	0.25–5

Sources: Hansen et al, (2013), Hahladakis et al. (2018), Xanthopoulos,P (2014)

29. The addition of additives or processing aids has the potential to render plastic waste hazardous or [problematic] [difficult to recycle]. A study found that over 2,400 substances [used in the production of plastics] (as monomers, additives or processing aids) have been identified as substances

[7] 70% applies to a small range of applications.

of potential concern as they meet one or more of the persistence, bioaccumulation, and toxicity criteria in the European Union (EU) (Wiesinger et. al (2021). Table 6 [provides information on] [shows] POPs listed by the Stockholm Convention that have been or are used as plastic additives or processing aids and Table 7 provides information on some substances that have been or are used as plastic additives and have been identified as substances of very high concern (SVHC) [under EU REACH legislation[8]].

Table 6: [Information on] POPs listed in the Stockholm Convention that have been or are used as plastic additives or processing aids

Additives	Purpose	Plastics	Typical content
Hexabromobiphenyl (HBB) (UNEP, 2006a)	Flame retardant	ABS for construction machine housings, and electrical products, polyurethane foam for auto upholstery, coatings and lacquers	N/A
Hexabromocyclododecane (HBCD)	Flame retardant	Expandable polystyrene, XPS in insulation HIPS in electrical and electronic equipment	0.7–2.5% (EPS, XPS) 1–7% (HIPS) (UNEP, 2017a)
Decabromodiphenyl ether (decaBDE)	Flame retardant	HIPS, PA, PE, PP	5–16% (Buekens and Yang 2014)
Heptabromodiphenyl ether (heptaBDE)	Flame retardant		N/A
Hexabromodiphenyl ether (hexaBDE)	Flame retardant	as c-octaBDE in: ABS, HIPS, PBT, PA	12–18% (UNEP, 2017b)
Pentabromodiphenyl ether (pentaBDE)	Flame retardant		N/A
Tetrabromodiphenyl ether (tetraBDE)	Flame retardant	as c-pentaBDE in polyurethane (PUR), plastics in former printed circuit boards	0.5–5% (UNEP, 2017b)
Short chain chlorinated paraffins (SCCPs)	Plasticizer, flame retardant	PVC	
Perfluorooctanoic acid (PFOA), its salts and PFOA related compounds (UNEP, 2016a)	Processing aids, surfactants	Fluorinated polymers, such as polytetrafluoroethylene (PTFE), sidechain fluorinated polymers such as fluoroacrylate;	N/A
Perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (UNEP, 2006b)	Processing aids, plastic coatings	Fluorinated polymers	N/A

Source: Wagner et al. (2020)

Table 7: Information on some SVHCs listed on the ECHA website[9] that have been or are used as plastic additives.

Additives	Purpose	Plastics	Typical content
Bisphenol A (Food and Drug Administration, 2014)	Antioxidant	PS, PVC, PC	
Tris phosphite (TNPP)	Antioxidant	PS, PVC	
Diethylhexylphthalate (DEHP)	Plasticizer	PVC	30% (European Chemicals Agency 2007)

[[8] See: https://echa.europa.eu/support/authorisation/substances-of-very-high-concern-identification]

[9] https://echa.europa.eu/candidate-list-table.

Additives	Purpose	Plastics	Typical content
Benzylbutylphthalate (BBP)	Plasticizer	PVC	5–30% (European Chemicals Agency 2007)
Dibutyl phthalate (DBP)	Plasticizer	PVC	1,5% (Danish Environmental Protection Agency, 2009)
Diisobutyl phthalate (DIBP)	Plasticizer	PVC	Comparable to DBP (Gächter and Müller 1990)
The following lead compounds • Trilead bis(carbonate) dihydroxide (Basic lead carbonate) • Tetralead trioxide sulphate (Tribasic lead sulphate) • Pentalead tetraoxide sulphate (Tetrabasic lead sulphate) • Phthalato(2-)] dioxotrilead (Dibasic lead phthalate) • Lead oxide sulfate (Basic lead sulphate) • Dioxobis(stearato)trilead • Trilead dioxide phosphonate (Dibasic lead phosphite) • Sulfurous acid, lead salt, dibasic Fatty acids, C16-18, lead salts	Stabilizer	PVC	0.6-2.5%[10]
Short chain chlorinated paraffins (SCCPs)	Plasticizer, flame retardant	PVC	
Medium chain chlorinated paraffins (MCCPs) (UNEP, 2022f)	Plasticizer, flame retardant	PVC	
UV 328 2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol	UV stabilizer	ABS resin, epoxy resin, fibre resin, PVC, unsaturated polyesters, polyacrylates and polycarbonates, polyolefins, polyurethanes, PVC, polyacrylate, epoxy and elastomers	1[- 10]% (UNEP, 2021b, UNEP, 2022g)
UV 327 2,4-di-tert-butyl-6-(5-chlorobenzotriazol-2-yl) phenol	UV stabilizer	Outdoor applications	Max 0.5% (De Kort, 2017)
UV 350 2-(2H-benzotriazol-2-yl)-4-(tert-butyl)-6-(sec-butyl) phenol	UV stabilizer	Outdoor applications	Max 0.5% (De Kort, 2017)
UV 320 2-benzotriazol-2-yl-4,6-di-tert-butylphenol	UV stabilizer	Outdoor applications	Max 0.5% (De Kort, 2017)

Source : Wagner et al. (2020)

[10] Lead stabilizers are used as a proprietary blend of different stabilizers. The concentration range shown above reflects the total concentration contained in the blend.

II. Relevant provisions of the Basel Convention and international linkages

A. Basel Convention

1. General provisions

30. The Basel Convention, which entered into force on 5 May 1992, aims to protect human health and the environment against the adverse effects resulting from the generation, management, transboundary movements, and disposal of hazardous and other wastes. It does this via a set of provisions on the transboundary movement of wastes and their ESM. In particular, the Basel Convention stipulates that any transboundary movement (export, import or transit) of wastes is permissible only when the movement itself and the planned disposal of the hazardous or other wastes are environmentally sound. A set of provisions of the Basel Convention lays out Parties obligations to ensure the ESM of wastes. These are listed in paragraphs 31 to 34 below.

31. Article 2 ("Definitions"), paragraph 1, of the Convention defines wastes as "substances or objects which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law". Paragraph 4 of that article defines disposal as "any operation specified in Annex IV" to the Convention. Annex IV contains two categories of operations: those leading to the possibility of resource recovery, recycling, reclamation, direct reuse or alternative uses (R operations) and those not leading to this possibility (D operations). Paragraph 8 defines the ESM of hazardous wastes or other wastes as "taking all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner which will protect human health and the environment against the adverse effects which may result from such wastes."

32. Article 4 ("General obligations"), paragraph 1, establishes the procedure by which Parties exercising their right to prohibit the import of hazardous wastes or other wastes for disposal shall inform the other Parties of their decision. Paragraph 1 (a) states: "Parties exercising their right to prohibit the import of hazardous or other wastes for disposal shall inform the other Parties of their decision pursuant to Article 13." Paragraph 1 (b) states: "Parties shall prohibit or shall not permit the export of hazardous or other wastes to the Parties which have prohibited the import of such wastes when notified pursuant to subparagraph (a) above."

33. Article 4, paragraphs 2 (a)-(e) and 2 (g), and paragraph 8, contain key provisions of the Basel Convention pertaining to environmentally sound management, transboundary movement, waste minimization and waste disposal practices aimed at mitigating adverse effects on human health and the environment:

Paragraphs 2 (a) – (e) and 2 (g): "Each Party shall take the appropriate measures to:

(a) Ensure that the generation of hazardous wastes and other wastes within it is reduced to a minimum, taking into account social, technological and economic aspects;

(b) Ensure the availability of adequate disposal facilities, for the environmentally sound management of hazardous wastes and other wastes, that shall be located, to the extent possible, within it, whatever the place of their disposal;

(c) Ensure that persons involved in the management of hazardous wastes or other wastes within it take such steps as are necessary to prevent pollution due to hazardous wastes and other wastes arising from such management and, if such pollution occurs, to minimize the consequences thereof for human health and the environment;

(d) Ensure that the transboundary movement of hazardous wastes and other wastes is reduced to the minimum consistent with the environmentally sound and efficient management of such wastes, and is conducted in a manner which will protect human health and the environment against the adverse effects which may result from such movement;

(e) Not allow the export of hazardous wastes or other wastes to a State or group of States belonging to an economic and/or political integration organization that are Parties, particularly developing countries, which have prohibited by their legislation all imports, or if it has reason to believe that the wastes in question will not be managed in an environmentally sound manner, according to criteria to be decided on by the Parties at their first meeting;

(g) Prevent the import of hazardous wastes and other wastes if it has reason to believe that the wastes in question will not be managed in an environmentally sound manner.

Paragraph 8: "Each Party shall require that hazardous wastes or other wastes, to be exported, are managed in an environmentally sound manner in the State of import or elsewhere."

34. The Ban Amendment entered into force 5 December 2019, and it provides that Parties listed in Annex VII to the Convention (members of the European Union (EU), Organisation for Economic Cooperation and Development (OECD) and Liechtenstein) shall prohibit transboundary movements of hazardous wastes to States not listed in Annex VII of hazardous wastes which are destined for operations according to Annex IV-A and hazardous wastes under Article 1.1(a) which are destined to operations according to Annex IV-B[11].

2. Provisions relating to plastic wastes

35. According to article 1 ("Scope of the Convention"), the Basel Convention covers two types of waste subject to transboundary movement: "hazardous wastes" and "other wastes".

36. Paragraph 1 (a) of Article 1 sets out a two-step process for determining whether a "waste" is a "hazardous waste" covered by the Convention: first, the waste must belong to one of the categories listed in Annex I to the Convention ("Categories of wastes to be controlled"), and second, it must possess at least one of the characteristics listed in Annex III to the Convention ("List of hazardous characteristics").

37. Annex I wastes are presumed to exhibit one or more Annex III hazardous characteristics, which may include H4.1"flammable solids"; H6.1 "Poisonous (Acute)"; H6.2 "Infectious substances"; H11 "Toxic (delayed or chronic)"; H12 "Ecotoxic"; or H13 (capable after disposal of yielding a material which possess a hazardous characteristic), unless, through "national tests," they can be shown not to exhibit such characteristics. National tests may be useful for identifying a particular hazardous characteristic in Annex III of the Convention until such time as the hazardous characteristic is fully defined. Guidance documents for Annex III hazardous characteristics H4.1, H11, H12 and H13 were adopted on an interim basis by the Conference of the Parties to the Basel Convention at its sixth and seventh meetings.

38. [At its fourth meeting in February 1998, the Conference of the Parties added the two lists of wastes as two new annexes to the Convention, namely Annex VIII (list A) and Annex IX (list B). These were intended to provide greater certainty and clarity to the entries. List A and List B are kept under review by the Conference of the Parties; in addition, a process was established under Decision BC VIII/15 of the Conference of the Parties to the Basel Convention to facilitate the identification and agreement on new entries. However, please note that Annex I and Annex III remain the factors to characterize wastes as hazardous for the purpose of this Convention, and that List A and List B are not intended to be exhaustive.]

39. List A of Annex VIII describes wastes that are "characterized as hazardous under Article 1, paragraph 1 (a) of this Convention" although "their designation on this Annex does not preclude the use of Annex III [hazard characteristics] to demonstrate that a waste is not hazardous" (Annex I, paragraph (b)). List B of Annex IX lists wastes that "will not be wastes covered by Article 1, paragraph 1 (a), of this Convention unless they contain Annex I material to an extent causing them to exhibit an Annex III characteristic".

40. As stated in Article 1, paragraph 2, "Wastes that belong to any category contained in Annex II that are subject to transboundary movement shall be "other wastes" for the purposes of this Convention".

41. The Basel Convention contains three main entries on plastic wastes in Annexes II, VIII and IX of the Convention[12] as follows:

(a) Annex II (categories of wastes requiring special consideration, i.e., they are subject to the control procedure): entry Y48 covering all plastic waste, including mixtures of plastic waste, except for the plastic waste covered by entries A3210 (in Annex VIII) and B3011 (in Annex IX);

Y48[13,14]	Plastic waste, including mixtures of such waste, with the exception of the following: • Plastic waste that is hazardous waste pursuant to paragraph 1 (a) of Article 1[15]

[11] For information on the status of individual Parties in relation to the amendment/s, please see the Status of Ratifications page on the Basel Convention website.

[12] See decision BC-14/12.

[13] This entry becomes effective as of 1 January 2021.

[14] Parties can impose stricter requirements in relation to this entry.

[15] Note the related entry on list A A3210 in Annex VIII.

	• Plastic waste listed below, provided it is destined for recycling[16] in an environmentally sound manner and almost free from contamination and other types of wastes:[17] - Plastic waste almost exclusively[18] consisting of one non-halogenated polymer, including but not limited to the following polymers: o Polyethylene (PE) o Polypropylene (PP) o Polystyrene (PS) o Acrylonitrile butadiene styrene (ABS) o Polyethylene terephthalate (PET) o Polycarbonates (PC) o Polyethers - Plastic waste almost exclusively consisting of one cured resin or condensation product, including but not limited to the following resins: o Urea formaldehyde resins o Phenol formaldehyde resins o Melamine formaldehyde resins o Epoxy resins o Alkyd resins - Plastic waste almost exclusively consisting of one of the following fluorinated polymers[19]: o Perfluoroethylene/propylene (FEP) o Perfluoroalkoxy alkanes: ▪ Tetrafluoroethylene/perfluoroalkyl vinyl ether (PFA) ▪ Tetrafluoroethylene/perfluoromethyl vinyl ether (MFA) o Polyvinylfluoride (PVF) o Polyvinylidenefluoride (PVDF) • Mixtures of plastic waste, consisting of polyethylene (PE), polypropylene (PP) and/or polyethylene terephthalate (PET), provided they are destined for separate recycling[20] of each material and in an environmentally sound manner and almost free from contamination and other types of wastes[14].

(b) Annex VIII (wastes presumed to be hazardous, subject to the control procedure): entry A3210 covering hazardous plastic waste;

A3210[21]	Plastic waste, including mixtures of such waste, containing or contaminated with Annex I constituents, to an extent that it exhibits an Annex III characteristic (note the related entries Y48 in Annex II and on list B B3011).

(c) Annex IX (wastes presumed to be non-hazardous, not subject to the control procedure): entry B3011, which replaced the entry B3010 from 1 January 2021.

B3011[22]	Plastic waste (note the related entries Y48 in Annex II and on list A A3210): • Plastic waste listed below, provided it is destined for recycling[23] in an environmentally sound manner and almost free from contamination and other types of wastes[24]:

[16] Recycling/reclamation of organic substances that are not used as solvents (R3 in Annex IV, sect. B) or, if needed, temporary storage limited to one instance, provided that it is followed by operation R3 and evidenced by contractual or relevant official documentation.

[17] In relation to “almost free from contamination and other types of wastes”, international and national specifications may offer a point of reference.

[18] In relation to “almost exclusively”, international and national specifications may offer a point of reference.

[19] Post-consumer wastes are excluded.

[20] Recycling/reclamation of organic substances that are not used as solvents (R3 in Annex IV, sect. B), with prior sorting and, if needed, temporary storage limited to one instance, provided that it is followed by operation R3 and evidenced by contractual or relevant official documentation.

[21] This entry becomes effective as of 1 January 2021.

[22] This entry becomes effective as of 1 January 2021. Entry B3010 is effective until 31 December 2020

[23] Recycling/reclamation of organic substances that are not used as solvents (R3 in Annex IV, sect. B) or, if needed, temporary storage limited to one instance, provided that it is followed by operation R3 and evidenced by contractual or relevant official documentation.

[24] In relation to “almost free from contamination and other types of wastes”, international and national specifications may offer a point of reference.

	- Plastic waste almost exclusively[25][18] consisting of one non-halogenated polymer, including but not limited to the following polymers: o Polyethylene (PE) o Polypropylene (PP) o Polystyrene (PS) o Acrylonitrile butadiene styrene (ABS) o Polyethylene terephthalate (PET) o Polycarbonates (PC) o Polyethers - Plastic waste almost exclusively[14] consisting of one cured resin or condensation product, including but not limited to the following resins: o Urea formaldehyde resins o Phenol formaldehyde resins o Melamine formaldehyde resins o Epoxy resins o Alkyd resins - Plastic waste almost exclusively[26] consisting of one of the following fluorinated polymers[27]: o Perfluoroethylene/propylene (FEP) o Perfluoroalkoxy alkanes: ▪ Tetrafluoroethylene/perfluoroalkyl vinyl ether (PFA) ▪ Tetrafluoroethylene/perfluoromethyl vinyl ether (MFA) o Polyvinylfluoride (PVF) o Polyvinylidenefluoride (PVDF) • Mixtures of plastic waste, consisting of polyethylene (PE), polypropylene (PP) and/or polyethylene terephthalate (PET), provided they are destined for separate recycling[28] of each material and in an environmentally sound manner, and almost free from contamination and other types of wastes21.

42. The entries Y48, A3210 and B3011 became effective on 1 January 2021, except for one Party for which these entries became effective on 10 February 2022[29].

43. In addition to the plastic waste entries referred to in paragraph 42, Table 8 contains an indicative list of other entries relevant to plastic waste listed in Annexes I, II, VIII, and IX to the Convention.

Table 8: Indicative list of other entries [with direct reference to plastics wastes and other entries that are] relevant to plastic wastes listed in Annexes I, II, VIII and IX of the Convention[30]

Entries with direct reference to plastic wastes	
Y13	Wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives
A1181[31]	**Electrical and electronic waste (note the related entry Y49 in Annex II)[32]** • Waste electrical and electronic equipment

[25] In relation to “almost exclusively”, international and national specifications may offer a point of reference.

[26] In relation to “almost exclusively”, international and national specifications may offer a point of reference.

[27] Post-consumer wastes are excluded

[28] Recycling/reclamation of organic substances that are not used as solvents (R3 in Annex IV, sect. B), with prior sorting and, if needed, temporary storage limited to one instance, provided that it is followed by operation R3 and evidenced by contractual or relevant official documentation.

[29] http://www.basel.int/Countries/StatusofRatifications/PlasticWasteamendments/tabid/8377/Default.aspx.

[30] Refer to Annexes I, II, VIII and IX to the Basel Convention to see the full entries.

[[31] This entry becomes effective as of 1 January 2025.]

[32] PCBs or PBBs are at a concentration level of 50 mg/kg or more in equipment, in a component, or in wastes arising from the processing of waste electrical and electronic equipment or waste components of electrical and electronic equipment.]

	(a) containing or contaminated with cadmium, lead, mercury, organohalogen compounds or other Annex I constituents to an extent that the waste exhibits an Annex III characteristic, or (b) with a component containing or contaminated with Annex I constituents to an extent that the component exhibits an Annex III characteristic, including but not limited to any of the following components: – glass from cathode-ray tubes included on list A – a battery included on list A – a switch, lamp, fluorescent tube or a display device backlight which contains mercury – a capacitor containing PCBs – a component containing asbestos – certain circuit boards – certain display devices – certain plastic components containing a brominated flame retardant • Waste components of electrical and electronic equipment containing or contaminated with Annex I constituents to an extent that the waste components exhibit an Annex III characteristic, unless covered by another entry on list A Wastes arising from the processing of waste electrical and electronic equipment or waste components of electrical and electronic equipment, and containing or contaminated with Annex I constituents to an extent that the waste exhibits an Annex III characteristic (e.g. fractions arising from shredding or dismantling), unless covered by another entry on list A]
A1190	Waste metal cables coated or insulated with plastics containing or contaminated with coal tar, polychlorinated biphenyls (PCB)[33], lead, cadmium, other organohalogen compounds or other Annex I constituents to an extent that they exhibit Annex III characteristics
A3050	Wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives excluding such wastes specified on list B (note the related entry on list B B4020
B1115	Waste metal cables coated or insulated with plastics, not included in list A A1190, excluding those destined for Annex IVA operations or any other disposal operations involving, at any stage, uncontrolled thermal processes, such as open burning.
B3026	The following waste from the pre-treatment of composite packaging for liquids, not containing Annex I materials in concentrations sufficient to exhibit Annex III characteristics: • Non-separable plastic fraction • Non-separable plastic-aluminium fraction
B4020	Wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives, not listed on list A, free of solvents and other contaminants to an extent that they do not exhibit Annex III characteristics, e.g., water-based, or glues based on casein starch, dextrin, cellulose ethers, polyvinyl alcohols (note the related entry on list A A3050)
Other entries relevant to plastic waste	
Y1	Clinical wastes from medical care in hospitals, medical centres and clinics
Y3	Waste pharmaceuticals, drugs and medicines
Y4	Wastes from the production, formulation and use of biocides and phytopharmaceuticals

[33] PCBs are at a concentration level of 50mg/kg or more.

Y10	Waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs and/or polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBs)
Y12	Wastes from production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish
Y18	Residues arising from industrial waste disposal operations
Y24	Arsenic; arsenic compounds
Y26	Cadmium; cadmium compounds
Y27	Antimony, antimony compounds
Y29	Mercury; mercury compounds
Y31	Lead; lead compounds
Y41	Halogenated organic solvents
Y42	Organic solvents excluding halogenated solvents
Y45	Organohalogen compounds other than substances referred to in this Annex (e.g., Y39, Y41, Y42, Y43, Y44)
Y46	Wastes collected from households
Y49[34,35]	**Electrical and electronic waste** • Waste electrical and electronic equipment (a) not containing and not contaminated with Annex I constituents to an extent that the waste exhibits an Annex III characteristic, and (b) in which none of the components (e.g. certain circuit boards, certain display devices) contain or are contaminated with Annex I constituents to an extent that the component exhibits an Annex III characteristic • Waste components of electrical and electronic equipment (e.g. certain circuit boards, certain display devices) not containing and not contaminated with Annex I constituents to an extent that the waste components exhibit an Annex III characteristic, unless covered by another entry in Annex II or by an entry in Annex IX Wastes arising from the processing of waste electrical and electronic equipment or waste components of electrical and electronic equipment (e.g. fractions arising from shredding or dismantling), and not containing and not contaminated with Annex I constituents to an extent that the waste exhibits an Annex III characteristic, unless covered by another entry in Annex II or by an entry in Annex IX
A1160	Waste lead-acid batteries, whole or crushed
A1170	Unsorted waste batteries excluding mixtures of only list B batteries. Waste batteries not specified on list B containing Annex I constituents to an extent to render them hazardous
A1180[36]	Waste electrical and electronic assemblies or scrap[37] containing components such as accumulators and other batteries included on list A, mercury-switches, glass from cathode-ray tubes and other activated glass and PCB-capacitors, or contaminated with Annex I constituents (e.g., cadmium, mercury, lead, polychlorinated biphenyl) to an extent that they possess any of the characteristics contained in Annex III (note the related entry on list B B1110)[38].

[[34] This entry becomes effective as of 1 January 2025.

[35] Note the related entry on list A A1181 in Annex VIII.]

[36] Entry A1180 is effective until 31 December 2024.

[36] This entry does not include scrap assemblies from electric power generation.

[37] PCBs are at concentration level of 50 mg/kg or more.

A3120	Fluff - light fraction from shredding
A3140	Waste non-halogenated organic solvents but excluding such wastes specified on list B
A3150	Waste halogenated organic solvents
A3180	Wastes, substances and articles containing, consisting of or contaminated with polychlorinated biphenyl (PCB) polychlorinated terphenyl (PCT), polychlorinated naphthalene (PCN) or polybrominated biphenyl (PBB), or any other polybrominated analogues of these compounds, at a concentration level of 50 mg/kg or more[39]
A4020	Clinical and related wastes; that is wastes arising from medical, nursing, dental, veterinary, or similar practices, and wastes generated in hospitals or other facilities during the investigation or treatment of patients, or research projects
A4070	Wastes from the production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish excluding any such waste specified on list B (note the related entry on list B B4010)
A4110	Wastes that contain, consist of or are contaminated with any of the following: • Any congenor of polychlorinated dibenzo-furan • Any congenor of polychlorinated dibenzo-p-dioxin
A4130	Waste packages and containers containing Annex I substances in concentrations sufficient to exhibit Annex III hazard characteristics
B1090	Waste batteries conforming to a specification, excluding those made with lead, cadmium or mercury
B1110[40]	Electrical and electronic assemblies: • Electronic assemblies consisting only of metals or alloys • Waste electrical and electronic assemblies or scrap[41] (including printed circuit boards) not containing components such as accumulators and other batteries included on list A, mercury switches, glass from cathode-ray tubes and other activated glass and PCB-capacitors, or not contaminated with Annex I constituents (e.g., cadmium, mercury, lead, polychlorinated biphenyl) or from which these have been removed, to an extent that they do not possess any of the characteristics contained in Annex III (note the related entry on list A A1180) • Electrical and electronic assemblies (including printed circuit boards, electronic components and wires) destined for direct reuse[42], and not for recycling or final disposal[43]
B1250	Waste end-of-life motor vehicles, containing neither liquids nor other hazardous components
B3030	Textile wastes[44]
B3035	Waste textile floor coverings, carpets

[39] The 50 mg/kg level is considered to be an internationally practical level for all wastes. However, many individual countries have established lower regulatory levels (e.g., 20 mg/kg) for specific wastes.

[40] Entry B1110 is effective until 31 December 2024.

[41] This entry does not include scrap from electrical power generation.

[42] Reuse can include repair, refurbishment or upgrading, but not major reassembly

[43] In some countries these materials destined for direct re-use are not considered wastes.

[44] Refer to Annex IX to the Basel Convention to see the full entry

B4010	Wastes consisting mainly of water-based/latex paints, inks and hardened varnishes not containing organic solvents, heavy metals or biocides to an extent to render them hazardous (note the related entry on list A A4070)
B4030[45]	Used single-use cameras, with batteries not included on list A

B. International linkages

1. Stockholm Convention

44. The Stockholm Convention on Persistent Organic Pollutants (POPs) is a global treaty aimed at protecting human health and the environment from POPs.

45. The objective of the Stockholm Convention, which entered into force on 17 May 2004, is set forth in Article 1 (“Objective”): “Mindful of the precautionary approach as set forth in Principle 15 of the Rio Declaration on Environment and Development, the objective of this Convention is to protect human health and the environment from persistent organic pollutants.”

46. The POPs listed in Annexes A, B, or C of the Stockholm Convention that are relevant in relation to plastic waste, inter alia as additives or processing aids, are:

(a) Hexabromobiphenyl (HBB);

(b) Hexabromocyclododecane (HBCD);

(c) The following polybromodiphenyl ethers: decabromodiphenyl ether (decaBDE), heptabromodiphenyl ether (heptaBDE), hexabromodiphenyl ether (hexaBDE), pentabromodiphenyl ether (pentaBDE) and tetrabromodiphenyl ether (tetraBDE);

(d) Short-chain chlorinated paraffins (SCCPs);

(e) Perfluorooctanoic acid (PFOA), its salts and PFOA related compounds;

(f) Perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride;

(g) Unintentionally produced POPs.

47. For further information on the general provisions and the waste-related provisions of the Stockholm Convention, refer to section II.B of the General technical guidelines on POPs.

48. For further information on the specific provisions related to these POPs, it is referred to the specific technical guidelines on POP-BDEs (UNEP, 2019d), HBCD (UNEP, 2015a), SCCPs (UNEP, 2019c), PFOS and PFOA (UNEP, 2022a) and unintentionally produced POPs (UNEP, 2019e).

2. Minamata Convention

49. The Minamata Convention on Mercury, which entered into force on 16 August 2017, is a global treaty with the objective according to Article 1, “to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. For further information on the general provisions and the waste-related provisions of the Minamata Convention, refer to section II.B of the technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds (UNEP, 2022c).

50. Some plastics contain mercury, including residual mercury from the manufacturing process of PVC, and pigments containing mercury sulphide. Mercury and methylmercury also adsorb onto marine plastics.

3. Montreal Protocol

51. The Montreal Protocol on Substances that Deplete the Ozone Layer is a global treaty aimed at protecting the Earth’s ozone layer by phasing out the chemicals that deplete it. The agreement entered into force in 1989. Under the Montreal Protocol), Parties are obligated to phase out the production and consumption of ozone-depleting substances (ODS) according to specified controls schedules, as well as to phase down the production and consumption of hydrofluorocarbons (HFCs). HFCs do not deplete the ozone layer but are greenhouse gases that were introduced to replace some uses of ODS.

52. Several of the substances controlled by the Montreal Protocol are used or have been used as blowing agents in the manufacture of rigid plastic foams. In foams used mainly for insulation

[45] Entry B4030 is effective until 31 December 2024.

purposes, in particular rigid polyurethane foam, trichlorofluoromethane (CFC-11), 1,1-dichloro-1-fluoroethane (HCFC-141b) and 1,1,1,3,3-pentafluoropropane (HFC-245fa) have been used, among other substances controlled by the Protocol. While there are no obligations pertaining to the destruction of these substances under the Protocol, the Parties agreed through Decision IV/24 to urge "all parties to take all practicable measures to prevent releases of controlled substances into the atmosphere", including "to destroy unneeded ozone-depleting substances where economically feasible and environmentally appropriate to do so". Furthermore, Parties to the Montreal Protocol have approved a list of destruction technologies and related minimum destruction removal efficiencies applicable to controlled substances[46], and a Code of Good Housekeeping Procedures[47], which outlines measures that should be considered to ensure that releases to the environment of controlled substances are minimized during the disposal of plastic wastes containing substances controlled by the Protocol.

4. Work under the United Nations Environment Assembly (UNEA) on marine plastic litter and microplastics

53. Concerns about global marine litter including plastic pollution and microplastics and the related risks to the environment and potentially human health are increasing. The negative effects on ecosystems, biota, societies and economies have been globally recognised and governments are committing to reducing plastic pollution. Four resolutions on marine plastic litter and microplastics have been adopted by UNEA at its sessions in 2014, 2016, 2017 and 2019 to address this global challenge. The issue has also been addressed in separate resolutions, detailed below, on sustainable consumption and production, waste management and single-use plastics in 2019.

54. UNEA-1 resolution 6 on "Marine plastic debris and microplastics" (UNEP/UNEA, 2014) formally brought the issue within the scope of UNEA's agenda and emphasized the challenges of marine debris, particularly plastic and microplastic pollution, the need for urgent action, further information and research and encouraged multi-stakeholder engagement.

55. UNEA-2 resolution 11 on "Marine plastic litter and microplastics" (UNEP/UNEA 2016) addressed the challenges related to marine litter, the issues of microplastic and nano-size particles, transport of plastic through freshwater systems, slow degradation processes and the release and adsorption of chemicals such as POPs.

56. In 2017, UNEA-3 resolution 7 on "Marine litter and microplastics" (UNEP/UNEA, 2017) addressed the importance of preventive actions through waste minimization, environmentally sound waste management, actions in areas with large sources of marine plastic litter and recognized that measures exist to provide cost-effective solutions. UNEA members also recognized the importance of long-term elimination of discharges of litter and microplastics to the oceans and avoiding detriment to marine ecosystems, and the human activities dependent on them, from marine litter and microplastics.

57. The resolution also established an open-ended ad hoc expert group (AHEG) to further examine barriers to and options for combating marine plastic litter and microplastics. The AHEG discussed the adequacy of existing global governance frameworks (UNEP/AHEG, 2018a), and addressed issues related to information, monitoring and governance and possibilities for enhancing existing efforts or identifying new governance structures for marine plastic litter (UNEP/AHEG, 2018b).

58. UNEA-4 resolution 6 on "Marine plastic litter and microplastics" (UNEP/UNEA 2019) extended the mandate of the AHEG to address development of indicators to harmonize monitoring, the need for effective monitoring of sources, the quantities and impacts of marine litter, and invited member states to promote environmentally sound waste management and marine plastic litter recovery; a multi-stakeholder platform was also established to strengthen coordination and cooperation. UNEA-4 resolution 9 on "Addressing single-use plastic products pollution" encourages member states to develop and implement actions to address the environmental impacts of single-use plastic products, identify environmentally friendly alternatives to single-use plastics, promote improved waste management and more resource-efficient design, production, use and sound management of plastics across their life cycle. At its third and fourth AHEG meetings in November 2019 and November 2020, AHEG discussed stocktaking of existing activities and the effectiveness of existing and potential responses to address marine litter issues (UNEP/AHEG 2019 and UNEP/AHEG 2020). In 2020, AHEG completed its mandate, however, potential options for continued work on the global level will be considered at UNEA-5.

[46] https://ozone.unep.org/treaties/montreal-protocol/meetings/thirtieth-meeting-parties/decisions/annex-ii-destruction-technologies-and-status-their-approval.

[47] https://ozone.unep.org/meetings/fifteenth-meeting-parties-montreal-protocol/decisions/annex-iii-code-good-housekeeping.

59. At UNEA 5.2, a resolution titled, [‘End plastic pollution: Towards an international legally binding instrument’ was adopted. By this resolution, the Assembly agreed to convene] an Intergovernmental Negotiating Committee (INC) to [develop an international legally binding instrument on plastic pollution, including in the marine environment, with the ambition to complete its work by the end of 2024. The instrument will be based on a comprehensive approach that addresses the full lifecycle of plastics. The resolution indicates that provisions to promote sustainable production and consumption of plastics, including, among others, product design and environmentally sound management of plastic waste [should be included in the instrument.] [It was also decided to promote cooperation and coordination with relevant regional and international conventions, instruments and organizations, while recognizing their respective mandates, avoiding duplication and promoting complementarity of action.] [Microplastics and chemicals in plastic products are issues with emerging evidence of environment and human health risks identified in the Global Chemicals Outlook II (UNEP, 2019f).]

5. Strategic Approach to International Chemicals Management (SAICM)

60. SAICM was developed to support the achievement of the global goal of sound chemicals and waste management by 2020, agreed at the 2002 Johannesburg World Summit on Sustainable Development. It is a multi-stakeholder, multi-sector voluntary international policy instrument focussed on the achievement of the Sustainable Development Goals relating to sound chemical and waste management. Its work is governed by the following documents: Dubai Declaration; Overarching Policy Strategy; Global Plan of Action and Overall Orientation and Guidance.

61. The International Conference on Chemical Management (ICCM) under SAICM assesses and calls for appropriate action on emerging policy issues and issues of concern. Chemicals in Products (CiP) was identified as an issue of concern at the ICCM2 in 2009 “with a view of taking appropriate cooperation actions, to consider the need to improve the availability of and access to information on chemicals in products in the supply chain and throughout their life cycle.” The CiP Programme, a voluntary framework activity, was welcomed by the fourth session of the ICCM4. The Programme’s activities are focussed on greater access to the information on chemicals in products that actors need for the sound management of chemicals, and the products that contain them, throughout their life cycle. One of the potential outcomes of the Programme is “enhancing the safe recycling and reuse of materials and products”. The CiP Programme focuses specifically on four sectors: textiles, toys, electronics, and building materials.

62. Other emerging issues under SAICM relevant to plastics include hazardous substances within the life cycle of electrical and electronic products, perfluorinated chemicals and the transition to safer alternatives, and endocrine disrupting chemicals. In addition, it is recognized that actions have been taken to address microplastic use in cosmetics and personal care products, but actions addressing other major sources of microplastics are limited (UNEP, 2020a).

63. SAICM shares common goals with multilateral environmental agreements such as the Basel, Rotterdam and Stockholm Conventions. In 2019 the Conference of the Parties to the Basel, Rotterdam and Stockholm Conventions requested the Secretariat (decisions BC-14/21; SC-9/19; RC-9/9) to continue to enhance cooperation and coordination with relevant initiatives including SAICM.

III. Guidance on environmentally sound management (ESM) of plastic wastes

A. General considerations

64. Environmentally sound management (ESM)[48] is a broad policy concept that is understood and implemented in various ways by different countries, organizations and stakeholders. The provisions and guidance documents pertaining to the ESM of hazardous wastes and other wastes under the Basel Convention provide for a common understanding and international guidance to support and implement the ESM of hazardous wastes and other wastes. OECD has also produced core performance elements related to ESM.

65. The 2013 Framework for the environmentally sound management of hazardous wastes and other wastes, adopted by decision BC-11/1 (“ESM framework”) (UNEP, 2013) establishes a common understanding of what ESM encompasses and identifies tools and strategies to support and promote the implementation of ESM. In addition, a set of practical manuals for the promotion of the environmentally sound management of wastes (UNEP, 2017c and UNEP,2019h) has been developed.

[48] See paragraph 31 for the definition of ESM in the Basel Convention.

The ESM framework and the practical manuals are intended as practical guides for governments and other stakeholders participating in the management of hazardous wastes and other wastes and complement the Basel Technical guidelines. Moreover, guidance on how to address the environmentally sound management of wastes in the informal sector (UNEP, 2019a) and a practical manual for stakeholders to ensure that notifications of transboundary movements meet environmentally sound management requirements (UNEP, 2022f) have been developed.

66. As presented in paragraph 33 of this document, Article 4 of the Basel Convention contains provisions related to the ESM of hazardous wastes and other wastes. ESM is also the subject of the following declarations:

(a) The 1999 Basel Declaration on Environmentally Sound Management, which was adopted at the fifth meeting of the Conference of the Parties to the Basel Convention, calls on the Parties to enhance and strengthen their efforts and cooperation to achieve ESM, including through prevention, minimization, recycling, recovery and disposal of hazardous and other wastes subject to the Basel Convention. This takes into account social, technological and economic concerns, and through further reduction of transboundary movements of hazardous and other wastes subject to the Basel Convention;

(b) The 2011 Cartagena Declaration on the Prevention, Minimization and Recovery of Hazardous Wastes and Other Wastes was adopted at the tenth meeting of the Conference of the Parties to the Basel Convention. The Declaration reaffirms that the Basel Convention is the primary global legal instrument for guiding the ESM of hazardous wastes and other wastes and their disposal, including efforts to prevent and minimize their generation, and efficiently and safely manage that which cannot be avoided.

67. The waste management hierarchy is a guiding principle for the ESM of waste and covers prevention, minimization, reuse, recycling, other recovery including energy recovery, and final disposal. The hierarchy encourages treatment options that deliver the best overall environmental outcome, taking into account lifecycle thinking[49].The waste management hierarchy has also been recognised by the Strategic Framework (adopted by decision BC-10/2), the ESM framework (see its paras. 11, 14, 18, 26 and 43) and in the Guidance to assist Parties in developing efficient strategies for achieving the prevention and minimization of the generation of hazardous and other wastes and their disposal (UNEP, 2017d). UNEA-2 resolution 11 on marine plastic litter and microplastics also called on countries to establish and implement necessary policies, regulatory frameworks and measures consistent with the waste hierarchy.[50] The waste hierarchy was also defined and described in UNEP's Global Waste Management Outlook (UNEP, 2015b).

68. Parties should consider a systemic approach to harmonizing and developing policy frameworks related to plastic wastes. Such an approach may address the root causes of the problem and take a long-term perspective that considers the long-lasting consequences of plastic in the environment, including the marine environment.

69. In addition, Parties should develop a range of measures (strategies, legislation, regulations and programmes) and monitor their implementation to support the meeting of ESM objectives. The implementation of national strategies, policies and programmes are effective methods to ensure a structured approach to the implementation of legislation and regulations; monitoring and enforcement; incentives and penalties; technologies; and other tools in which all key stakeholders participate and cooperate (UNEP, 2013). The following sections should be taken into account when establishing, implementing or evaluating ESM.

B. Legislative and regulatory framework

70. Parties to the Basel Convention should examine their national and subnational strategies, policies, controls, standards and procedures to ensure that they are in agreement with the Convention and with their obligations under it, including those that pertain to the transboundary movement and ESM of plastic wastes.

71. Most countries already have in place some form of legislation that outlines broad environmental protection principles, powers and rights. Such legislation should make ESM operational and include requirements for protection of both human health and the environment. Such enabling legislation can give governments the power to enact and enforce specific rules and

[49] Decision BC-10/2: Strategic framework for the implementation of the Basel Convention for 2012-2021.

[50] http://web.unep.org/unea/list-resolutions-adopted-unea-2.

regulations on the ESM of plastic wastes, including provisions for inspections and for establishing penalties for violations (e.g., on illegal traffic).

72. Such legislation should enable relevant authorities to monitor whether facilities where plastic wastes are disposed of, for example plastic waste recycling facilities, have obtained all the necessary approvals and can demonstrate due diligence in compliance to ensure such facilities are fully protective of human health and the environment. In addition, any legislation should establish whether actors involved in plastic waste management (e.g., collectors, transporters, and recyclers) ensure that the collection, transportation, storage and disposal of wastes are environmentally sound.

73. The legislation should require adherence to ESM principles, ensuring that countries provide ESM of plastic wastes, including environmentally sound disposal as described in the present guidelines. Specific components or features of a regulatory framework that would meet the requirements of the Basel and Stockholm Conventions and other international agreements are addressed in relevant guidance documents developed under these conventions.[51]

74. The legislation should cover plastic product policies to increase the recycling rates of plastic wastes or stimulate sustainable use of plastic products.

1. Extended producer responsibility

75. Extended Producer Responsibility (EPR) systems for plastic and plastic packaging have been introduced in many industrialized countries. EPR is an approach that promotes reduction in the environmental impact of products, throughout their lifespan, from production to the waste stage. EPR assigns the responsibility of the whole lifecycle of a product to the producer of the goods, including environmentally sound waste disposal.

76. In addition to plastic packaging, products partly consisting of plastic such as electrical and electronic equipment and vehicles are, in some developed and emerging economies, under relevant EPR schemes. For example, in Canada, EPR schemes are in place in many provinces and territories and cover a range of plastic products including plastic film, bags, containers, and products partially consisting of plastic, such as electronics (Environmental and Climate Change Canada, 2021 and Electronic Products Recycling Association, 2020). In the European Union (EU) for example, Member States must establish EPR schemes for certain single use plastic products to ensure that producers contribute to the cost of waste collection, transportation and treatment of the waste, of awareness raising measures and of cleaning up litter (European Union, 2019). In a few countries, such as China, France, Italy, Spain and Sweden, EPR has, for example, been introduced for agricultural plastic film, and Argentina has introduced EPR for agrochemical plastic containers. Other products such as toys, housewares, furniture, mattresses, fishing gear and textiles (such as carpets) can also be covered by EPR schemes.

77. Components of effective EPR programs related to plastic products can include:

(a) Clear definitions of products covered;

(b) Mandatory compliance with legally binding requirements;

(c) Responsibility with producers furthest up the chain that is under the jurisdiction of the government (this may be the manufacturer, importer, distributor, brand owner, etc.), as the entity that can have the most influence on product design;

(d) Financial responsibility borne by producers;

(e) Measurable targets for plastic waste prevention and reduction, for reusability, durability and reparability of plastic products, for exclusion of hazardous additives, and for mechanical recycling;

(f) Effective enforcement provisions, including dissuasive fines or financial remediation plans for non-compliance and the ability for public oversight;

(g) Protection for existing informal waste collection workers;

(h) Public education programmes;

[51] Further guidance on Basel Convention regulatory frameworks can be found in the following documents: *Manual for the Implementation of the Basel Convention* (UNEP, 2015d) and *Basel Convention: Guide to the Control* (UNEP, 2015e). Parties to the Stockholm Convention should also consult the *Guidance for Developing a National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants* (UNEP, 2017e).

(i) Publicly accessible reporting.

78. Further guidance on EPR is available in the practical manual on extended producer responsibility adopted by decision BC-14/3, in "Extended Producer Responsibility - Guidance for efficient waste management" (OECD, 2016) and in "Development of Guidance on Extended Producer Responsibility (EPR)" (European Commission, 2014).

2. End-of-waste status

79. The text of the Basel Convention does not clarify when a waste ceases to be a waste. The Glossary of Terms of the Basel Convention provides explanatory notes in this regard (UNEP, 2017f). Possibilities for waste to cease to be waste referenced in the Glossary of terms include when:

(i) It has been prepared for reuse;

(ii) It has undergone a recycling operation and that operation is completed;

(iii) It has otherwise gained end-of-waste status as a result of a recovery operation.

80. Some Parties have adopted conditions in their national legislation that can determine the point at which a material need no longer be classified as waste, such as the European Union (European Union, 2008) and the UK (English Environment Agency, 2016).

3. Transboundary movement requirements

81. Transboundary movements of hazardous wastes and other wastes must be kept to a minimum consistent with their environmentally sound and efficient management and conducted in a manner that protects human health and the environment from any adverse effects that may result from such movements. Y48 in Annex II and A3210 in Annex VIII are categorized as other wastes and hazardous wastes respectively and should, as far as is compatible with their ESM, be disposed of in the country where they were generated. Transboundary movements of such wastes are permitted only under the following conditions:

(a) If the country of export does not have the technical capacity and the necessary facilities, capacity or suitable disposal sites in order to dispose of the wastes in question in an environmentally sound and efficient manner;

(b) If the wastes in question are required as a raw material for recycling or recovery industries in the country of import;

(c) If the transboundary movements in question are in accordance with other criteria decided by the Parties.

82. Any transboundary movements of hazardous wastes and other wastes considered under the Basel Convention are subject to prior written notification from the exporting country and prior written consent from the importing and, if appropriate, transit countries. Parties shall not permit the export of hazardous wastes and other wastes if the country of import prohibits the import of such wastes in accordance with the Basel Convention.

83. Parties listed in Annex VII to the Convention (members of the EU, OECD and Liechtenstein), that are bound by the Ban Amendment, shall prohibit transboundary movements to states not listed in Annex VII of hazardous wastes which are destined for operations according to Annex IVA and hazardous wastes under Article 1.1(a) which are destined to operations according to Annex IVB[52].

84. The Basel Convention also requires that information regarding any proposed transboundary movement of hazardous wastes and other wastes be provided using the accepted notification form and that the approved consignment be accompanied by a movement document from the point where the transboundary movement commences to the point of disposal. Furthermore, hazardous wastes and other wastes subject to transboundary movements should be packaged, labelled and transported in conformity with international rules and standards[53].

85. When a transboundary movement of hazardous wastes and other wastes to which consent of the countries concerned has been given cannot be completed, the country of export shall ensure that the waste in question is taken back into the country of export for their disposal if alternative

[52] For information on the status of individual Parties in relation to the amendment, please see the Status of Ratifications page on the Basel Convention website http://www.basel.int/Countries/StatusofRatifications/BanAmendment/tabid/1344/Default.aspx.

[53] In this connection, the United Nations Recommendations on the Transport of Dangerous Goods (Model Regulations) of 2019 (UNECE, 2019) or later versions should be used.

arrangements cannot be made. In the case of illegal traffic (as defined in Article 9, paragraph 1), as the result of conduct on the part of the exporter or the generator, the country of export shall ensure that the wastes in question are taken back into the country of export for their disposal or otherwise disposed of in accordance with the provisions of the Basel Convention (as per Article 9, paragraph 2). For further information, see the Guidance on the implementation of the Basel Convention provisions dealing with illegal traffic, adopted by COP13 in 2017 (UNEP, 2017g).

86. No transboundary movements of hazardous wastes and other wastes are permitted between a Party and a non-Party to the Basel Convention unless a bilateral, multilateral or regional agreement or arrangement exists as required under Article 11 of the Convention.

4. [Considerations on][Interpretation of]terms contained in the entries Y48 and B3011

87. In the entries Y48 and B3011 the terms “almost free from contamination and other types of wastes” and “almost exclusively consisting of” appear. The purpose of these terms is to distinguish between entries Y48 and B3011.

88. When implementing the entries B3011 and Y48 at the domestic level, Parties may interpret the terms “almost free from contamination and other types of wastes” and “almost exclusively consisting of” used in these entries in different ways. Examples of approaches to interpreting these terms are the following:

(a) A quantitative approach using quantitative criteria. Guidance following this approach has for example been issued in the European Union (European Commission, 2021). Such guidance, inter alia, contains that, for the first indent of entry B3011, the content of contamination, other types of wastes or non-halogenated polymers, cured resins or condensation products, or fluorinated polymers other than the one non-halogenated polymer, cured resin or condensation product, or fluorinated polymer that makes up the bulk of the plastic waste should not exceed a total maximum percentage of the weight of the consignment of 2%;

(b) An approach drawing on an assessment of quantitative elements and qualitative criteria. Guidance following this approach has for example been issued by the Scottish Environment Protection Agency (Scottish EPA, 2020). This guidance says that to be classified under entry B3011, a consignment of a certain type of plastic waste must contain only minimal amounts of other plastic wastes and only minimal amounts of contamination or other wastes. The assessment of the minimal amounts is based on the quantity, type and quality of contaminants in the waste and on the specific type of waste.

89. Parties and their competent authorities should share information on the national legislation and relevant guidance they have issued in a transparent and efficient manner.

90. It is the responsibility of persons involved in shipments of plastic wastes, such as exporters, importers, and carriers, to ensure they comply with the national legislation and apply the relevant guidance issued by the States of export, import and transit. [However, national procedures for the import of plastic waste should not be considered a replacement for prior-informed consent procedure for all Parties concerned by a transboundary movement.]

5. Specifications for containers and storage sites

91. To meet the requirements of ESM and specific clauses in the Basel and Stockholm Conventions (for example, Basel Convention Article 4, paragraph 7, and Stockholm Convention Article 6, paragraph 1), Parties may need to enact specific legislation that describes the types of containers and storage areas that are acceptable for particular plastic waste streams.

92. Parties should ensure that containers that may be subject to transboundary movement meet international standards such as those established by the International Air Transport Association (IATA), the International Maritime Organization (IMO) and the ISO.

6. Requirements for plastic waste treatment and disposal facilities

93. Most countries have legislation in place that requires the operators of waste treatment and disposal facilities to obtain approval to operate. Approvals may contain specific conditions that must be adhered to for these approvals to remain valid. A permitting or approval process based on established and transparent criteria on, inter alia, how to operate facilities, emission levels, monitoring, as well as an inspection regime may be an appropriate approach. It may prove necessary to add requirements specific to plastic wastes to meet the requirements of ESM, and to comply with the specific requirements of the Basel and Stockholm Conventions.

7. Other legislative controls

94. Examples of other aspects of the life-cycle management of plastic wastes that could be regulated through legislation and or a permitting/approval process may include:

(a) Environmental impact assessment of facilities disposing of plastic wastes, if appropriate;

(b) Citing provisions and requirements relative to the storage, handling, collection and transportation of plastic wastes;

(c) Public participation in the permitting or approval process for plastic waste disposal facilities as referred to in section III, J;

(d) Requirements for health and safety of workers;

(e) Decommissioning requirements for plastic recycling facilities, including:

(i) Inspection prior to and during decommissioning;

(ii) Procedures to be followed to protect worker and community health and the environment during decommissioning;

(iii) Post-decommissioning site requirements;

(f) Emergency contingency planning, spill and accident response, including:

(i) Clean-up procedures and post-clean-up concentrations to be achieved;

(ii) Worker training and safety requirements;

(iii) Waste prevention, minimization and management plans;

(iv) Obligations to ensure best-practice management systems, including requirements for annual reporting and regular third-party auditing and verification after the accident;

(g) Restrictions on greenhouse gas (GHG) emissions across the life cycle of plastics including their management as wastes, including such restrictions as are required to meet nationally determined contributions for parties to the Paris Agreement.

C. Waste prevention and minimization

1. General considerations

95. Prevention and minimization of wastes are the most important steps in the waste management hierarchy. The third preambular paragraph to the Basel Convention, affirms that the most effective way of protecting human health and the environment from the dangers posed by hazardous wastes and other wastes is the reduction of their generation to a minimum in terms of quantity and/or hazard potential.

96. In Article 4, paragraph 2, the Basel Convention calls on Parties to "ensure that the generation of hazardous wastes and other wastes is reduced to a minimum". Waste prevention should be the preferred option in any waste management policy, so that the need for waste management is reduced, enabling resources to be used more efficiently.

97. At the tenth meeting of the Conference of the Parties to the Basel Convention, the Parties, in adopting the Cartagena Declaration committed "to enhancing the active promotion and implementation of more efficient strategies to achieve prevention and minimization of the generation of hazardous waste and other wastes and their disposal".

98. One of the multiple benefits of plastic waste prevention and minimization is the reduction in the release of plastic waste into the terrestrial and marine environments. The Conference of the Parties to the Convention addressed the prevention and minimization of the generation of plastic waste in its decision BC-14/13: Further actions to address plastic waste under the Basel Convention, in particular in part II of the decision.

99. According to the ESM framework, the need to manage wastes and/or the risks and costs associated with waste management can be reduced by not generating wastes and by ensuring that generated wastes are less hazardous (UNEP, 2013).

100. The ESM framework states that "companies that generate wastes (waste generators) are responsible for ensuring the implementation of best available techniques (BAT) and best

environmental practices (BEP) when undertaking activities that generate wastes". In doing so, they act to minimize the wastes generated by ensuring research, investment in design, innovation and development of new products and processes that use less resources and energy and that reduce, substitute or eliminate the use of hazardous materials (UNEP, 2013).

101. Waste management efforts require multi-stakeholder involvement in the development of waste management plans with a strong emphasis on prevention and minimization, in partnership with waste generators, industrial users and civil society.

102. A practical manual on waste prevention, as part of the set of practical manuals for the promotion of the environmentally sound management of wastes (UNEP, 2017c), provides stakeholders with general guidance on waste prevention principles, strategies and possible measures and tools. The Guidance to assist Parties in developing efficient strategies for achieving the prevention and minimization of the generation of hazardous wastes and other wastes and their disposal (UNEP 2017d) identifies elements of a waste prevention and minimization programme that apply also to plastic wastes.

2. Policy instruments and measures on waste prevention and minimization

103. Countries [are encouraged to] [should] adopt policies and measures to prevent and minimize plastic waste generation throughout the [entire] life cycle of plastics [from bottom to top approach] [, taking into account national circumstances, [and] [capabilities] needs and priorities]. Examples of policy instruments and measures on waste prevention and minimization [that may be applied] are provided in Table 9[54].

Table 9: Examples of policy instruments and measures on waste prevention and minimization[55]

Policy instruments	Waste prevention and minimization measures
Regulatory	- Design requirements [- Ban on certain single-use plastic products [, such as single-use plastic bags or cutlery][56]] [- Ban on oxo-degradable plastics] - Restrictions on [toxic or] hazardous substances in plastics and of microplastics in products - Consumption reduction measures[57] - Targets on recovery/recycling - Targets on recycled content - Deposit return schemes to increase reuse and recycling - Labelling and identification of products - Extended Producer Responsibility (EPR), e.g., including fee modulation with respect to recycled content or other design aspects - Green procurement criteria [- Landfill ban/incineration ban] [- Measures to [Reduce][ban/restriction][Restrictions on] the use of hard-to-recycle plastics]
Market-based	- Taxes on products (e.g. packaging, plastic bags[, virgin plastic]) - Tax exemptions [and other positive economic incentives] (e.g. for reuse and repair) - Pay-as-you-throw schemes (PAYT) - Deposit return schemes - Extended producer responsibility (EPR) - Landfill tax/incineration tax [- Tax on virgin plastic] [- Economic incentives for reusable and repairable products and packaging, packaging-free businesses]
Information-based	- Awareness campaigns/school education - Labelling and identification of products - Procurement guidelines - Providing practical information, e.g., via information exchange platforms, to businesses and consumers - Environmental certification schemes

[54] More information on the examples can be found in OECD, 2019.

[55] Some measures are relevant to more than one policy instrument.

[56] For example, see European Union, 2019.

[57] For example, see European Union, 1994, and European Union, 2019.

Voluntary	- Product standards (e.g., eco design) and specifications [- Stakeholder recognition and incentive programs] - Labelling and identification of products - Extended producer responsibility (EPR) [- Green procurement criteria] [- Sustainable procurement]

(a) Regulatory instruments and measures

104. Design requirements for products are a central feature in successful waste prevention and minimization policy. It has been shown that eco-design, for all products, determines almost 80 percent of a product's environmental impact (European Commission, 2012).

105. Design requirements can reduce the amount of plastic waste generated by limiting the use of plastics in new products. This can be achieved either by using alternative materials with less environmental impact or by reducing the size of the products. In addition, the volume of plastic packaging could be reduced, e.g. in order to prevent excessive use of packaging that is not necessary.

106. For some plastic products, the most relevant design feature would be to focus on an extended lifespan, thereby postponing and reducing waste generation. This can be achieved through integrating aspects of durability, reusability, repairability and upgradability in the design process.

107. The choices made at the design stage will also influence the options available for recycling, once the product has become waste. [Measures to reduce the use of hard-to-recycle plastics could be taken]. Using materials that lead to hard-to-recycle plastic waste could be avoided [, such as carbon black in black plastics, which are found in products such as packaging, as these plastics are difficult to detect by automatic sensor sorting.] Composite products where the individual parts or layers are difficult to separate should [also] be avoided, as they typically consisting of a combination of plastics and other material types or of different plastic polymers. [The use of carbon black in black plastics, found in certain products, e.g. in packaging, could also be avoided since these plastics are difficult to detect by automatic sensor sorting.]

108. Specific waste prevention and minimization measures can be applied to single-use products and other products that are known be frequently littered, such as plastic bags, [disposable] [single-use] cutlery and products made of EPS. A ban on certain single-use plastics could be formulated. Oxo-degradable plastics could also be banned since this plastic type leads to [significant] release of microplastics. Consumption reduction measures could also be a relevant initiative for these articles, leading to a substantial reversal of increasing consumption trends [(see paragraph 18)].

109. [In addition, measures to restrict the use of certain plastic polymer types that are known to cause problems in the waste management chain, such as PVC, could be considered]

110. Product design could be tailored to ensure that hazardous substances used as additives in plastics are avoided. Furthermore, it is important to restrict the use of intentionally added microplastics in products, such as cosmetics and paint.

111. Setting targets for recycled content in plastic products and/or targets on recovery/recycling could increase the demand for secondary raw materials and strengthen their market position, thereby stimulating recycling activities. [This is also expected to increase general public awareness on the importance of sound disposal and separate collection.] In addition, the implementation of deposit return schemes for plastic products, such as PET beverage bottles, typically leads to high levels of collection and provides a clean stream of plastics for reuse [or of plastic waste for recycling].

112. Businesses, including manufactures, suppliers and retailers should disseminate product design information through claims, labels and identification schemes regarding plastic products, e.g., for clear and well-designed recyclability labels. This will enable consumers to make informed choices when buying products, leading to waste prevention and minimization. Such claims and labels could also enable plastic waste disposal facilities to access information about waste containing additives or processing aids to an extent to render the waste hazardous or problematic, notably POPs or SVHC (see tables 6 and 7), in order to avoid contamination of subsequent recycling and manufacturing processes.

113. Principles such as reliability, relevance, clarity, transparency and accessibility should serve as the main guiding principles of claims, labels and identification schemes (UNEP, 2020b).

114. EPR systems aim to shift a large part of the costs of waste management back to producers, thereby stimulating investment in eco-design, leading to waste prevention and increased recycling. In order to be effective, the EPR systems should implement incentives for waste prevention and recycling for each individual producer, for instance through modulating the fees that producers pay

according to certain criteria, such as recycled content or other design aspects. For further information on EPR, see section B.1 above.

115. Green public procurement criteria may be developed to facilitate the inclusion of green requirements in public tender documents, including specific requirements on [the use of products that meet certain design requirements (e.g., the use of minimum recycled content)] [waste prevention and recycling]. Since the public sector's purchasing accounts for a large proportion of the economic activity in society, such criteria could have an important influence on services and works within the marketplace.

116. Introducing a [total or partial] ban on landfilling of plastic waste could be considered. It could also be relevant to ban [energy recovery] [incineration] of recyclable plastics, except in cases where certain plastic types or additives represent a particular health risk or environmental hazard and require destruction. [This could increase recycling and stimulates waste prevention and increase recycling, if alternative waste management infrastructure is in place] [after careful analysis to determine that such a measure would be unlikely to result in improper disposal to avoid compliance with such measures (e.g., open dumping). For example, in jurisdictions with low rates of collection and developing recycling markets, enacting a ban on landfilling could unintentionally create an incentive to improperly dispose of waste unless alternative management options are available].

(b) Market-based instruments and measures

117. Marked-based measures may be used to incentivize actions towards waste prevention and minimization. Taxes can be levied on certain plastic products, such as [virgin single-use plastics,] plastic bags, or on plastic products that do not comply to a certain environmental standard, such as a minimum content of recycled material. Tax [exemptions and other positive economic incentives] [, such as subsidies,] can also be applied [to stimulate] [, for instance] for reuse and repair [activities] [of plastic products and packaging-free businesses [or awarded to businesses that sell products without plastic packaging or in reusable containers]. Another option is to introduce pay-as-you-throw (PAYT) schemes with variable pricing for waste collection by weight or volume, which works as an incentive for consumers to generate less waste. The highest fee would typically be imposed on mixed residual waste. In addition, taxes can be levied on [energy recovery] [incineration] or landfilling of plastics. [Taxes on virgin single-use plastic products can be levied to disincentivize the production of such items. Tax reductions can also be awarded to businesses that sell products without packaging or in reusable containers.]

(c) Information-based instruments and measures

118. Actions for the prevention and minimization of plastic waste would benefit from a change of public awareness relating to production and consumption. Creating awareness amongst the general public as well as the business community can e.g. be achieved through targeted campaigns and education. Sharing practical information and guiding tools about how individuals and companies can prevent and reduce plastic waste in their daily lives, is also a useful step.

[ALT 118. Raising awareness among the general public and business community about ways to prevent and minimize the generation of plastic waste can also be an effective way to spur action. [Furthermore, this can lead to a change of public awareness relating to production and consumption] Examples of [such] [relevant] measures include targeted campaigns education, and the sharing of practical information and guiding tools about how individuals and companies can prevent and reduce plastic waste in their daily lives.]

119. Additionally, local authorities should promote waste prevention-based community building through communication with local commerce and industries, as well as consumers. For further information, see section III.J.

(d) Voluntary instruments and measures

120. Some of the instruments and measures on waste prevention and minimization described above are applicable to more than one policy instrument. This is for instance the case for some regulatory measures that can also be applied voluntarily by various actors, such as product standards and specifications, labelling and identification of products, EPR and green procurement criteria.

[ALT 120. Voluntary measures encompass a range of activities undertaken by stakeholders and other actors and can include many of the instruments and measures identified as regulatory in Table 9, such as product standards and specifications, labelling and identification of products, EPR and green procurement criteria. Voluntary measures can include also programs established by governments or other organizations that incentivize stakeholders to prevent and reduce waste without regulatory action, e.g., stakeholder recognition programs, that highlight actions taken by stakeholders that go beyond mandated requirements.]

3. Reduction of plastic leakage through waste prevention and minimization

121. Waste prevention and minimization measures described above will in general reduce the leakages of plastics from the waste phase. In addition, special care should be taken to reduce leakages from the unintended loss of plastic products, such as fishing gear, plastic pellets and artificial turf. Most of these losses occur in the use phase of products, whereas losses of pellets may occur in the production phase as well.

122. The leakages of plastics from the production and use phase can be addressed through various policy instruments, such as regulatory, voluntary and information-based. In general, procedures and best practices for handling of the products should be applied, in order to reduce the risk of [loss][losing] [them] to the environment. For some product types, notably plastic pellets, this should be done for several handling steps along the value chain, since losses can occur from any of the steps. Leakages of plastics and the relevant sources could typically differ from country to country, so regulations and other measures to prevent leakages should be tailored to each country's circumstances.

123. [Text may be added based on activities undertaken by the Working Group 1 on Prevention and Minimization of Waste established under the Plastic Waste Partnership (PWP).]

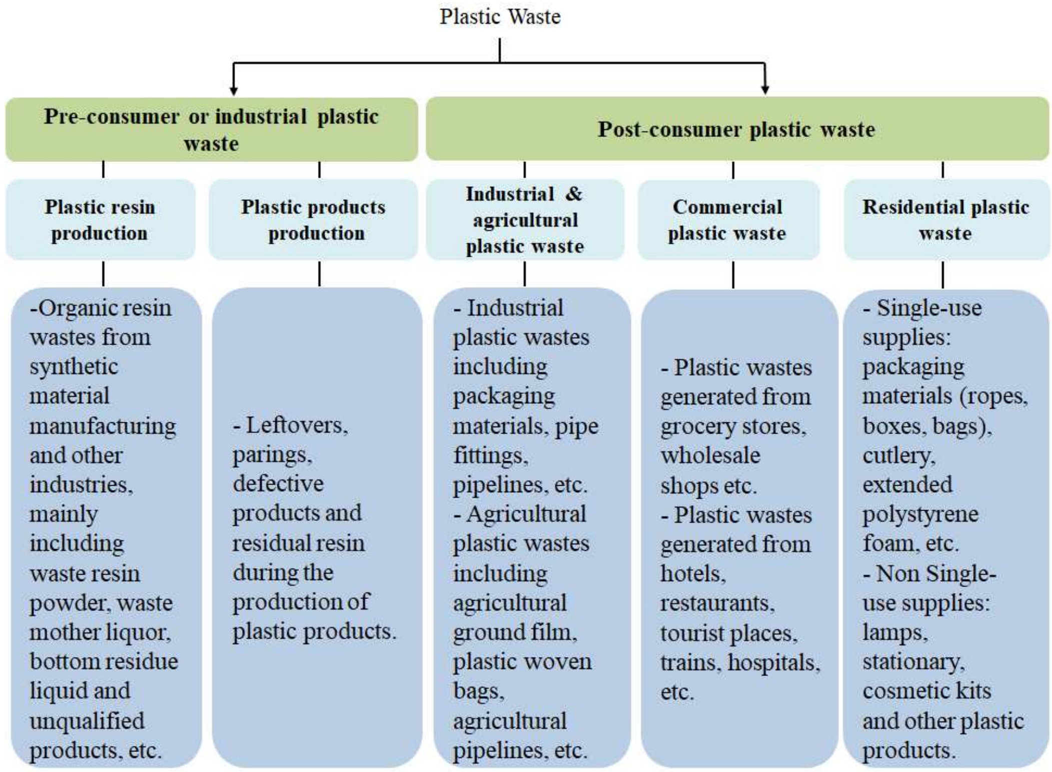
D. Identification and inventories

1. Identification of plastic wastes sources

124. The identification of plastic waste is the starting point for their effective ESM. To enable effective action to prevent, minimize and manage plastic wastes, it is important that Parties identify the sources of plastic waste generation and quantify the amount of plastic wastes generated.

125. Plastic wastes can be categorised into two main categories: pre-consumer and post-consumer wastes (see Figure 2). Post-consumer plastic wastes are found mainly in municipal solid waste (MSW) and in the following economic sectors: industry, agriculture, [building and] construction [and demolition], commercial, institutional, automotive, electrical and electronic equipment, and textiles (see Table 10 for main sources and examples of plastic wastes.)

Figure 2: Classification of plastic wastes



Source: Based on Yang et al., 2018.

Table 10: Main sources and examples of plastic wastes:

Source	Examples of waste types generated	Detailed examples
Pre-consumer plastic wastes		
Polymer production and compounding	Wastes from: · Industrial packaging · Pre-production offcuts · Sweepings · Off-specification plastic	Off-specification colour pellets, compounder purge, clean-down waste, pellet conveying systems line-purge waste, handling and bulk loading spillages.
Plastic conversion	Wastes from moulding and extrusion	Sheet edge trimmings and mould flow sprues.
Plastic assembly or installation	Wastes from plastic assembly and installation processes	Damaged assemblies, intentional ‘press-out’ blanks, component handling tabs, screw thread covers, body panel covers, failed trial polymer applications
Post-consumer plastic wastes		
Municipal solid waste	Consumer plastic packaging	Plastic bottles, pots, tubs, trays, films and wrappers.
	Garden plastics	Outdoor seats and tables, toys, buckets, flowerpots, paddling pools.
	Household products	Crates, filing boxes, washing baskets, kitchenware.
	Furnishings	Seating foams, upholstery textiles, legs, feet, mouldings, and mattresses.
	Sports and leisure equipment	Rackets, balls, cushion mats, protective headwear and footwear.

Commercial and large industrial plastic wastes	Packaging and containers	Waste of bags, drums and containers from the food and chemical industries, packaging films, industrial equipment, crates.
Agriculture plastic wastes	Flexible films, fibres, string and nets Tanks, drums, containers and pipes	Greenhouses covers, fertilizer sacks, mulch and fumigation films, silage bale-wraps, bird protection nets and baling twine. Water tanks, chemical drums, fertilizer bottles, irrigation pipes and valves.
Plastic wastes from hospitals, health and safety, and laboratories	Single-use plastic packaging, medical and laboratory supplies and personal protective equipment	Infusion bottle (bag), dialysis bucket, plastic packaging, packing box, packing barrel, masks, protective clothing.
Plastic wastes from WEEE	Refrigerators, computers, vacuum cleaners, small domestic appliances, mobile phones and office equipment.	Printed circuit board, fans, shells, PUR foams, pipes, inner tank, coil, plastic capacitor, and resistance
Plastic wastes from end-of-life vehicles waste (ELV)	-	Car bumpers, body mouldings, interior trim panels, seat foams, flexible cooling pipes, battery shell.
Plastic wastes from Fishing/aquaculture	Nets and other fishing gear	Fishing nets, trawls, ropes, strapping bands, floats, buoys
Wastes from construction and demolition		Plastic from window frames and doors, construction off-cuts, roofing sheets, insulation panels, textiles, drainage pipes.
Plastic wastes from textiles	Textile wastes	Clothing and textiles such as towels, curtains, bedding, and carpets.
Plastic wastes from cables		Cable jackets

2. Identification of plastic products/wastes according to the resin type

126. The ASTM D7611—Standard Practice for Coding Plastic Manufactured Articles for Resin Identification provides a set of symbols appearing on plastic products that identify the plastic resin out of which the product is made (See Table 1).

3. Identification of hazardous [and non-hazardous] plastic wastes

127. According to Article 1 paragraph 1(a) of the Convention, plastic waste that belongs to any category contained in Annex I is to be considered hazardous waste, unless it does not possess any of the hazardous characteristics contained in Annex III. For example, the following plastic wastes should therefore be presumed to be hazardous waste[58]:

(a) Plastic wastes covered under the category Y13 (wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives) and entry A3050. For example, wastes of formaldehyde resins may exhibit the hazardous characteristics H6.1, H11 and H12;

(b) Plastic wastes containing or contaminated with heavy metals covered under the categories Y24 (arsenic; arsenic compounds), Y26 (cadmium; cadmium compounds), Y29 (Mercury; mercury compounds) and Y31 (lead; lead compounds). For example, [waste of] rigid PVC [that contains] [may contain] [containing] cadmium and lead stabilizers may [possess] [exhibit] Annex III characteristics] H6.1, H11, H12 and H13, in which case they would fall under entry A3210;

(c) Plastic wastes containing or contaminated with brominated flame retardants (BFRs), in particular BFRs that are POPs according to the Stockholm Convention, covered [under category Y45 and] [under] entry A3210. In general, [waste containing BFRs may fall under Annex I category Y45 (organohalogen compounds other than substances referred to elsewhere in Annex I) and,] if antimony compounds are used as synergists of the BFRs, under category Y27 (Antimony, antimony compounds). Depending on the concentration and the chemical properties of the BFRs and their synergists, plastic wastes containing or contaminated with BFRs may possess Annex III hazardous characteristics H6.1, H11, H12 and H13.

(d) Textile wastes made of plastic containing or contaminatedwith PFAS compounds after treatment for waterproofing covered under Annex I category Y45 (organohalogen compounds other

[58] It should be noted that some of the entries in Annex VIII have references to entries in Annex IX. See also Table 8.

than substances referred to elsewhere in Annex I) PFAS compounds such as PFOS and PFOA that are listed as POPs under the Stockholm Convention, may possess the hazardous characteristics H6.1, H11, H12 and H13.

(e) Plastic wastes contaminated with hazardous materials such as solvents covered under the categories Y41 (halogenated organic solvents) and Y42 (organic solvents excluding halogenated solvents), and entry A3140 [and material covered under categories Y39 such as Bisphenol A] and A3150. For example, a waste solvent plastic tank may possess the hazardous characteristics H11 and H12.

(f) Plastic wastes from medical care in hospitals, medical centres and clinics covered under the category Y1(clinical wastes from medical care in hospitals, medical centers and clinics) and entry A4020, plastic wastes contaminated with waste pharmaceuticals, drugs and medicines under the category Y3 (Waste pharmaceuticals, drugs and medicines). For example, waste syringes may possess the hazardous characteristics H6.1, H6.2, H11 and H12.

(g) Plastic wastes containing certain additives such as MCCPs covered under Annex I category Y45 (organohalogen compounds other than substances referred to elsewhere in Annex I) and entry A 3210 may possess the hazardous characteristics H11 and H12.

(h) Plastic wastes from metal cables containing or contaminated with organohalogen compounds covered under category Y45 (organohalogen compounds other than substances referred to elsewhere in Annex I) and entry A1190. Such plastic waste may exhibit the hazardous characteristics H6.1, H11, H12 and H13.

(i) Plastic wastes from waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs) and/or polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBs) covered under category Y10 (waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs) and/or polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBs)) and entry A3180, and possibly under entries A1160, A1170, A1180[59], A1181[60], A3120 and A4130. PCBs and HBB, a PBB, are listed as POPs under the Stockholm Convention. Waste containing PCBs, PCTs and PBBs may possess the hazardous characteristics H6.1, H11, H12 and H13, depending on their concentration levels in a waste.

(j) Plastic wastes from production, formulation and use of inks, dyes, pigments, paints, lacquers and varnish covered under the category Y12 (wastes from production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish) and entry A4070. For example, wastes of azo dyes may exhibit the hazardous characteristics H11, H12 and H13;

(k) Plastic wastes that contain or are contaminated with any congenor of polychlorinated dibenzo-furan and/or any congenor of polychlorinated dibenzo-p-dioxin covered under the category Y43 (any congenor of polychlorinated dibenzo-furan) and Y44 (any congenor of polychlorinated dibenzo-p-dioxin) and entry A4110. These plastic wastes may exhibit the hazardous characteristics H6.1, H11 and H12.

(l) [Plastic wastes covered under category Y4 (Wastes from the production, formulation and use of biocides and phytopharmaceuticals) and entry A4030, and possibly under entries A3210 and A4130. For example, an empty plastic container for biocides may exhibit the hazardous characteristics H6.1, H11, H12 and/or H13.]

(m) [Plastic wastes covered under category Y18 (Residues arising from industrial waste disposal operations. For example, residues from the processing of hazardous plastic wastes, such as from sorting or shredding, may exhibit the hazardous characteristics H6.1, H11, H12 and H13, in which case they would fall under entry A3210.]

128. Annex II to the Basel Convention lists category Y46 (Wastes collected from households) which may contain or be contaminated with certain plastic wastes referred to in paragraph 127.

4. Identification of non-hazardous contaminants

129. Contaminants are unwanted materials present in plastic wastes., including non-hazardous contaminants. The composition of plastic wastes depend not only on the intrinsic composition of the different plastics but may also contain certain non-hazardous contaminants which derive from the production, use or waste phases of the plastic lifecycle.

[59] This entry is effective until 31 December 2024

[60] This entry becomes effective as of 1 January 2025.

130. Plastic wastes from industrial processes often arise in large volumes of clean material consisting of a single polymer type with low levels of contamination. However, it can have a higher contamination than virgin plastics (Huysveld et al. 2019) and be non-homogenous when it is generated in the manufacture of composite materials. The majority of residential post-consumer plastic wastes is a much wider range of mixed items and material types, where the contamination levels may be significant.

131. Mixed polymer waste streams may be more difficult to recycle. For instance, small amounts of PVC mixed with other polymers (PE, PP or PET) can prevent effective recycling. Clear PET and PVC (i.e., from packaging) have a particular problem with cross-contamination as their visual appearance is very similar. [The density ranges of PET and PVC also overlap making it more challenging to separate the polymers using float-sink technology. Film types such as PP, PET and multi-layer laminates are considered contaminants in a mixed LDPE stream (Mepex Consult AS, 2017).

132. Paper labels can contaminate recyclable plastic wastes (e.g., stock identification labels on pallet wraps). Inks, that are used to print information directly on the surface of the packaging material, can bleed during the recycling washing process and discolour the recyclate and waste liquid effluent.

133. Plastic wastes can be contaminated with either non-ferrous or ferrous metals. Plastic wastes from cables may contain residual metals. Post-consumer plastic packaging wastes may contain aluminium which may be difficult to remove.

134. Contamination can also appear at the use phase of plastic. Plastic waste can also be contaminated with food or beverage residues. Many packaging items contain a residual level of the original contents and require washing during recycling, leaving a clean plastic material for onward processing.

135. Plastic film wastes from agriculture may contain high percentages of soil and traces of pesticides, and emptied plastic containers may still contain and be impregnated with agrochemicals, that could render the waste hazardous under Art. 1, paragraph. 1 (a) and (b) of Basel Convention.

5. Specifications

136. Specifications (see the footnotes related to “almost free from contamination and other types of waste” and “plastic waste almost exclusively consisting of” in entries B3011 and Y48 that refer to international and national specifications that may offer a point of reference) can be sourced from industry-wide standards, regional and national quality standards linked to the plastic waste trade. Under the Plastic Waste Partnership, a compilation of national and international specifications is under development.

137. [Text may be added based on activities undertaken under the Plastic Waste Partnership (PWP)]

6. Inventories

138. Inventories can be an important tool for identifying, quantifying and characterizing wastes. When developing an inventory for plastic wastes, priority should be given to the identification of important waste streams (e.g., hazardous plastic wastes).

139. National inventories may be used to:

(a) Establish a baseline quantity of plastic products, articles and plastic wastes and products with a relevant content of plastic and related wastes;

(b) Establish an information registry to assist with safety and regulatory inspections;

(c) Assist with the preparation of emergency response plans;

(d) Track progress towards minimizing and phasing out specific plastic waste streams (e.g., single-use plastics).

140. For further information on the development of national inventories Parties may consult the methodological guide for the development of inventories of hazardous wastes and other wastes under the Basel Convention. (UNEP, 2015c). The guide focuses on the actions recommended to develop the national information systems that produce the information needed to assist countries in fulfilling their reporting obligations under the Basel Convention. In addition, Practical guidance on the development of an inventory of plastic wastes has been developed (UNEP, 2022f).

141. Kept for consistency of paragraphs numbers

E. Sampling, analysis and monitoring

142. Sampling, analysis and monitoring are important activities in the management of plastic wastes enabling the manager of the wastes and those who regulate its management to identify the composition of plastic types in some waste streams, the degree of contamination of the plastic wastes, as well as the presence and concentration of hazardous substances within plastic wastes.

143. Monitoring and surveillance serve as elements for identifying and tracking environmental concerns and human health risks.

144. The information obtained from the monitoring should be used:

(a) To detect any releases which cause any change to the quality of the surrounding environment;

(b) To ensure that different types of plastic wastes are managed in an environmentally sound manner;

(c) To identify potential issues relating to possible exposure to humans and determine whether adjustments to the management approach might be appropriate.

145. Sampling, analysis and monitoring should be conducted by trained professionals in accordance with a well-designed programme and using internationally accepted or nationally approved methods, carried out using the same method each time over the duration of the programme. They should also be subjected to rigorous quality assurance [(QA)] and quality control [(QC)] measures. Mistakes in sampling or analysis, or deviation from standard operational procedures, can result in meaningless data or even programme-damaging data.

146. Each party should identify its sampling, analysis and monitoring needs and ensure it has laboratory and equipment capacity that will meet the required operating standards. Training and protocols should be in place to ensure that standards can be met, and that quality data and meaningful results can be obtained.

147. As there are different reasons for sampling, analysis, and monitoring, and because wastes come in so many different physical forms, many different sampling, analysis, and monitoring methods are available. For information on good laboratory practices the OECD series (OECD, various years) and the Handbook on Good Laboratory Practices (WHO, 2009) may be consulted. The next three sections consider key elements that should be included in sampling, analysis, and monitoring.

1. Sampling

(a) General considerations

148. The overall objective of any sampling activity is to obtain a sample that can be used for the targeted purpose, e.g., waste characterization, compliance with regulatory standards or specifications or suitability of proposed treatment or disposal methods, and environmental monitoring. This objective should be identified before sampling is started. It is essential that quality requirements for equipment, transportation and traceability are met.

149. Standardised sampling procedures should be established and agreed before the start of a sampling campaign. Elements of these procedures include the following:

(a) The number of samples to be taken, the sampling frequency, the duration of the sampling project and a description of the sampling method (including [QA] procedures put in place, e.g., field blanks and chain-of-custody);

(b) Selection of location or sites and time or stage of sample-taking (including description and geographic localization);

(c) Identity of the person who took the sample and conditions during sampling.

(d) Full description of sample characteristics – labelling;

(e) Preservation of the integrity of samples during transportation and storage (before analysis);

(f) Close cooperation between the sampler and the analytical laboratory;

(g) Appropriately trained sampling personnel.

150. Sampling should comply with specific national legislation, where it exists, or with international regulations and standards. Sampling procedures include the following:

(a) Development of a standard operational procedure for sampling plastic wastes;

(b) Application of well-established sampling procedures;[61]

(c) Establishment of [QA] and [QC] procedures.

151. All these steps should be followed for sampling programmes to be successful. Similarly, documentation should be thorough and rigorous.

(b) Sampling of plastic wastes

152. Sampling of plastic wastes may be carried out to identify the composition of plastic types in some waste streams and the degree of non-hazardous contamination of the plastic wastes, as well as the presence and concentration of hazardous substances within plastic wastes. This information may be used to determine the suitability of disposal methods.

153. Microplastics samples can be sorted according to characteristics such as location, shape, polymer type, amount, size, colour or surface condition. The sampling methods for microplastics will differ depending on the compartment being sampled (sea surface or water column) and the size range of litter being monitored. A common challenge in any sampling effort is for the information collected to be as representative as possible. The abundance and distribution of plastic in the water surface and water column compartments are highly variable due to seasonal changes in river outputs, ocean currents or mechanisms of degradation and fragmentation. Some of the methods used for sampling microplastics include using ship intake water for sampling, bulk water sampling, pump sampling, Continuous Plankton Recorder (CPR), etc. Although standardized methods for sampling microplastics have not been established, some countries have developed specific methods for sampling microplastics in seabed and biota. (UNEP/GESAMP, 2019)

154. When carrying out sampling of plastic wastes, locations should be determined based on the objective of the sampling being undertaken. These could include:

(a) Points of collection of plastic wastes, including collection of marine litter;

(b) Input and output of disposal facilities (e.g., material recovery and re-processing facilities);

(c) Points of reception of imported plastic wastes, e.g., ports.

(c) Sampling for environmental monitoring and biomonitoring

155. Pollutant emissions related to disposal and treatment of plastic wastes at respective facilities can include liquids, solids, gases, and others, which can be determined following the specific national legislation or international regulations and standards. Waste matrices typically sampled for monitoring emissions include:

(a) Liquids:

(i) Wastewater from plastic waste treatment/disposal facilities as well from the sewage treatment facilities (inlet and outlet);

(ii) Leachate from dumpsites and landfills;

(iii) Water (surface water, drinking water and industrial and municipal effluents);

(b) Solids:

(i) Consumer products;

(ii) Solids from industrial sources and treatment or disposal processes (e.g., fly ash, bottom ash, filter and scrubber residues, sludge and wastewater treatment sludge still bottoms, other residues, clothing, ash from dumpsite and landfill fires;

[61] Such as procedures developed by ISO, ASTM, the EU, the United States Environmental Protection Agency (EPA), the Global Environment Monitoring System (GEMS), and the European Committee for Electrotechnical Standardization (CENELEC) (See Standard on Collection, logistics and treatment requirements for WEEE (Waste Electrical and Electronic Equipment) – Part 1: General Treatment Requirements, in particular specifications for de-pollution), and the European Committee for Standardization (CEN) (see EN 14899:2005 Characterization of waste - Sampling of waste materials - Framework for the preparation and application of a sampling plan and the series of CEN/TR 15310 1-5: 2006 Characterization of waste - Sampling of waste materials).

(iii) Soil, sediment (including in drains and water bodies near plastic waste disposal facilities), rubble and compost;

(c) Gases:

(i) Air (indoor);

(ii) Air (emissions);

(d) Biota and human biological samples (for the purpose of biomonitoring):

(i) Trout and other fatty fish in water bodies as well as soil living organisms, chicken and other biota feeding from the ground in the vicinity of plastic waste disposal facilities;

(ii) Bodily fluid and hair samples from workers in plastic waste-management and communities located near facilities.

156. Sampling for the purpose of monitoring should prioritize the investigation of pollutants specifically associated with the disposal of plastic wastes including, but not limited to, the following:

(a) Bisphenols and phthalates;

(b) Short chain chlorinated paraffins;

(c) Medium chain chlorinates paraffins;

(d) Per- and polyfluoroalkayl substances;

(e) Brominated flame-retardants;

(f) Relevant UV stabilizers such as UV 320, UV 327, UV 328 and UV 350;

(g) Relevant aldehydes such as formaldehyde;

(h) Heavy metals, in particular antimony, cadmium, lead and mercury;

(i) Polychlorinated dibenzodioxins (PCDDs)/ polychlorinated dibenzofurans (PCDFs);

(j) Polybrominated dibenzo-p-dioxins and dibenzofurans (PBDD/PBDFs).

2. Analysis

157. Normally, plastic waste analysis is performed in a dedicated laboratory. However, rapid developments in process instrumentation and real-time online detection equipment have enabled very sophisticated high-speed sensors to be used in-situ on sorting equipment and in the field (e.g., hand-held X-ray fluorescence (XRF) detection of metals in plastics; online X-ray transmission sorting systems).

158. For analysis in laboratories, there are several analytical methods available. Therefore, Parties should verify the availability and costs of methods of chemicals, including POPs, relevant to plastics before developing a monitoring and sampling programme.

159. The main steps in the analysis are:

(a) To scope the sample group(s) e.g., source separated plastic, plastic from residual household waste, reprocessed plastic;

(b) To proceed with pre-treatment of samples;

(c) To select target analytes;

(d) To prepare samples (e.g., microwave assisted digestion with magnetic stirring);

(e) To select chemical analysis method (e.g., Inductively coupled plasma mass spectrometry);

(f) To proceed with statistical analysis of samples.

160. The analysis of microplastics is related to their particle size, shape, concentration, and chemical composition. For microplastics, it is often difficult to describe the sizes, shapes and polymer types fully and reliably, from complex environmental matrices, using a single analytical method. In general, microplastic analysis consists of two steps: physical characterization of potential plastics (e.g., microscopy) followed by chemical characterization (e.g., vibration spectroscopy) for confirmation of plastics. In special cases, co-contaminant chemical analysis is performed on extracted chemicals.

Through physical characterization (done by visual observation with the naked eye, or by using microscopy), size (maximum dimension or particle image), shape and colour can be observed and recorded. Chemical characterization is a final step to identify microplastics from the other natural materials, when visual and microscopic observation is not enough to confirm the particle nature. The most common method used in chemical characterization of microplastic particles is spectroscopy (e.g., Fourier-Transform Infra-Red and Raman) (UNEP/GESAMP, 2019).

3. Monitoring

161. Article 10 ("International Cooperation") paragraph 2 (b) of the Basel Convention requires Parties to "cooperate in monitoring the effects of the management of hazardous wastes on human health and the environment".

162. Monitoring programmes should be implemented for facilities managing plastic wastes if appropriate, as they provide an indication of whether a plastic waste management operation is functioning in accordance with its design and complying with environmental regulations and serve as elements for identifying and tracking environmental concerns and human health risks.

163. Information collected from monitoring programmes can feed into science-based decision-making processes and can be used for the evaluation of the effectiveness of risk management measures, including regulations. Monitoring of plastic litter, both in the marine environment and on land, can provide information on the nature, extent and impact of plastic pollution, notably on which products are prone to be discarded outside the waste management system. Monitoring can also give information on the effectiveness of policy measures related to plastic waste management.

164. To measure the effectiveness of ESM practices at a facility, accurate and up-to date data are required on the precise effects of the activities of the facility on the environment as well as on individuals. Therefore, a planned, regular sampling and monitoring programme should be conducted.

165. Monitoring is not restricted to analytical measuring, it also includes regular maintenance, visual and safety checks.

F. Handling, separation, collection, packaging, compaction, transportation and storage

166. Handling, separation, collection, packaging, compaction, transportation and storage are important elements in the management of plastic wastes, including in relation to the prevention of plastic leakage. Procedures and processes for managing wastes should be considered for these activities, both for hazardous and non-hazardous plastic wastes, to prevent spills and leaks, e.g., through wind, resulting in worker exposure, releases to the environment or exposure of the community.

1. Handling

167. Plastic wastes should be handled appropriately to minimize risk to human health and the environment. It should be taken into account that wastes from polymer manufacturing and blending processes are often in the form of powders or granulates contained in bulk bags or containers. Post-consumer wastes are likely to be in bulky form and may require baling or bagging for transportation to waste processors. Employees should be supplied with appropriate protective clothing, trained in the safe handling of large/heavy containers and equipped with equipment such as sack-barrows, pallet trucks and fork-lift trucks.

2. Separation

168. Separation at source of generated plastic wastes increases efficiency and reduces costs related to segregating mixed waste and can improve the quality of the outputs from downstream pre-treatment, sorting and recovery operations. Source separation entails the sorting of plastic waste from other types of waste before collection as opposed to separation from other waste after collection. In order for source separation to be an effective approach, plastic waste generators should be given clear instructions and information about the required separation method prior to collection (e.g., by means of on-pack recycling labels or other simple separation instructions such as 'clear drink bottles only').

169. Source separation can be described as a form of multi-stream collection system in which the waste generator is responsible for manually sorting plastic wastes and placing them into designated bins or bags, to keep them separate by type or according to certain established criteria.

170. Source separation of post-consumer plastic packaging wastes may be performed in:

(a) Mono-material separation systems, where plastic wastes are segregated at source as one material fraction including more than one type of plastic together (as mixed plastics) or targeting specific plastic types (e.g., PET bottles, or rigid plastic such as pots, tubs and trays);

(b) Co-mingled separation systems, where several types of source separated dry wastes (e.g., metal and plastic wastes) are collected together.

171. The collection of clean plastic wastes that have been separated at source should be a priority as this will facilitate a simpler recycling process system and will generally produce recyclate polymers with a higher quality, with lower waste fractions and improved environmental performance (i.e., lower energy cost per tonne, reduced washing effluent flows).

3. Collection

172. Care should be taken in establishing and operating collection programmes for plastic wastes in order to increase the efficiency of the waste collection system.

(a) Household plastic wastes collection schemes

173. The three main recognized household plastic wastes collection schemes are:

(a) Source-separated or multiple-stream collection scheme;

(b) Co-mingled fractions or single-stream collection scheme;

(c) Residual waste or mixed waste collection scheme.

174. These schemes utilise the following collection systems for the collection of plastic wastes:

(a) Kerbside collection system: The system includes containers at ground level for collection from the street. Packaging plastic wastes are collected as a single stream or together (co-mingled) with a different waste fraction i.e., plastic and metal wastes are collected in the same bin;

(b) Door-to-door collection system: Door-to-door collection schemes involve a system whereby plastic waste streams in bags, bins, and/or containers are collected directly at households with regular frequency. Packaging plastic wastes are collected as a single stream or together (co-mingled) with different dry waste fractions i.e., plastic and metal wastes are collected in the same bin;

(c) Bring system (Drop-off) system: Consumers bring their plastic wastes such as plastic bottles and plastic bags to a certain collection site. While this is generally used for enhancing collection of plastic bottles, it could also be used for plastic bags and wraps, like grocery bags, zipper sandwich bags and some cereal bags, to be dropped off at depots and stores. Collection sites may include municipal staffed collection sites where several types of wastes (e.g., WEEE and bulky waste from households) can be brought by residents (civic amenity sites).

175. Deposit-and-return system (DRS): DRS is a system whereby consumers buying a product pay an additional amount of money (a deposit) that will be reimbursed upon the return of the packaging or product to a collection point. The system is based on offering an economic incentive for consumers to return empty containers to any shop to ensure that they will be reused or recycled. For beverage containers, these systems are already operating in many countries. The DRS could be expanded to other types of plastic packaging.

176. The highest quality plastic wastes are typically from separate collection via DRS, followed by kerbside separated/door-to-door collection. The quality will, however, also depend on the type and quality of further pre-treatment before recycling, such as washing.

177. The possibility of organizing selective collection schemes depends mainly on the volume of plastic waste collected separately and the frequency of collection. Collection schemes may be much more difficult for drop-off systems than for kerbside systems and in rural areas compared to urban or semi-urban areas. When selective collection is organized with compartmentalized trucks, both plastic wastes and residual household wastes can be collected simultaneously.

178. The informal sector, including individuals and small enterprises, is involved in the collection of plastic wastes. This is a common practice in geographies where the formal sector provides insufficient waste management (Wilson et al., 2006; Kumar et al., 2018; Hande, 2019). Collection of recyclables takes place from all possible places where access is possible, for example, (open) dumpsites, the streets, and door-to-door collection. For further information on these types of situations, see the guidance on how to address the environmentally sound management of wastes in the informal sector (UNEP, 2019a).

179. Communities in mountainous [and remote] regions face challenges, due to the terrain, isolation, and remoteness, for the collection of plastic waste that may not be experienced in other regions. [Such communities may rely heavily on the informal sector for plastic waste collection (see paragraph 178).] Challenges in collection of plastic waste in these communities can stem from transportation, influx of plastic waste from those outside the community, e.g. tourists, or lower volumes of recyclable waste to make separate collection realistic. Community-based solutions for the collection of plastic waste should be explored, such as raising community awareness of the value of plastics, incentivizing the return of plastics, e.g. through a deposit program, and targeting tourist lodge owners to collect and [recycle] their plastic waste (Alfthan *et al.,* 2016).

(b) Industrial, commercial, institutional, and agricultural plastic and other waste collection schemes

180. Collection of industrial and institutional plastic wastes, commercial packaging plastic wastes and agricultural plastic wastes could be organized by waste generators themselves, or with large drop-off containers rented by the generators and collected regularly by private operators. The collection systems should be designed in such a manner that the plastic wastes are transported to specialized treatment facilities. In the European agriculture sector, many countries have implemented collection schemes, funded by producers, which allow farmers to bring collected farm plastic wastes to organised hubs on specific dates and times during the year. This facilitates efficient manual sorting and baling of the various plastic types at those hubs using mobile baling equipment, prior to transportation to reprocessing facilities. Plastic packaging waste from hazardous pesticides, herbicides and other bio-active substances should be separately collected.

181. Plastic wastes originating from maritime activities such as aquaculture and fisheries, both as their own waste and marine litter that gets caught in the fishing gear of commercial fishing vessels (e.g., nets, trawls and ropes), should be brought back on land and delivered to port reception facilities.

182. Waste leakages from marine activities, e.g., loss of fishing gear, should also be collected and delivered to a municipally or privately operated waste management system, as should plastic wastes from clean-ups along beaches, rivers and waterways and other water bodies. This also applies to the unintended leakage of other plastics, such as plastic pellets. Special collection schemes may be applied to retrieve unintentionally lost plastic products. For instance, lost fishing gear can be located, e.g., by equipping the gear with GPS thereby ensuring targeted retrieval of lost gear. Plastic wastes from marine litter, collected by clean-ups or by fishing vessels, typically contain significant amounts of ropes and nets. Extra separation operations will therefore be needed to untangle the materials in order to facilitate recycling of the waste.

4. Separating and extracting plastic wastes from other waste streams

183. Efforts should be made to separate and extract plastic waste from other waste streams which contain a considerable volume of plastics such as WEEE, waste vehicles, construction and demolition waste, waste cables and waste textiles. Source separation is the most desirable option. When this is not possible, effort should be made to separate plastics from the respective waste stream post collection to the extent that is feasible. Some of these wastes are large, and it should be ensured that collection and treatment infrastructure is in place that is capable of handling them. The method of separation of plastics from the waste stream will depend on factors like characteristics of the waste stream in consideration, availability of sorting technology, possibility of automation and associated cost. A 'one size fits all' approach may not be possible, and the appropriate method used for separation should be chosen based on the factors mentioned above.

184. For example, in very dense urban environments, source separation of plastic wastes can be difficult. In these cases, plastic wastes can be sorted out of mixed MSW. By using advanced sensor sorting technology and avoiding contamination with organic and paper waste in the mixed MSW, the quality of the resulting plastic wastes can be similar to the quality of plastic wastes from source separation systems. Other simpler techniques may result in plastic wastes of an inferior quality, in terms of physical/mechanical and other properties, to plastic wastes collected from source separation systems. For example, recyclate produced from plastic wastes from simple post-sorting operations can have a strong odour, particularly when the original mixed MSW contained organic waste. This can limit the possibility, or potentially make it impossible, to use the material in consumer applications.

5. Packaging

185. Packaging of plastic wastes falls into two categories: packaging for transportation and packaging for storage.

186. Packaging for transportation of hazardous plastic wastes is often controlled by national dangerous goods transportation legislation. For packaging specifications for transportation, reference materials published by IATA, IMO, United Nations Economic Commission for Europe (UNECE), and national governments should be consulted.

187. Plastic wastes, whether hazardous or not, should be properly packed for both ease of transportation and as a safety measure to reduce the risk of leaks and spills. For certain plastic wastes, baling might be appropriate. However, if this is an inappropriate size, transportation in big bags or closed bulk containers can be a reasonable measure.

188. Packaging of plastic wastes for storage should be conducted as follows:

(a) Plastic wastes should be properly packaged;

(b) In most cases packaging that is acceptable for transportation is suitable for storage, unless more stringent storage requirements are specified. Plastic wastes in the original containers of plastic products before becoming plastic wastes are generally safe for storage if the packaging is in good condition;

(c) Plastic wastes should not be stored in containers that were not intended to contain such wastes, that have labels on them that incorrectly identify their contents, or which may be contaminated;

(d) Containers that are deteriorating or deemed unsafe should be emptied or placed inside a sound outer package (overpack). When unsafe containers are emptied, the contents should be placed in appropriate new or refurbished containers. All new or refurbished containers should be clearly labelled as to their contents;

(e) Smaller containers can be packaged together in bulk by placing them in appropriate or approved larger containers containing absorbent material.

6. Compaction, shredding, compressing and baling

189. Plastic wastes from semi-finished product conversion, packaging wastes and other plastic wastes may be bulky and may contain more than one type of plastic waste. For economical transportation and storage some compaction may be necessary. The most common compaction processes are shredding, compressing and baling. Some plastics, such as EPS, should not be shredded but can be compacted. Compaction may destroy the plastic corpus which may contain important labels or markings from which technical information can be derived for the recycler [. As such, compaction may not be appropriate if such technical information needs to be retained.] With complete plastic items, it can be determined what the material it is and what additives it contains.

190. Shredding, compressing and baling should take place spatially separated from other technical equipment / process steps and a fire-prevention system should be installed. This is because explosive substances may be contained in the waste (e.g., lithium-ion batteries in electrical appliances or spray cans with residual contents) due to incorrect disposal or sorting.

191. Shredding may be either a dry or a wet process. Wet shredding is used not only to achieve compaction but also to begin the process of cleansing the plastic residues of paper labels, glue and dirt. Both baling and shredding require properly trained and equipped personnel, including occupational exposure protection strategies for the processes, as well as processes for handling wastewater and other wastes from the shredding.

192. Wherever possible, sorting into single material streams should be undertaken before the compaction process. However, shredded material may not be accepted in certain cases because quality standards beyond common sorting processes are required.

193. Mixed plastic wastes should only be shredded if there is an assured application for the mixed output or if a post-shredding sorting system is available to produce single material streams of acceptable quality.

194. Shredding should be conducted as follows:

(a) Shredders should be constructed and installed so as to protect the operator from flying fragments, hazardous substances, entangling film waste and noise, in addition to protection from other types of health hazards during the process;

(b) Shredders should be protected from metallic contamination by metal detector/removal systems, if a shredder is not able to handle metal contamination;

(c) Before shredded material is re-processed it should be dried and/or conditioned to the specification used by downstream industry/waste processors.

195. Baling is suitable for component, film and bottle wastes. Baling should be conducted as follows:

(a) The size and form of the bale should be optimized for its transportation and further processing;

(b) Over-compaction of baled plastic waste may weld the waste together producing a solid mass that can be difficult to separate;

(c) It should be considered that compacted bales contain considerable mechanical energy. The rust-resistant steel or polyester strapping should be strong enough to contain the long-term load of the compacted material;

(d) Care should be taken when opening bales to avoid injury caused by the sudden release of compacted materials;

(e) It should be taken into account that under-compacted bales may be unstable;

(f) Bales should only be handled by means of a pallet truck or fork-lift truck due to the potential large weights involved.

196. The compressing of plastic waste may be carried out to facilitate storage and transportation, depending on the nature of the wastes and the method of subsequent treatment. For example, wastes with high moisture content may not be suitable for compression.

7. Transportation

197. The transportation of shredded or baled plastic waste requires considerable attention to the stability and protection of the load. Bags and bales should be stacked no more than 2.5 meters high, and the load should be secured either with strong ropes or tarpaulins. Loads should be protected from weather and vandalism. When loading and unloading plastic wastes, particular care should be taken to ensure the safety of workers. Plastic wastes should be prevented from entering the environment during transportation.

8. Storage (D15 or R13)

198. Plastic wastes in shredded or baled form should be stored on clean concrete floors. If plastic wastes are stored indoors, a fire-prevention system should be available to prevent fires and ease firefighting. If plastic wastes are stored outdoors, it should be protected from contamination and weather damage by means of tarpaulins or [other suitable weatherproof covering]. This will also help prevent plastic leakage, e.g., through wind drift. Protection against fire should also be in place. Contamination of plastic wastes from dust and dirt can be avoided by the use of pallets.

199. Plastic wastes stored outside should be covered with a UV-protective material as polymers degrade with prolonged exposure to UV light, resulting in the deterioration of the physicochemical properties of the plastic.

200. Storage space should not be completely occupied by plastic wastes. There should be access to all areas for handling equipment and for emergency services vehicles. There should be sufficient exit paths from the storage area for employees and they should be well marked and easy to find. The storage area should be secured against unauthorised entry. Fire-fighting equipment should also be readily available (see section H below).

G. Environmentally sound disposal

1. General considerations

201. According to the waste management hierarchy, prevention, minimization, reuse and recycling should be prioritized over other recovery operations and final disposal operations. For pursuing recycling and recovery of plastic wastes, the guidance to assist parties in developing efficient strategies for achieving recycling and recovery of hazardous wastes and other wastes (UNEP, 2019c) may be useful.

202. Disposal operations relevant to plastic waste and provided in Annex IV, part A and B of the Basel Convention are the following, ordered according to the waste management hierarchy, whereby

operations that take place prior to the submission to the following operations are addressed in paragraph 214:

(a) R3 Recycling / reclamation of organic substances which are not used as solvent;

(b) R1 Use as a fuel (other than in direct incineration) or other means to generate energy;

(c) D5 Specially engineered landfill and D10 Incineration on land.

203. Some disposal operations that occur prior to the submission to any operations referred to in paragraph 202 above are applicable to plastic wastes. These operations are addressed in sections F.5, F.6, F.8 and G.2 and include the following operations:

R12 Exchange of wastes for submission to operations R1, R3, or R13;
R13 Accumulation of material intended for operations R1, R3, or R12;
D9 Physico-chemical treatment prior to submission to operations D5, D10, D14 or D15;
D13 Blending or mixing prior to submission to operations D5, D9, D10, D14 or D15;
D14 Repackaging prior to submission to operations D5, D9, D13 or D15;
D15 Storage pending operations D5, D9, D10, D13 or D14.

204. It should be noted that some applicable disposal operations for plastic wastes containing or contaminated with mercury or POPs are different than those identified in paragraph 205 and 206. Specific guidance on the environmentally sound disposal operations applicable to plastic wastes containing or contaminated with mercury or mercury compounds or POPs is provided in the technical guidelines on the ESM of wastes consisting of, containing, or contaminated with mercury or mercury compounds (UNEP, 2022c) and the general technical guidelines on the ESM of wastes consisting of, containing or contaminated with POPs (UNEP, 2022), respectively.

205. Plastic waste recycling (operation R3) can be categorized as follows:

(a) Mechanical recycling, whereby plastic waste is processed by sorting, size reduction, cleaning and drying, thermal melt-extrusion and pelletizing, and compounding;

(b) Physical recycling, whereby plastic waste is dissolved in a solvent and the polymer is separated from constituents (e.g., flame-retardants) from plastic waste using solvents while keeping the plastic polymer molecules chain largely intact (solvent-based purification);

(c) Chemical recycling, whereby plastic polymer molecules are broken down into smaller component parts (monomers or oligomers), subjected to further processing and used as base chemicals, including feedstock for plastic manufacture (feedstock recycling).

206. Plastic waste recycling can be hindered by other methods of plastic waste disposal. For example, energy recovery of plastic wastes may become competitive in financial terms and reduce plastic waste recycling. Parties may consider introducing policy, regulatory and financial instruments to prioritise plastic waste recycling over other recovery and final disposal.

207. The recycling of plastic wastes can be challenging because of the wide variety of uses, additives, and blends that are used in a multitude of products. Recycling can be either reprocessing into the original product application with equivalent properties (closed-loop recycling) or a different plastic application with similar material properties (open-loop recycling).

208. As noted above, closed-loop recycling refers to a recycling method in which recycled plastic wastes are processed and returned to their original use. A well-established example of closed-loop recycling is bottle-to-bottle recycling. Open-loop recycling refers to the recycling process whereby plastics wastes are converted into new use. An example of open-loop recycling is the recycling of waste PET bottles into polyester staple fibre, polyester filament, film, etc. When choosing closed-loop recycling or open-loop recycling, inter alia the physical properties, and the environmental benefits should be considered. Improving the quality of the recycled materials, as well as supporting and improving markets for secondary materials, should be promoted.

2. Mechanical recycling (covered by R3)

209. Mechanical recycling [refers to the processing of plastic wastes by physical means. It] is commonly used to treat thermoplastic polymers such as PP, PE and PET. Thermoplastics polymers are better suited for mechanical recycling compared to thermosetting polymers because thermoplastics can be re-melted and reprocessed into new products with relative ease.

210. Mechanical recycling can be divided into the following main process stages:

(a) Physical sorting, size reduction, cleaning and drying to make purified, polymer flakes (see subsections (i) to (iv) below);

(b) Thermal melt-extrusion and pelletizing to make shaped profiles or wide sheets, or homogenous polymer pellets (see subsection (v) below); and/or compounding to make recyclate pellets with improved mechanical properties to meet the quality specifications for end-use product applications (see subsection (vi) below).

211. There are multiple configurations of equipment and individual unit operations to create a complete mechanical recycling process. Various designs, methods and approaches having been developed for the very wide range of different plastic waste streams. Some of such methods are 'mature technologies' (e.g., PET bottle recycling), while others are new and still evolving (e.g., robotic artificial intelligence (AI) sorting machines, or combined laser light, X-ray and induction sensor sorters).

212. Direct recycling of plastic wastes refers to the direct thermal plasticization of plastic wastes, followed by profile or shaped product forming. Normally this simplified 'direct' process can only be applied to clean, single-polymer industrial waste streams (e.g., the waste mould-flow sprues ejected from an injection forming process being immediately granulated and re-moulded). However, when this practice is conducted within an existing industrial process facility, the material may not become 'waste'.

213. Table 14 describes some of the generic processing unit operations employed for mechanical recycling of plastic wastes. However, it should be noted that every individual design of a facility will utilize its own set of equipment items, machinery layout and sequence of techniques needed for obtaining high-quality output recyclates from the particular mix, type and format of the incoming plastic waste streams.

Table 14: Mechanical recycling operations (not necessarily sequential)

Process	Description
Sorting: 1. To remove non-plastic materials 2. To separate individual polymers or similar plastic types 3. To remove plastics containing unwanted additives [4. To separate hazardous plastic waste] [5. To sort by colour]	Sorting methods are used to separate plastic wastes, remove [non-target materials including unwanted contaminants] and purify to a single polymer type. The main separation methods are manual separation, size & shape sorting, induction sorting, magnetic ferrous removal, eddy current metal separation, air-flow separation, automatic sensor sorting of materials, float-sink density separation and hydro-cyclone density separation. Other novel techniques are employed based upon any detectable physical differences in materials.
Size Reduction: Granulation / grinding Shredding / chopping Milling / comminution Crushing / impaction	Size reduction is used to chop plastic wastes into small flakes or chips, liberating joined materials & enables downstream separation (e.g., metals, glass, paper) and separating different plastic types (e.g., PET bottles from PP lids).
Cleaning / Washing	Manual or machine cleaning methods are used to remove various [non-target materials or contaminants] [, such as] oils, dust, dirt, biodegradable waste[, labels, adhesives and printing inks] from the surface of waste plastics. Can be wet or dry-friction methods.
Drying	Drying is used to remove surface moisture after wet washing.
Melting	Heating and melting plastic wastes into raw materials or products, including single-type plastic wastes and composite plastic wastes.
Extrusion	Extrusion is used to melt similar plastic flakes in a heated screw-barrel. Blending, mixing, vapour venting and melt-filtration can be applied to create a homogenous and uniform polymer material. Other additives can be added to the infeed mix to create a specific plastic compound grade. Polymer melt exits through a die-head, typically to allow for pelletisation. Direct formation of product is also feasible – e.g., thin sheets, or shaped profiles or filaments.
Pelletizing	Pelletizing can be done via chopping of water-cooled strands OR by direct die-face cutting to make small, regular free-flowing pellets.
Compounding	Compounding may be conducted through physical modification (by mixing of additive components before extrusion) or chemical modification (by adding active ingredients before extrusion).

214. Some examples of mechanical recycling steps for specific types of post-consumer plastic wastes are the following [, not necessarily taking place in the same facility]:

(a) PET bottles: Sorting (including colour sorting) → grinding → washing → separating → drying → processing into PET bottles, polyester fibres, sheets or containers;

(b) LDPE films used in agriculture and industrial packaging: Pre-washing → grinding → washing → separating → drying → melt-filtration → processing for example into refuse bags or agricultural films;

(c) PVC pipes: Grinding → washing → separating → drying → reprocessing into similar or other applications;

(d) EPS fish boxes: Sorting → washing and drying → grinding → regranulation and melt filtration → reprocessing into PS or EPS pellets or product;

(e) Mixed WEEE and/or ELV plastic waste: Sorting and separation → shredding and separating of plastic from metal fractions → screening and size reduction → air-separation of fluff and dust removal → density separation in modified liquid media → spin-drying → sensor sorting → colour sorting rubber and elastomer removal → bulk-mixing in silo → extrusion compounding → de-gassing → melt-filtration → pelletisation.

215. The following potential environmental impacts from the mechanical recycling of plastic wastes should be avoided or reduced [in respect of the following]:

(a) Air emissions in the form of dust and volatile organic compounds (VOCs) (He et al., 2015);

(b) Wastewater emissions [for example] from the washing of plastics flakes;

(c) Indirect air emissions associated with heat production (e.g., for flake washing), if the heat is generated on-site by gas, oil, etc;

(d) Site littering;

(e) [Unsound residuals management such as dumping and open burning of unrecycled fractions;]

(f) [Excessive] water [consumption] [use] [intensity], e.g., for washing, sink float separation, agglomeration, and pellet cooling;]

(g) [Reintroduction of hazardous substances into recyclates e.g., from additives or contaminants;]

(h) Contamination of the recycling site and surrounding areas with POPs as well as other hazardous substances (Tang et al., 2015);

(i) Pellet loss (Karlsson et al., 2018).

216. In most cases, well managed material handling, process safety procedures and good housekeeping can minimize the risk of these adverse impacts taking place, when carried out under professional supervision and within a waste management regulatory control system.

217. Certain types of plastic wastes are not suitable for mechanical recycling. This can for example be due to the complexity of the physical structure of the wastes and the way different polymer types and other materials have been combined within the original product design. Examples include thermosetting plastic composites, where the plastic resin cannot be thermally re-formed and the fibres are very difficult to remove, and thin-walled, multi-layer packaging films made with various plastic and metallic layers bonded together.

218. [It is important to remove plastics that contain or are contaminated with additives or processing aids, which are listed in Tables 6 and 7 of this document, in order to avoid contamination of subsequent recycling and manufacturing processes.] It is important to remove plastics that contain or are contaminated with additives, processing aids [or other substances,] notably POPs or SVHC (see Tables 6 and 7), to an extent to render the waste hazardous[, difficult to recycle] or [otherwise] problematic, in order to avoid contamination of subsequent recycling and manufacturing processes. Where such removal is not possible or difficult, it is important to manage the subsequent recycling and manufacturing processes accordingly.

219. [With the currently applied pre-treatment technologies, such as sorting, washing, float-sink and grinding, there may still be contaminants present in the post-consumer plastic waste, as these techniques are not able to thoroughly clean the polymers and remove the impurities embedded in the

polymer structure. [Other] [Solvent-based extraction] methods can be applied to remove target additives from the polymer matrix without dissolving (Kol et al 2021).[62]]

220. [In case recycled plastic, for example PET or HDPE, is used in food contact materials, strict national legislation for using recycled plastics in food contact materials should be in place to minimize migration of substances into food.]

[ALT 220. Regarding recycled plastic applications with direct human exposure such as in food-contact materials, strict national legislation for using recycled plastics in such applications should be in place to meet national health and safety requirements (e.g. the US Food and Drug Administration (FDA).]

(a) Sorting

221. Sorting can be classified into manual sorting, automated/mechanical sorting, float-sink separation, liquid density separation, electrostatic separation and sorting by hydro-cyclones and centrifugal sorting. Automated/mechanical sorting technologies can be broadly classified into screen separators, air separators, ballistic separators and film grabbers based on their ability to sort items based on particle shape, size and density (see table 15). Furthermore, based on their ability to remove different types of metals from the waste stream, they can be classified into overband/conveyer head-roller magnets, eddy current separators, and induction sensors. Sensor based sorting and robotic sorting are examples of advanced forms of automated sorting.

222. Since plastic wastes may be mixed with impurities and other types of plastic wastes, which may not only cause difficulty in recycling plastic wastes but may also greatly affect the quality of the products produced, plastic wastes should be separated from non-plastic wastes (e.g., metals, rubber, sand, fabrics) through sorting and, where appropriate and feasible, sorted into single polymer types.

223. Manual sorting involves identification [notably] by shape, colour, appearance [and trademark] of the plastic that distinguishes it for visual identification by the operators (Ruj et al., 2015). Manual sorting operations may be a pre-sorting stage before or after mechanical sorting in order to remove unwanted or contaminated input materials and improve the efficiency of a downstream-automated process. Manual sorting may also be used in final quality checks at the end of a sorting process to ensure that sorted plastics meet technical specifications.

224. Manual sorting may be suitable when larger plastic items are present in large amounts in mixed waste and have not yet been size reduced to small flakes, or when separating different polymer types from mixed plastic wastes. In most cases, when plastic items or particles to be sorted are below circa 75 to 100mm in size, then manual sorting will become overly laborious and not be practicable.

225. Manual separation of plastic wastes into single plastic material streams could be performed directly from piles of plastic wastes or from the surface of sorting conveyors. In both cases manual sorting requires experience, knowledge, dexterity and concentration for long time periods. In many cases, the use of polymer-type labels (see Table 1) on individual items or components is not practical.

226. Manual sorting can be augmented by the use of hand-held analytical instruments and sensors to rapidly test individual polymer pieces in the field or sorting yard. However, sample test times above circa 30 seconds per item can make this impracticable for all but the largest items (e.g., whole car bumper assemblies).

227. For workers involved in manual sorting, there should be appropriate working conditions (e.g., provision of personal protective equipment, adequate safety training, proper ergonomics to reduce worker strain (see for example Illinois Recycling Association, 2010)).

228. Automated/mechanical sorting should be used where appropriate to increase the separation efficiency and is most effective at industrial scale (i.e., 5,000 to >50,000 tonne per annum input waste volume). The exact method of identification, separation and sorting can depend upon a wide range of physical and chemical properties of the plastic and the contaminant materials, as well as the size, shape and format in which it is presented to the sorting equipment. Automated mechanical sorting systems for plastic wastes can include a very wide range of technologies and separation methods.

229. Screen separators, air classifiers and ballistic separators are used for the removal of small, light, 2D pieces such as film and paper and for removal of heavy pieces such as glass and stone. The separation method depends upon the physical size, shape (i.e., 2 or 3 dimensions), density and mass of the sorted items. The creation of a waste stream which has a uniform range of particles or items within

[62] Solvent-based extraction techniques such as the dissolution-precipitation technique have shown to be able to remove target additives from the polymer matrix as well as to selectively recover different polymers.

a controlled size and shape format is important for the successful application of downstream sorting methods. Table 15 below provides an overview of size, shape and density sorting technologies.

Table 15: Overview of size, shape and density sorting technologies (automated/mechanical sorting)

Technology	Sub- Type	Description
Screen separators	Trommel screen	An angled rotating cylinder with holes that allows wastes of a given size to fall through.
	Disk Screen	A bed of vertical-spaced discs that transports large waste items but allows smaller items to drop through the gaps.
	Oscillating screen	A vibrating/oscillating declined bed that allows smaller waste to pass through holes in the mesh deck while transporting larger wastes to the end.
	Flip-flop screens	A flexible, oscillating screen deck is used to transport material down an inclined belt. The resulting motion allows smaller items to pass through the set size of hole in the screen deck. Particularly useful for sticky or wet materials which have a tendency to clog screen holes.
Air separators	Zigzag air classifier	Waste is dropped through an upward air current in a zig-zag shaped flue. Light wastes are blown to the top, while heavier wastes fall to the bottom.
	Rotary air classifier	A trommel screen separator with an air current that captures the lightweight fraction.
	Cross-current air classifier	Wastes are fed on a conveyor and dropped through an air stream. The light components are blown horizontally to a collection point and the heavy components drop through.
	Suction hood	Sucks light weight wastes directly from the conveyor belt.
Ballistic Separator	N/A	A steeply inclined bed with a perforated plate screen deck, with alternate vibrating elements. Light fractions are lifted by cams to the top of the bed, heavy fractions fall to the bottom.
Film grabber	N/A	Wastes are accelerated onto a rotating drum with spikes. These hook plastic film and let other waste drop.

Source: International Solid Waste Association (ISWA) 2017

230. In most cases it is sensible to remove unwanted metallic contaminant prior to any size reduction or further material-type separation. Normally this follows a logical three-step approach to metal removal:

(a) First – Ferrous and magnetic metals (cast iron, mild-steel);

(b) Second – Non-ferrous metals (aluminium, copper, brass, zinc etc.);

(c) Third – Stainless-steels and metal composites (304 / 316– stainless grades).

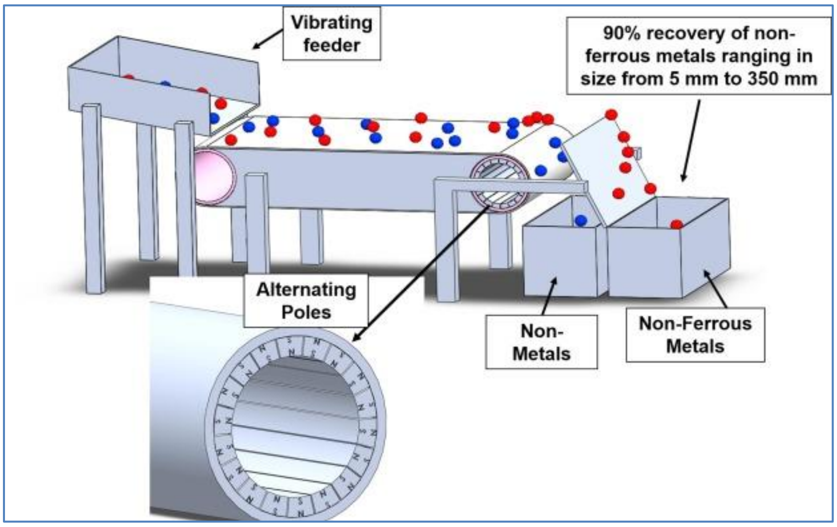
231. Based on their ability to remove different types of metals from the waste stream, automated sorting technologies can be classified into overband/conveyer head-roller magnets (removal of magnetic/ferrous metals), eddy current separators (sorting of non-ferrous metals), and induction sensors (sorting of stainless steel and composites).

232. Overband magnets can be used to lift ferrous metal from the moving waste stream, and often move the trapped metal items away to a side-located metal waste bin. Belt-conveyor head-roller magnets attract and hold ferrous metal items onto the conveyor belt as it passes over and back under the cylindrical top-roller, while other non-magnetic waste drops down its natural ballistic path under gravity. A splitting plate is normally positioned just below the roller, between the two different falling paths, to ensure a good separation and capture of the recovered metal parts.

233. Eddy current separators (see Figure 3) are used to separate non-ferrous metal contaminant items, e.g., copper, aluminium, brass, zinc with pieces at 5 to 30 mm nominal size. The plastic waste stream is passed over a very high-speed rotating magnetic roller that induces a rapidly changing magnetic flux field up through the transfer conveying belt and this causes an induced electric current inside each moving conductive metal particle. The resulting repulsive force causes the metal item to

'jump up' and away from the belt, so that it follows a higher trajectory ballistic path, enabling a separation plate to divert most metals away from the bulk plastic stream.

Figure 3: Eddy Current Separator – generic operating principle

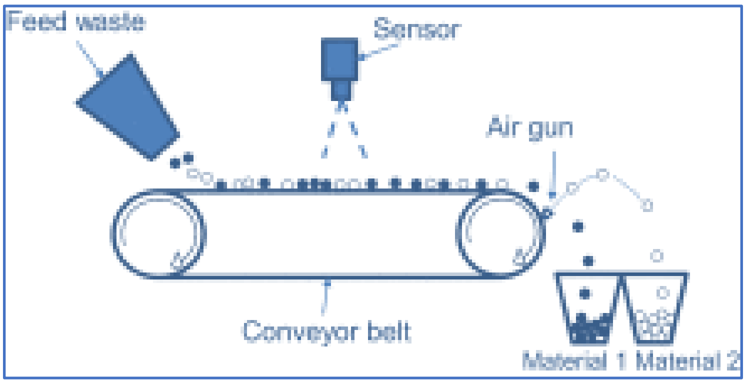


Source: York et al (2019)

234. Sensor-based sorting machines, with induction loops positioned immediately below the sorting conveyor belt, can be used to detect and then eject stainless steel and/or composite conductive items as they pass through the electro-magnetic field generated by the induction sensor loop. The exact position and approximate size of the metallic item are detected by the electric signal induced in the loop and this information is rapidly analysed to trigger an air-jet pulse that blows the unwanted contaminant particle away from the bulk flow of plastics as it leaves the end of the belt. In many cases, this type of detection technology is combined with over-belt optical and X-ray sensor methods to provide additional identification and characterization information during a single pass along a multi-material sorting (e.g., Near Infrared (NIR) / XRF / Induction combined).

235. Automatic sensor-based technology can be used to sort materials according to its type. Sensor-based sorting technology (see Figure 4) including, but not limited to, near infrared (NIR), mid infrared (MIR), laser-induced breakdown spectroscopy (LIBS), visual spectrometry (VIS), XRF and, (X-ray transmission (XRT) enables separation of plastics by polymer type, plastic density or colour, as well as removing other materials (e.g., paper/cardboard, glass and metals) thus optimizing the plastic waste recycling process and ensuring a higher final quality. In most applications, mixed plastic wastes are transported on a fast-moving conveyor under strong light or X-ray source where high-speed sensing cameras record the position, shape and reflected light or wave signals and make instant analysis of the received spectrum. This allows the polymer type and certain additive chemicals to be identified. Immediately post-detection precisely controlled compressed air-jets are used to eject the sorted items away from the bulk material flow at the end of the transport cover, with splitting plates positioned to affect the final separation process.

Figure 4: Generic layout for most over-belt, sensor-based sorting detect-and-eject methods



Source: Serranti et al (2019)

236. Advanced, automated sensor sorting can also be used to separate plastic wastes from mixed, residual MSW. In addition, these technologies can be used to sort plastic wastes separated and extracted from bulk flow streams of other waste streams, such as mixed WEEE, ELV and mixed construction waste, as described in section F.4. Table 16 provides an overview of available sensor sorting technologies. Constant and rapid technology developments are continually adding new and novel sorting methods to this family of sorting methods. Modern flake sorting designs of sensor equipment can operate on particles as small as 3 to 10mm, but for whole packaging items the normal size of sorted items is in the 40 to 300mm range.

Table 16: Overview of sensor sorting technologies

Near infrared (NIR)	Used to differentiate between plastic types (PET, HDPE, PVC, PP and PS) and to differentiate plastic waste from mixed, residual MSW and other materials such as paper and metals.
Visual spectrometry (VIS)	Used to identify materials based on colour
X-ray Fluorescence (XRF)	Used to differentiate between metals / alloys (for example, copper from steel). Also used for potential POPs or SVHC screening of brominated, chlorinated and fluorinated plastic additives
X-ray Transmission (XRT)	Identifies materials based on atomic density – for example, halogens and organic components, mineral fillers, hidden metal particles inside plastic parts etc.

Source: Cuauhtémoc et al (2021)

237. Robotic sorting is an advanced form of automated sorting. Robots can identify specific products using cameras and analyse images against an internal database of products identified by shape, size, colour, and texture. Typically, rapid speed mechanical arms and grabbers are used to pick and deflect the selected items from the bulk material flow. These systems can also utilize a wide range of detection sensors and camera types, in a similar approach to the over-belt sorting equipment described above.

238. In certain cases, float sink separation and liquid density separation can be used to separate various types of polymers. For float-sink separation, small flakes or particles of mixed plastic are fed into a vessel or tank filled with liquid of a known and controlled density. Plastics in the mix which have a solid density lower than the liquid separation medium will float; those plastics heavier than the liquid density will sink.

239. Water is most commonly used as the separation liquid, to create a density separation at a specific gravity of 1.00. Other fluid densities can be achieved by making controlled salt solutions or adding suspended solids as fine powders to create density split points at up to a specific gravity of 1.40 (Ragaert et al, 2017).

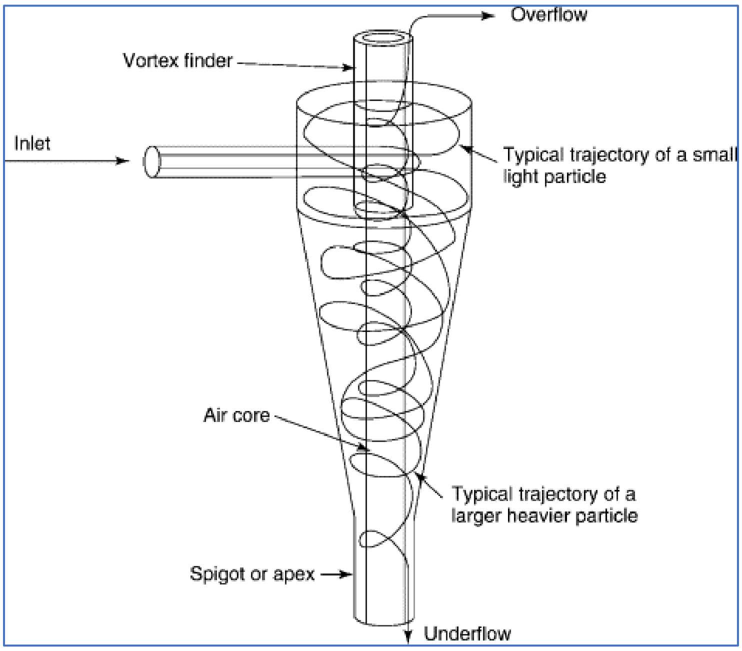
240. Float-sink separation in water can effectively separate polyolefins (PP, HDPE, LDPE) from PVC, PET and PS, with higher liquid salinity, for sink-float sorting of PS and ABS (in the range of a specific gravity of 1.08 to 1.20). Use of different media can allow separation of PS from PET, but PVC cannot be removed from PET in this manner as their density ranges overlap. In fact, a density gap of 0.1 to 0.2 g/cm³ is recommended to enable a successful float-sink separation with reasonable purity of fractions.

241. Float-sink separation is not effective for separating plastics with similar density. Electrostatic separation can be used to separate polymeric materials of the same or very similar density (e.g., ABS and PS). The principle of electrostatic separation is based on differences in electrostatic forces acting on particles of the mixture exposed to the electric field. The effectiveness of electrostatic separation depends, among others, on the size and shape of particles in the mixture (which has a stochastic character), environmental conditions like humidity, pressure and temperature, the moisture content of the mixture as well as its voltage level, the configuration of the electrode system, and the position of the feeding unit. (Rybarczyk et al, 2020) A plastic containing BFR additives has a higher density (circa +10% higher) than the same plastic without BFR. This density technology can be used to sort plastic waste separated and extracted from WEEE and ELV, as the polyolefin and styrenics floated fraction obtained are almost free of BFRs. BFRs (minor impurities in the ppm range) can persist, but the vast majority of BFRs should be separated into the denser plastic residuals.

242. Hydro-cyclones are based on the principle of centrifugal acceleration to separate plastic waste mixtures by density. A hydro-cyclone transfers fluid pressure energy into high-speed rotational fluid motion (see Figure 5). This rotational motion creates a strong centripetal force within the spinning liquid chamber (i.e., a G-force of multiple times gravity) causing a rapid and strong relative movement

of solid particles suspended in the fluid in relation to the particle and fluid density, thus permitting rapid density separation of materials from one another. Hydro-cyclones have a very high throughput rate and result in highly accurate density separation if plastic particle size is small (<6mm nominal size) and of a regular shape.

Figure 5: General configuration liquid hydro-cyclones



Source: Makenji (2009)

243. A similar sorting process for shredded plastics is centrifugal sorting. A cylindrical water-filled centrifuge is used for this purpose and the whole body of the chamber is rotated at very high speed to induce a centrifugal force within the liquid suspension (with up to ~300 G-force). The technique can selectively separate plastic flakes from a mixture of polymer waste materials (Karaman et al., 2015). Various designs of industrial scale continuous power-driven centrifuges are available to provide very accurate density separations of plastics.

(b) Size reduction

244. Shredding, granulation, crushing, cutting, chopping, milling and grinding are mechanical methods for the size reduction of plastic waste items. Selection of the appropriate machinery and method will depend upon the input size of the waste stream, the size and thickness of the items and the toughness of the plastic type as well as the plastic waste format (e.g., solid mouldings, flexible films, woven textiles etc). Size reduction is a necessary process for plastic waste recycling, which delivers a controlled particle size range to the downstream sorting process while also enabling separation of different material types from complex waste components (e.g., HDPE screwcaps from PET beverage bottles; brass screw inserts from electronics casings). Size reduction methods for plastic wastes can be divided into dry and wet systems, but the dry method is most commonly used for cleaner plastic waste streams.

245. When using a dry method to shred or grind plastic wastes, dust prevention and noise reduction equipment is recommended. When using a wet method to crush plastic wastes, the use of a liquid effluent filtration system is recommended to prevent small particles from entering the wastewater.

246. Regardless of which size reduction method is used it is advisable to acquire efficient, energy-saving technology, equipped with effective safety protection measures. Cutting blade wear rates and replacement parts also contribute significantly to operating costs.

(c) Cleaning

247. Plastic wastes may be contaminated with dirt, dust, oils and greases and other wastes. Effective surface cleaning of plastic wastes is vital to reduce impurities before entering a thermal extrusion or granulation process and to reduce consumption of polymer-melt waste in particle filtration screens.

248. Many designs and configurations of cleaning machinery using liquids, in particular water, exist, as well as complete multi-stage plastic washing processes. Mixing, stirring, scrubbing, surface friction, abrasion and high-pressure liquid jets are all employed to remove surface dirt, dust, oils, paints, adhesives and paper-labels etc. The addition of chemical detergents and other cleaning agents (e.g., caustic soda) is common, as is the use of hot-water to provide more effective cleaning (e.g., for label-glue removal from bottles)

249. A circulating liquid system can be used for cleaning plastic wastes and fresh liquid should only be used to supplement the system losses. Phosphorus free cleaning agents or other green cleaning agents are preferable.

250. The cleaning liquid should be collected, assessed for contamination and treated before release to the environment or recycled within the recycling unit.

251. Dry cleaning recycling systems, where water is not required, may be used to pre-clean plastics from sand, stones, glass, paper, etc.

(d) Drying

252. Drying of plastic wastes is carried out to remove excess moisture.

253. Commonly used plastic waste drying technologies include centrifugal spin-drying, air-blast drying, fluidized bed drying, infra-red drying and these often include heated airflow to increase the drying rate.

254. Most common plastic types (e.g., PE, PP and PS) need to be dried to below circa 0.5% water prior to feeding into thermal melt processing equipment. Certain polymer types require much longer drying times to remove all traces of absorbed moisture from within the plastic granules (e.g., PET, ABS, PC, Nylon), otherwise cosmetic and structural problems will result post-extrusion and during moulding.

255. The gas produced by drying of plastic wastes should be treated appropriately before being released to the atmosphere in particular if it is odorous or it contains harmful volatile contaminants.

(e) Thermal melt-extrusion and pelletizing

256. Plastic extrusion processing equipment is the most commonly used method for the final stages of mechanical recycling. Electrical power is used to rotate mechanical screw elements within a heated metal barrel. The combined effects of the physical screw mass-transfer forces and the applied barrel heaters melts the waste polymer flakes and mixes and blends the input raw material components to make a homogenous polymer compound with consistent material properties.

(a) Melt-Filtration - Metal wire-mesh melt-filter screens are often used to remove the final traces (to reach below ~0.5% of plastic mass) of solid particulate contaminants during high-pressure polymer melt flow through a heated extruder screw-and-barrel machine. Used filters should be collected and re-processed;

(b) Pelletizing - The molten output flow leaving the extruder is normally shaped into the form of filament strands by a multi-port die-head, and then cutting or ‘chipping’ is applied to create small (circa 2 to 3 mm) solid plastic pellets. Cooling water baths plus strand-chippers or die-face cutters with pumped water-rings are frequently used to solidify the plastic pellets ready for bagging or bulk storage in silo;

(c) Profile Extrusion - Alternatively, thermal extrusion equipment can be fitted with direct shape-forming die heads to make continuous shaped profiles (e.g., PVC window frames) or wide sheets to create rolls of thin plastic suitable for onward shape forming (e.g., vacuum forming of flowerpots and trays).

(f) Compounding

257. The main purpose of compounding is to make recyclate pellets with improved mechanical properties to meet the quality specifications for end-use product applications. Cosmetic improvements to colour, odour and surface finish can also take place during extrusion compounding of plastic. All of these improvements increase the quality of the recyclate. Compounding may be conducted through physical or chemical modifications, as follows:

(a) Physical Modification - The most common methods for compounding involve the physical mixing of additive components at an accurately controlled mass-ratio to the main recycled plastic waste infeed at the extruder barrel inlet-port. Typical additives that effect physical changes to the output recyclate properties are fillers, impact- and flow-modifiers, fibre re-enforcements, plasticizers, antioxidants, UV-stabilizers etc. Pigments and dyes are commonly added to meet a defined output plastic colour specification. In all cases, a thorough and complete blending, dispersion and mixing of the additive components is important to create a consistent and homogenous output recyclate quality (as described in Table 5 – Additives);

(b) Chemical Modification – during compounding it is possible to effect chemical changes to the recycled plastic waste input by the addition of active ingredients to the input mixture and by control of the physical conditions within the extrusion barrel (e.g., temperature-time profile, degree of shear-mixing and barrel pressure). Typically, chemical improvements to the polymer molecular structure are the desired outcome, with re-building of chain-length, cross-linking bonds, modified crystallinity and improved phase-mixing being examples of this technique. Increasing the polymer viscosity of PET bottle flakes by polycondensation during the extrusion recycling phase is a well-known example of this approach.

3. [Physical Recycling] [Solvent-based recycling] (covered by R3)

258. [ALT During solvent-based recycling the solid plastic's physical macro-structure is dissolved while the original molecular structure of the individual polymer chains is preserved.] [Physical recycling refers to solvent-based purification which dissolves the solid plastic's physical macro-structure but preserves the original molecular structure of the individual polymer chains.] This method can be used to separate and remove additive chemicals and fillers bound within the waste polymer compound. The resulting cleaned polymer molecules can then be recovered (e.g., by precipitation), dried and re-formed into the original plastic material at close to 100% product purity and mass yield.

259. Based on the similar compatibility between solvent and solute molecules, solvent-based recycling separates the plastic resin from various additives and fillers. Solvent-based recycling is a novel technology allowing the recycling of, among others, complex polymer compounds like multilayer packaging or contaminated polystyrene using selective dissolution.

4. [Chemical recycling (covered by R3)

260. The term 'chemical recycling' describes a broad range of non-mechanical/physical recycling methods, which have significantly different outputs arising from the applied process techniques. [It is a rapidly evolving field that may be a complementary technology to mechanical recycling for certain plastic waste types or applications that are not suitable for mechanical recycling (see para 188bis).] The various methods can be classified into three categories:

(a) Solvolysis (monomer recycling);

(b) Pyrolysis (falls under chemical recycling in case the output is used as material for base chemicals [and not as a fuel]);

(c) Gasification (falls under chemical recycling in case the output is used as material for base chemicals [and not as a fuel]).

261. Solvolysis is the collective term used for various types of solvent-specific methods, including 'glycolysis', 'methanolysis' etc. Solid plastic is dissolved into a liquid phase solvent and the polymer molecules then further break-down into smaller component parts [(monomer or oligomers)]. This technique [is] [can be] used for polymers with specific targetable bonds, such as polyurethane, where the original polymerisation reaction is reversed in the liquid solvent phase and the resulting building-blocks, or intermediates, can be purified (i.e., to remove pigments and fillers), prior to being fed-back into the original polymerization process (Dow, 2021; Sołtysiński et al, 2018). This approach preserves the useful chemical components of the waste polymer molecules, and these can be re-used back into full-scale industrial reactors, as direct replacement for primary feedstock raw materials. In the process of purification, hazardous wastes may be generated which should be treated appropriately. The mass of output polymer material recovered by this method can be classified as 'recycled plastic'.

262. In the context of chemical recycling, pyrolysis is a method that refers to sealed-reactor thermal process. Plastic wastes are subjected to intense heat and/or chemical break-down during a thermal reaction process and normally results in output streams that are a mixture of gases, liquids and waxes, plus a residual carbonaceous char. Often the lightest gaseous output fractions are incinerated within the process to generate heat energy for the chemical break-down. In most cases this is carried out in the absence of oxygen or moisture. Pyrolysis may be used for polymers consisting exclusively of hydrocarbons such as polyethylene, polypropylene and polystyrene.

263. Some of the resulting output mass fractions [from pyrolysis] can be used as chemical feedstock to replace prime (e.g., oil-derived) naphtha materials, as part of the cracking and polymerization reaction stages that make-up large-scale petrochemical process plants. However, the tracking and

tracing of the exact end-destination for the waste-derived monomer and short-chain fractions is [difficult] [usually not possible.][, so] [M][m]ass-balance approaches (a type of chain of custody model) are [needed][a means] to estimate the actual mass-flow from input plastic waste into the polymer end-products.

264. ISO 22095 (Chain of custody — General terminology and models) can be used as the basis for the definition and description of chain of custody models. Within the mass-balance [chain of custody model][approaches], there can be significant variation [between the precise approaches] used for this type of chemical recycling with respect to allocation of inputs to outputs. There are various measurement schemes to certify mass-balance processes, which vary in their definitions of recycling and recycled content (Edwards, 2021). Out of the Chain of Custody models according to the terminology described in ISO 22095, book and claim removes all physical links between inputs and outputs and therefore is not considered a valid approach for chemical recycling of plastic wastes.

265. In the context of chemical recycling, gasification involves plastic wastes being subjected to high-temperatures in the presence of an oxidizing agent to break down the polymer to a ‘syngas’ containing carbon dioxide, monoxide, water and hydrogen. This can, in some cases, be converted into ethanol and then used to make new hydrocarbons (e.g., polyethylene).

266. [The following potential environmental impacts from the chemical recycling of plastic wastes should be avoided or reduced:]

267. [Chemical recycling, a rapidly evolving field, may be a complementary technology to mechanical recycling for certain plastic waste types or applications.] Various examples of chemical recycling methods for plastic wastes are available at the pilot-plant stage and also at close to full-scale operating throughput, [but most are yet to demonstrate commercial maturity at the full industrial scale]. There is [a lack of evidence to generate conclusions around the viability of many technologies, and] a lack of understanding of the life-cycle impacts (Hann et al., 2020)]. [For these reasons it is not yet fully proven that chemical recycling can be considered an ESM operation for all applications].

268. [For further information refer to the report “Chemical Recycling of Polymeric Materials from Waste in the Circular Economy” (European Chemicals Agency, 2021), “Chemical recycling: A critical assessment of potential process approaches (Quicker et al, 2022)”, “Chemical Recycling of Plastic Waste: Comparative Evaluation of Environmental and Economic Performances of Gasification- and Incineration-based Treatment for Lightweight Packaging Waste” (Voss et al, 2022) and “Chemical Recycling: State of Play” (Hann et al, 2020).]

5. Energy recovery (R1)

269. Plastic wastes suitable for energy recovery may, for example, be non-recyclable or hard-to-recycle plastic wastes, plastic wastes consisting of small items dispersed among other waste materials, plastic wastes with a POP content at or above the low POP content limit values and residues from the recycling process containing plastic wastes which cannot themselves be recycled. In line with the waste hierarchy, [recycling of plastic wastes should be prioritized over energy recovery], except in the case where certain plastic types or additives represent a particular health risk or environmental hazard and require destruction in a controlled system.

270. For energy recovery, plastic wastes can inter alia be thermally treated through incineration with energy recovery with other kinds of waste, e.g., MSW and industrial wastes, or through co-incineration in blast furnaces and power plants, and through co-processing in cement kilns.

271. Most plastics are hydrocarbon polymer compounds that can burn and have a high calorific value (see Table 17). [Due to its] high calorific value, plastic waste should be mixed with other compatible waste fractions with a low calorific value in order to achieve a preferably constant calorific value of the mixture.

Table 17: Energy values of plastic wastes, including mixed plastic wastes, in comparison with other waste and fuels.

Single polymers / *Fuels or wastes*	Lower calorific value[63](MJ/kg)
LDPE / HDPE	45
PP	45
PS	41
ABS, *Oil*	40

[63] Other terms meaning the same as “lower calorific value” are “lower heating value”, “net heating value”, and “net calorific value”. It is noted there are different methods for calculating it.

Coal	25
PET	23
PVC	22
Packaging Derived Fuels (PDF)	20
Refuse Derived Fuel (RDF)	15-17
MSW, Wood	8-10
Mixed polymers (Plastic Fuels)	
LDPE/PP/ HDPE (food packaging)	45
PP/ABS/HDPE (computers)	43
LDPE/PP/PVC (mixed packaging) PP/ LDPE/PVC (non-food packaging)	37 37
PU/PP/PVC/ABS (bumpers/fuel tanks)	33

272. Plastic wastes can be part of fuels derived from waste such as Solid Recovered Fuel (SRF) in accordance with the European standard (EN 15359) and RDF. SRF usually has a higher calorific value than RDF. RDF is produced by removing non-combustible components such as metals, glass and putrescible materials from MSW and then pelletizing the combustible material. As this is processed MSW, RDF has a higher concentration of plastic waste than MSW and consequently a higher energy value.

273. For further information on incineration with energy recovery of plastic wastes containing or contaminated with POPs, refer to the General technical guidelines on the environmentally sound management of wastes consisting of, containing, or contaminated with persistent organic pollutants (UNEP, 2022a). For further information on incineration with energy recovery of plastic wastes other than plastic wastes containing or contaminated with POPs, refer to the technical guidelines on the environmentally sound incineration of hazardous wastes and other wastes as covered by disposal operations D10 and R1 (UNEP, 2022d). For information on the reduction of mercury releases from the energy recovery of plastic waste containing or contaminated with mercury, refer to the technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds (UNEP, 2022c).

274. For further information on the co-processing of plastic wastes in cement kilns, refer to the technical guidelines on the environmentally sound co-processing of hazardous wastes in cement kilns (UNEP, 2011).

275. For further information on the disposal of incineration residues, refer to the technical guidelines on the environmentally sound incineration of hazardous wastes and other wastes as covered by disposal operations D10 and R1 (UNEP, 2022d), and the technical guidelines on the environmentally sound disposal of hazardous wastes and other wastes in specially engineered landfill (D5) (UNEP, 2022e). For further information on the disposal of incineration residues containing or contaminated with POPs, refer to the General technical guidelines on the environmentally sound management of wastes consisting of, containing, or contaminated with persistent organic pollutants (UNEP, 2022).

6. Final disposal operations (D5, D10)

276. According to the waste management hierarchy, final disposal of plastic wastes is the least preferred option. Final disposal operations that may be relevant to plastic wastes include specially engineered landfill (D5), and incineration on land (D10).

277. Since plastics can be very light, special care should be taken to ensure plastic wastes are not blown off-site by wind.

278. Some additives such as phthalates, decaBDE, HBCD, PFOS and PFOA contained in plastics could enter the leachate of landfills (Teuten et al., 2009; Wowkonowicz & Kijenska, 2017; Stuart et al., 2019).

279. When carrying out incineration on land (D10) of plastic waste, a preferably constant calorific value of the mixture should be achieved (see paragraph 272 and Table 17).

280. For further information on landfilling of plastic wastes, refer to the technical guidelines on the environmentally sound disposal of hazardous wastes and other wastes in specially engineered landfill (D5) (UNEP, 2022e). For further information on landfilling of plastic wastes containing or contaminated with POPs, refer to the General technical guidelines on the environmentally sound management of wastes consisting of, containing, or contaminated with persistent organic pollutants

(UNEP, 2022). For information on the reduction of mercury releases from plastic wastes containing or contaminated with mercury from specially engineered landfill (D5), refer to the technical guidelines on the environmentally sound management of wastes consisting of, containing, or contaminated with mercury or mercury compounds (UNEP, 2022c).

281. For further information on incineration on land (D10) of plastic wastes containing or contaminated with POPs, refer to the General technical guidelines on the ESM of wastes consisting of, containing or contaminated with Persistent Organic Pollutants (POPs) (UNEP, 2022a). For further information on incineration on land (D10) of plastic waste other than plastic wastes containing or contaminated with POPs, refer to the technical guidelines on the environmentally sound incineration of hazardous wastes and other wastes as covered by disposal operations D10 and R1 (UNEP, 2022d). For information on the reduction of mercury releases from incineration on land (D10) of plastic wastes containing or contaminated with mercury, refer to the technical guidelines on the environmentally sound management of wastes consisting of, containing, or contaminated with mercury or mercury compounds (UNEP, 2022c).

7. Specific aspects related to recycling of certain types of plastic wastes

(a) Specific aspects related to recycling of common types of plastic wastes

282. Specific aspects of recycling of common types of plastic waste (PE, PP, PS, ABS, PET, PC, PVC) are provided below.

(i) Recycling of waste PE

283. LDPE can be mechanically recycled and this involves initial removal of contaminants followed by washing, drying and melt re-processing. Post-extrusion, the LDPE melted paste can be re-formed into thin plastic sheets which can be used for manufacturing plastic products. Good quality LDPE is used for household items like plastic wrap, grocery bags, and non-food containers. Recycled LDPE can be made into garbage cans, garbage bags, construction panelling, furniture, flooring and bubble wrap.

284. Bales of LDPE film can provide a high yield depending on the waste source, with clean distribution film performing best. The recyclate can be reintroduced into many primarily film related applications (e.g., non-food contact packaging, grocery bags, refuse bags, drip irrigation systems).

285. HDPE is normally treated through mechanical recycling. At first, the plastic waste is sorted and cleaned in order for any unwanted non-plastic debris to be removed. Then it needs to be segregated and purified, so that only HDPE items will be re-processed together. If other, non-compatible plastic polymers were to remain in the batch, the recycled end-product will be poor quality. HDPE can be separated by NIR sensor sorting techniques. However, if the plastic is too dark in colour, which means it absorbs the infrared waves, it is difficult to use this technique. Sorted HDPE is then shredded, washed melted and filtered to further purify the polymer. Finally, the plastic is cooled into pellets which can be used in product manufacturing. Recycled HDPE is used, for example, in pens, plastic lumber, plastic fencing, picnic tables and non-food bottles.

286. HDPE obtained from MSW (e.g., milk containers), distribution (e.g., crates and pallets), and construction (e.g., pipes) can be sorted at the article level into relatively pure HDPE streams.

287. HDPE obtained from waste vehicles and WEEE is often sorted by density separation. Preferably, this stream should be further separated (e.g., through electrostatic sorting). Alternatively, HDPE from waste vehicles and WEEE can be co-processed into a compounded blend, although the properties of the final plastic may be of a lower quality than individual 100% pure polymers.

288. Plastic wastes consisting of PE are usually mixed with PP and, occasionally, PVC. HDPE and LDPE may also be mixed together. PE has a degree of compatibility with PP, but has poor compatibility with PVC, so even if the amount of PVC is small, it must be removed before melt processing.

289. The PE/PP compatibility can be enhanced through the use of compatibilization additives. The presence of a small amount of PP in PE will not greatly reduce the performance of the recycled material, but if the amount of PP is large, then, for example, EPDM (ethylene propylene diene monomer rubber) can be considered as a possible compatibilizer for improved melt-blending.

290. [In case recycled HDPE is used in food contact materials, strict national legislation for using recycled plastics in food contact materials should be in place to minimize migration of chemicals into food.]

(ii) Recycling of waste PP

291. PP obtained from MSW (e.g., margarine tubs), bulky waste (e.g., garden furniture), distribution (e.g., crates and pallets), ELV and WEEE mixed-plastics and construction wastes can be sorted into relatively homogeneous single-polymer waste streams. Good segregation of these different waste streams helps to deliver well-characterised mixed plastic waste items into recycling sorting facilities and aids higher recycling yields and recyclate quality.

292. Regarding the mechanical recycling of PP, like other plastics, good sorting, washing, purification and melt re-processing are all critical steps to delivering high yield and quality of recyclate output. In the melt reprocessing phase, high purity PP flake is fed into an extruder where it is melted at 180 to 220 °C then homogenized, de-gassed, melt-filtered and die-formed into strands before cooling to be chipped into pellet granules. This is the common format for secondary PP raw-material polymer product.

293. Recycled PP can be mixed with virgin PP in any ratio for the production of new products such as clothes hangers, playground equipment, compost bins and kerbside recycling crates. However, there are many recent examples of high-quality PP recyclates being used at 100% levels for the production of car-parts, pipes, drainage goods and electrical product casings, as well as for non-food contact packaging items.

(iii) Recycling of waste PS

294. PS can be recycled physically and/or mechanically. HIPS is easier to recycle since its properties are not greatly affected even after multiple re-processing. The recycling rate of PS packaging waste is low due to the difficulty in removing food residues and odours from used packages.

295. PS foams can be troublesome for most rigid plastic recycling facilities. If oily molecules, water, and other contaminants make it into recycled materials, the substances can disrupt and weaken the polymers. PS clamshell containers and coffee cups are especially likely to be dirty, adding to the effort of processing them for recycling (Lemonick. S, 2019).

296. Solvent-based dissolution of foamed PS and rigid-PS waste materials can be used to remove unwanted contaminants, odours, and additives (e.g., BFR) to create high-purity PS recyclates[64].

(iv) Recycling of waste ABS

297. ABS can be successfully recycled mechanically from mixed waste streams. Similar to the recycling of PS from these waste fractions, NIR sorting is difficult due to the extensive use of black plastics. However, density separation can be employed to create a mixed-styrenics fraction (PS+ABS) that is almost free from BFR additives. The presence of mineral filled-PP in the plastic waste infeed mixture will result in some PP contamination in the PS+ABS density sorted fraction, which is incompatible for melt-blending even at low levels. Further separation may not always be necessary, because ABS and PS polymers display a level of compatibility in extrusion, although further purification is possible using electrostatic sorting, to remove filled-PP and PS, to make near-pure ABS for higher-end applications. The ABS recyclates can be reintroduced into their original applications (e.g., vacuum cleaners) or other used for other applications (e.g., non-food containers; automotive parts; furniture feet).

298. ABS regenerated material can sometimes be blended with other similar types of compatible plastic waste (e.g., HIPS), and, by adding various functional additives, modified ABS blended materials with good toughness, corrosion resistance, oil resistance, cold resistance, weatherability and anti-aging properties can be produced. When recycled, ABS from plastic wastes can be used either in a mixture with virgin material, or as 100% recyclate, to produce products.

(v) Recycling of waste PET

299. PET makes up a large percentage of rigid, household packaging items in the form of blow-moulded bottles and thermoformed trays, often in clear, natural colour. The collection of rigid packaging from municipal sources means that PET recycling rates are some of the highest for any plastic, especially in countries where DRS are well-established (e.g., Norway has over 90% bottle collection rates)[65]. Polyester fibre recycling from clothing, household fabrics and bedding (e.g., duvet

[64] See https://www.ivv.fraunhofer.de/en/recycling-environment/recycling-plastics.html#creasolv.

[65] See https://www.bpf.co.uk/suppliers/packaging/deposit-return-schemes.aspx.

fillings) remains at very much lower rates, due to less prevalence of collection systems for these products.

300. Blow-moulded PET from bottles is one of the plastic wastes that are easiest to recycle and have the highest recycling rate of any common plastic. Closed loop recycling (e.g., bottle to bottle) is possible. This is because it is relatively easy to wash, separate out coloured flakes and then upgrade the intrinsic viscosity (polymer chain length) during the recycling process to near-virgin quality using polycondensation reactions. Food-contact approval certification has been given to advanced recycling processes that can demonstrate very high purity and tight quality control of the closed-loop recycled PET (r-PET), with usage levels of up to 100% r-PET to make new consumer drinks bottles.

301. The process of recycling PET bottles (or other rigid PET packaging wastes) for use in fibres is generally to sort, granulate, float sink, wash and dry. The fibres are made by adding colouring (as required), extrusion melting, filtering, and spinning into fibres. The output quality of the fibres depends upon the input quality of the PET flakes and the capability of the recycling process. The most demanding woven applications with very fine denier yarns can be successfully made from 100% recycled PET.

302. PET textiles and fibres can be recycled by thorough washing and re-melting. Recycled PET can be used for carpets, garments and non-woven applications.

303. [In common with recycled HDPE, recycled PET is also used in food contact materials. Noting paragraph 290, there should be national legislation in place to minimize migration of chemicals into food.]

(vi) Recycling of waste PC

304. Waste PC can be recycled by mechanical recycling. PC is difficult to separate from mixed WEEE and ELV waste plastic streams due to the difficulty in reaching a high enough purity of the individual PC sorted flakes. Most PC recycling happens where source segregated PC-rich waste streams exist, such as used CD and DVD discs. After repeated recycling and reprocessing PC is prone to degradation and its mechanical properties, especially notched impact strength, will be significantly reduced. Therefore, PC recycled material can be reinforced by adding a toughening agent.

(vii) Recycling of waste PVC

305. PVC can be recycled by mechanical recycling, which involves mechanically treating the waste (e.g., grinding) to reduce it into much smaller particles (i.e., powder or 'pulver'). The resulting granules can be melted and re-moulded into different products, usually the same product from which it came, such as window frame profiles.

306. Certain PVC wastes may contain high concentrations of lead compounds, phthalates, or other additives to an extent to render the waste hazardous or problematic. In such cases, the future use of the recycled PVC should be carefully assessed in order to ensure its adequacy with the permitted uses in case of restrictions due to the presence of such additives in products.

(b) Specific aspects related to recycling of other types of plastic wastes

307. Specific aspects related to recycling of other types of plastic wastes (cured resins, fluorinated polymers, biodegradable plastic wastes, textile plastic wastes) are provided below.

(i) Recycling of waste cured resins

308. Cured resins are thermoset polymers which cannot be remelted or dissolved in a solvent. This makes such polymers difficult to recycle.

(ii) Recycling of waste fluorinated polymers

309. The recycling of waste fluorinated polymers is not well established inter alia as they may contain additives (e.g., glass fibres, glass beads, graphite, and soot) to an extent to render the waste hazardous or problematic (Schlipf et al., 2014). In addition, fluorinated polymers applied to metal articles (e.g., non-stick frying pans) may not be recycled as it is difficult to separate them from metal wastes during metal recycling.

310. In addition to the fluorinated polymers referred to in table 3, polytetrafluoroethylene (PTFE) is of practical relevance and the main material used. Currently, recycling of fluorinated polymers is mainly applied to certain PTFE wastes. Some of the fluorinated polymers are thermosets, such as PTFE, which cannot undergo thermal melt-extrusion or compounding, but can be recycled after size reduction. The recyclates obtained in this process can be used as additives e.g., in plastics other than PTFE. It is not possible to use such recyclates in their original applications. Some other fluorinated

polymers, such as FEP and PFA, are thermoplastics and can undergo thermal melt-extrusion or compounding. It is noted that the fluoride content of fluorinated polymers may lead to corrosion during recycling.

(iii) Recycling of biodegradable plastic wastes

311. [Biodegradable plastic [wastes] are not suitable for mechanical recycling [together with non-biodegradable plastic wastes]. To avoid contaminating or otherwise reducing the quality of plastic recyclate, biodegradable plastics [should not be mixed] with non-biodegradable plastics in the recycling stream] If collected in a separate stream, biodegradable plastic wastes may be treated e.g., with mechanical recycling. Research and development in this area is still ongoing. Mechanical recycling of biodegradable plastic wastes is possible, but it may be difficult to convert them into useful products, especially due to thermomechanical degradation during extrusion. Therefore, after each cycle the product quality is lower compared with the starting material.

312. PLA may be effectively sorted out using available detection technologies. There is however a risk that mechanical sorting techniques are not able to sufficiently sort out biodegradable plastics from conventional polymers, which can then contaminate the recycled fraction and degrade the quality of recyclate. Also, PLA is denser than water so in the flotation tank any PLA fragments will eventually follow the PET stream towards mechanical recycling. This mixing of PLA with PET materials may cause problems to the reprocessing unit since PLA and PET have different melting points (Luc et al., 2018).

313. [Not every plastic that is biodegradable is compostable. Whereas biodegradable plastic may be engineered to biodegrade in soil or water, compostable plastic refers to biodegradation into soil conditioning material (i.e., compost) under a certain set of conditions. In order for a plastic to be labeled as commercially “compostable” it must be able to be broken down by biological treatment at a commercial or industrial composting facility. Composting utilizes microorganisms, heat and humidity to yield carbon dioxide, water, inorganic compounds, and biomass that is similar in characteristic to the rest of the finished compost product. Decomposition of the plastic must occur at a rate similar to the other elements of the material being composted (within 6 months) and leave no toxic residue that would adversely impact the ability of the finished compost to support plant growth. The American Society for Testing and Materials (ASTM International) has established ASTM Standards D6400 and D6868 which identify specifications that must be met to label a plastic as commercially “compostable”. There are currently no ASTM standard test methods in place for evaluating the ability of a plastic to compost in a home environment (EPA webpage: https://www.epa.gov/trash-free-waters/frequently-asked-questions-about-plastic-recycling-and-composting).]

(iv) Recycling of textile plastic wastes

314. Textiles with fabrics that contain more than one fibre are inherently difficult to recycle mechanically because the fibres cannot be easily separated. (e.g., cotton and polyester blends).

315. Recycling of Nylon-6 (polyamides type) has been widely used in the carpet industry, through combining mechanical and chemical (depolymerization) processes (Hann et al., 2020). Nylon 6.6 (polyamides type) is commonly recycled mechanically from pre-consumer fibres (Le, 2018).

316. PP carpet fibres can be recycled, but the process is simplified when the complete carpet structure (i.e., pile fibres; adhesives; foam underlay) has been designed and constructed for ease-of-recycling by using fully compatible polymer types in the product composition. This approach works well for short-life carpets used, e.g., for large area exhibition halls and sports arenas.

[**New Section 8 - Specific aspects related to the disposal of compostable plastic wastes**]

Note: this section will provide guidance on the disposal of compostable plastic wastes together with organic wastes, further text will be elaborated at a later date taking into account paragraphs 317 to 319.

317. [Composting in industrial composting facilities currently can be applied for compostable plastic wastes e.g., PLA used for waste collection bags (Spierlinga, 2017) and starch-based plastics used for food-waste caddy sacks etc.]

318. [When collecting and accepting compostable plastic for treatment in a composting facility, clear guidance should be provided to residents and other waste generators about which type of plastics are to be collected together with the waste streams destined for composting in professionally /

industrially managed facilities. Otherwise, there is a risk of attracting other non-compostable plastics and subsequent technical problems in the composting activity.]

319. [In addition, compostable plastics may not break down sufficiently in the composting facility, especially in colder climates. Residual plastic may therefore remain visible, hindering marketing efforts, depending on the acceptance of anticipated customers for the final product. The time it takes for a material to go through a composting facility can vary significantly depending on the chosen composting process, local conditions and the properties of the biodegradable plastic wastes (such as the material thickness). The outputs of composting compostable plastics are CO_2, water, biomass, and inorganic compounds.]

H. Health and safety

320. Both the supplier and/or facility managing [plastic waste] should ensure that the following information is available and safety measures are in place, when required:

(a) The identity, quality and form of the plastic waste, especially the content of chemicals of concern such as POPs;

(b) The safe handling instructions appropriate to the plastic wastes;

(c) The protective clothing that should be worn by employees, including eye and ear protection, gloves, protective footwear, filter masks and hard hats, depending on the processing to which the plastic waste is subjected;

(d) The safe storage of the compacted plastic wastes, including mechanical handling equipment, stack heights/stability and stack spacing;

(e) Fire prevention, firefighting, fire extinguishers, emissions from burning plastic wastes, advice to fire fighters, means of dealing with fire residues.

321. To improve knowledge regarding possible risk due to contamination, the origin of the waste and information on how the waste is generated will help improve recycling and reduce risk to employees. Waste operators should have access to sufficient information on relevant hazardous substances (additives etc.) used at the production step of the plastic.

322. Contaminated plastic wastes, such as packaging of pesticides or other hazardous chemicals, should be handled with specific care, in particular if it constitutes a hazardous waste dependant on the type and amount of contamination.

323. When plastic waste is contaminated with larger quantities of food residues problems with micro-organisms, odour and attraction of pests may occur. Measures should be taken to reduce odour and pests around the workplace.

324. Plastic containers used to supply hospitals with sterile water and other aqueous solutions may safely be recycled provided they have been kept separated from medical/clinical wastes (e.g., RECOMED UK[66]). Plastic wastes may become contaminated with water, insect pests and dirt during transport and storage if not properly protected.

325. With respect to health and safety in relation to plastic wastes from healthcare facilities, the Technical guidelines on environmentally sound management of biomedical and healthcare wastes (Y1, Y3) (UNEP, 2002) should also be considered.

326. The following rules should apply in the workplace:

(a) Smoking should be forbidden in the plastic waste storage and disposal areas and such areas should be protected by secure fencing;

(b) Ready access to all parts of storage areas should be maintained by well-organised and supervised stacking patterns in order to ensure efficient working conditions, easy emergency escape routes for workers and ready access for emergency services vehicles;

(c) Suitable extinguishers should be readily available in storage areas and staff should attempt to extinguish fires in their very earliest stages.

327. Working conditions for employee health and safety should include, as applicable (Illinois Recycling Association, 2010):

[66] See https://recomed.co.uk/about-recomed.

(a) Appropriate training and instruction to workers;

(b) An environmentally comfortable and safe working environment. This includes:

(i) Space that is heated in the winter, cooled in the summer, and has good air exchange (ventilation);

(ii) Anti-fatigue mats to reduce the physical discomfort of standing in one place for long periods of time;

(iii) Sufficient lighting to reduce eye strain;

(iv) Gloves, safety glasses, hearing protection, steel-toed boots, and, if applicable, hardhats, facemasks and respirators;

(c) All stations and conveyors should be ergonomically designed. For instance, sorting conveyors should be of a comfortable reach across width, if sorting from one side of the conveyor.

1. Fire and safety

328. In the event of a fire (at any industrial operation):

(a) All staff should evacuate the premises immediately and assemble at recognised points and be counted;

(b) The emergency services should be summoned immediately and should be reminded:

(i) Of the speed at which fire can spread in burning plastics;

(ii) That burning plastics may form a mobile stream of burning material which can rapidly transfer the fire to other areas and can also block drains;

(iii) Of the need for self-contained breathing apparatus when entering a building in which any material is burning.

329. Good practice guidance for managing fire safety during the reception, treatment and storage of solid combustible wastes is provided by the Waste Industry Safety and Health (WISH) forum on reducing fire risks at waste management sites (WISH, 2020).

2. Smoke and toxic gases

330. The major cause of deaths in accidental fires is through the inhalation of carbon monoxide and smoke which should be prevented (Fardell, 1993). Fire brigades usually regard the smoke and fumes from any accidental fire as toxic and employ self-contained breathing apparatus when entering a burning building regardless of the materials present.

331. It should be taken into account that combusting PVC and fluoropolymers may emit acidic gases. The high chlorine content of PVC reduces its ignitability and also generates less heat compared with other types of plastics[67]. It should also be noted that combusting fluorinated polymers can produce hydrogen fluoride which is acutely toxic and ecotoxic.

332. Toxic gases emitted during thermal degradation are harmful on their own, but those harms can be multiplied when they are emitted in combination. For example, when carbon monoxide and hydrogen cyanide are emitted together from polyurethane insulation foam (a thermoset plastic) this can significantly increase the risk of cardiac arrest and cancer, hazards well-known to firefighters (Drager Safety AG & Co).

333. Soot from combusting materials, natural and man-made, contain small concentrations of more toxic materials and so should be handled with care using appropriate protective clothing.

I. Emergency response

334. Emergency response plans should be in place for plastic wastes in production, use, storage and transport or at disposal sites. The principal elements of an emergency response include:

(a) Identifying all potential hazards, risks and accidents;

(b) Identifying relevant local and national legislation governing emergency response plans;

(c) Planning for anticipated emergency situations and possible responses to them;

[67] See https://envorinex.com/web_assets/docs/products/PVC%20and%20Fire.pdf

(d) Maintaining a complete up-to-date inventory of the plastic wastes on site;

(e) Training personnel in response activities, including simulated response exercises, and first aid;

(f) Maintaining mobile spill response capabilities or retaining the services of a specialized firm for spill response;

(g) Installing mitigation measures such as fire suppression systems, spill containment equipment, fire-fighting water containment, spill and fire alarms, and firewalls;

(h) Installing emergency communication systems, including signs indicating emergency exits, telephone numbers, alarm locations and response instructions;

(i) Installing and maintaining emergency response kits containing sorbents, personal protective equipment, portable fire extinguishers and first aid supplies;

(j) Integrating facility plans with local, regional, national and global emergency plans, if appropriate;

(k) Regularly testing emergency response equipment and reviewing emergency response plans.

335. Emergency response plans should be prepared jointly by interdisciplinary teams that include emergency response, medical, chemical and technical personnel and labour and management representatives. When applicable, representatives of potentially impacted communities should also be included.

J. Awareness and participation

336. Public participation is a core principle of the 1999 Basel Declaration on Environmentally Sound Management and many other international agreements. It is essential that the public and all stakeholder groups have a chance to participate in the development of policy related to plastic wastes, the planning of programmes, the development of legislation, the review of documents and data and decision making on local issues related to plastic wastes. Paragraphs 6 (g) and (h) of the Basel Declaration reflect an agreement to enhance and strengthen efforts and cooperation to achieve ESM with regard to the enhancement of information exchange, education, and awareness-raising in all sectors of society, along with cooperation and partnership at all levels between countries, public authorities, international organizations, industry, non-governmental organizations and academic institutions.

337. Articles 6, 7, 8, and 9 of the UNECE 1998 Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention), along with the Escazú Convention, require the parties to conduct fairly specific types of activities regarding public participation in specific government activities, the development of plans, policies and programmes and the development of legislation and call for access to justice for the public with regard to the environment.

338. Public awareness and attitudes to plastic wastes can affect the population's willingness to cooperate and participate in adequate plastic waste management practices. General environmental awareness and information on health risks due to deficient plastic waste management are important factors which need to be continuously communicated to all sectors of the population.

339. Raising public awareness and promoting public participation is especially critical for separation and collection as important steps for environmentally sound management of plastic wastes.

340. Local authorities should organize awareness raising campaigns/events addressed to business (commercial, beach users, fishermen, etc.) and the public (tourists, households, etc.) to make people aware of the importance of ESM of waste plastics in tackling environmental problems such as marine litter and in improving people's lives. There exists a variety of communication techniques that can be used, such as door to door information, leaflets, community meetings, media etc. Communication objectives could (Climate and Clean Coalition, 2013):

(a) Address cultural practices and beliefs;

(b) Emphasize health benefits;

(c) Use simple messages and multiple media types;

(d) Build on existing neighbourhood networks;

(e) Emphasize the economic benefits of proper plastic waste management;

(f) Frame plastic waste management activities as a topic of great interest for voters, particularly on important issues (e.g., marine plastic litter);

(g) Increase visibility and credibility of plastic waste management activities (e.g., by issuing uniforms to workers);

(h) Identify instances where city activities support national goals;

(i) Communicate about the national benefits of proper local plastic waste management (e.g., to attract investments);

(j) Tailor communication to the intended audience;

(k) Emphasize the economic benefits to businesses (e.g., better conditions for attracting investment);

(l) Target groups with broad influence (e.g., tourism boards).

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Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
Sixteenth meeting
Geneva, 1–12 May 2023
Item 4 (b) (i) of the provisional agenda*

Matters related to the implementation of the Convention: scientific and technical matters: technical guidelines

Technical guidelines on the environmentally sound management of plastic wastes

Note by the Secretariat

1. As is mentioned in the note by the Secretariat on technical guidelines (UNEP/CHW.16/6), the annex to the present note sets out the revised version of the updated technical guidelines on the environmentally sound management of plastic wastes, reflecting the outcomes of the thirteenth meeting the Open-ended Working Group. The changes made to the updated version of the technical guidelines of 16 December 2022 (document UNEP/CHW.16/6/Add.3) have been tracked so that the revisions can be easily identified.

2. As is mentioned in the note by the Secretariat on the outcomes of and follow up to the thirteenth meeting of the Open-ended Working Group (UNEP/CHW.16/20/Add.1), the small intersessional working group on plastic wastes will prepare a revised version of the technical guidelines, taking into account the discussions during the thirteenth meeting the Open-ended Working Group. The revised version of the guidelines will be made available for consideration by the Conference of the Parties at its sixteenth meeting.

3. The present note, including its annex, has not been formally edited.

* UNEP/CHW.16/1.

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Annex

Technical guidelines on the environmentally sound management of plastic wastes

(Draft updated version of 23 February 2023)

Contents

Abbreviations

ABS	acrylonitrile butadiene styrene
AHEG	ad hoc expert group
ASTM	American Society for Testing and Materials
BAT	best available techniques
BEP	best environmental practices
BFRs	brominated flame retardants
CEN	European Committee for Standardization
CiP	Chemicals in Products Programme
c-octaBDE	commercial octabromodiphenyl ether
c-pentaBDE	commercial pentabromodiphenyl ether
decaBDE	decabromodiphenyl ether
DRS	deposit-and-return system
ELV	end of life vehicles
EN	European norm
EPR	extended producer responsibility
EPS	expandable polystyrene
ESM	environmentally sound management
EU	European Union
FEP	perfluoroethylene /propylene
GHG	greenhouse gas
HBCD	hexabromocyclododecane
HDPE	high-density polyethylene
HFCs	hydrofluorocarbons
HIPS	high impact polystyrene
IATA	International Air Transport Association
ICCM	International Conference on Chemical Management
IMO	International Maritime Organization
INC	intergovernmental negotiating committee
ISO	International Organization for Standardization
LDPE	low-density polyethylene
MF	melamine formaldehyde
MFA	tetrafluoroethylene/perfluoromethyl vinyl ether
MSW	municipal solid waste
NA	neutralisation agent
NIR	near-infrared
ODS	ozone depleting substances
OECD	Organisation for Economic Co-operation and Development
PA	polyamide
PBS	polybutylene succinate
PBT	polybutylene terephthalate
PC	polycarbonate
PCB	polychlorinated biphenyls
PCL	polycaprolactone
PE	polyethylene
PET	polyethylene terephthalate
PF	phenol formaldehyde
PFA	perfluoroalkanes
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonic acid
PLA	polylactic acid
POP	persistent organic pollutants
POP-BDE	brominated diphenyl-ethers listed in the Stockholm Convention: tetra-BDE, penta-BDE, hexa-BDE, hepta-BDE, deca-BDE
PP	polypropylene
PS	polystyrene
PTFE	polytetrafluoroethylene
PUR	polyurethane

PVC	polyvinyl chloride
PVDF	polyvinylidene fluoride
PVOH	polyvinyl alcohol
PVF	polyvinyl fluoride
QA	quality assurance
QC	quality control
RDF	refuse derived fuel
SAICM	Strategic Approach to International Chemical Management
UNEA	United Nations Environmental Assembly
UNEP	United Nations Environment Programme
UNECE	United Nations Economic Commission for Europe
UF	urea-formaldehyde
UV	ultraviolet
VIS	visual spectrometry
WEEE	waste electrical and electronic equipment
XPS	extruded polystyrene
XRF	X-ray fluorescence
XRT	X-ray transmission

Units of measurement

kg	kilogram
mg/kg	milligram(s) per kilogram.
mg	milligram
ppm	parts per million
tonne	1000 kg

I. Introduction

A. Scope

1. The present technical guidelines provide guidance on the environmentally sound management (ESM) of plastic wastes, pursuant to decisions BC-14/13 and BC-15/10 and BC-16 [to be completed post COP16] of the Conference of the Parties to the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal. This document supersedes the technical guidelines for the identification and environmentally sound management of plastic wastes and for their disposal of December 2002.

2. Plastic wastes, in the context of these guidelines, covers plastic wastes classified by entries Y48 in Annex II, A3210 in Annex VIII and B3011 in Annex IX to the Basel Convention. Furthermore, the guidelines cover plastic wastes extracted and/or separated from other waste streams that have plastic components or consist partially or fully of plastic (e.g., wastes collected from households (Y46), waste electrical and electronic equipment (WEEE), waste vehicles, waste cables, waste lead-acid batteries and waste textiles for which there are separate related entries in Annexes VIII and IX).

3. It should be noted that several other technical guidelines also provide guidance on plastic wastes, as follows:

(a) For specific guidance on plastic wastes containing or contaminated with persistent organic pollutants (POPs), see the Basel Convention general technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with Persistent Organic Pollutants (UNEP, 2022a) and the Basel Convention specific technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with hexabromodiphenyl ether and heptabromodiphenyl ether, or tetrabromodiphenyl ether and pentabromodiphenyl ether or decabromodiphenyl ether (UNEP, 2019d), technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with hexachlorobutadiene (UNEP, 2015a), technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with short chain chlorinated paraffins (UNEP, 2019b), technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF) and perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds (UNEP, 2022b) and technical guidelines on the environmentally sound management of wastes containing or contaminated with unintentionally produced polychlorinated dibenzo-p-dioxins, polychlorinated dibenzofurans, hexachlorobenzene, polychlorinated biphenyls, pentachlorobenzene, polychlorinated naphthalenes or hexachlorobutadiene (UNEP, 2019e);

(b) For specific guidance on plastic wastes containing, or contaminated with mercury or mercury compounds, see the technical guidelines on the ESM of wastes consisting of, containing, or contaminated with mercury or mercury compounds (UNEP, 2022c);

(c) For specific guidance on the co-processing of plastic wastes in cement kilns, see the Basel Convention technical guidelines on the environmentally sound co-processing of hazardous wastes in cement kilns (UNEP, 2011);

(d) For specific guidance on the incineration of plastic wastes, see the technical guidelines on the environmentally sound incineration of hazardous wastes and other wastes as covered by disposal operations D10 and R1 (UNEP, 2022d);

(e) For specific guidance on the landfilling of plastic wastes, see the technical guidelines on the environmentally sound disposal of hazardous wastes and other wastes in specially engineered landfill (D5) (UNEP, 2022e).

(f) For specific guidance on plastic wastes from healthcare facilities, see the technical guidelines on environmentally sound management of biomedical and healthcare wastes (Y1, Y3) (UNEP, 2002).

~~(e)~~

B. About plastics and plastic wastes

4. Plastics started being made over 100 years ago from cellulose [(Bellis, 2021)]. They started to come into wider use in the 1950s and within a few years production had risen to a high rate. They are currently almost exclusively made from fossil fuels such as crude oil or gas. [In 2021, 90.2% of the world's plastics production was fossil-based. Post-consumer recycled plastics and bio-based/bio

attributed plastics respectively accounted for 8.3% and 1.5% of world plastic production (Plastics Europe, 2022)]. Global production of plastic increased from 1.5 million tonnes in 1950 (Plastics Europe, 2008) to [390 million tonnes in 2021 (Plastics Europe, 2022)] .

5. Plastics are lightweight with varying degrees of strength and durability. They can be both thermal and electrical insulators, can be moulded in various ways, and can offer a large range of characteristics and colours achieved through additives. Plastics are most commonly used for packaging, food containers, building and construction, textiles, vehicles, electrical and electronic equipment, [agricultural] film and piping, healthcare equipment, sporting equipment and energy generation infrastructure.

6. [ALT However, [hazardous additives from plastic wastes] [plastic wastes] can have adverse effects on human health and the environment.~~] However, plastic wastes can have adverse effects on human health and the environment.~~ [Such effects are for example caused by the properties of polymers, and from hazardous substances in plastic, including the use of hazardous additives and processing aids, that may render the plastic waste hazardous, difficult to recycle or otherwise problematic.] [Such effects are for example caused by hazardous substances [that might exist] [contained] in plastic [wastes], including [some polymers and] certain additives and processing aids, that may render the waste hazardous or difficult to recycle [or otherwise problematic] [or other disposal operation]. [These additives have to be restricted from use in plastic to minimize any risk that can make their impact on plastic waste.] Attention to such effects has increased recently particularly, amongst other issues, due to the ubiquity of plastics and microplastics in marine, freshwater and terrestrial environments (UNEP, 2021a)[(Bank, 2022)]. This is a consequence of the leakage of plastic into the environment at every stage of its lifecycle, particularly if plastic wastes are not managed in an environmentally sound manner. The plastics lifecycle includes a full range of activities from extracting raw materials, production, distribution, use and disposal as waste. Environmental problems may be caused at any stage in the lifecycle of plastics, inter alia from point source emissions to air, water and soil from production processes, as well as from plastic wastes not managed in an environmentally sound manner. [Such impacts are for example caused by certain additives and processing aids that may render the waste hazardous or problematic.] The majority of plastics degrade very slowly in the environment.

7. The environmentally sound management of plastic wastes has been a constant challenge. [Of the 353 million tonnes of plastic waste generated globally in 2019, 9% was recycled, 19% was incinerated, almost 50% was disposed in landfills and 22% was disposed of in dumpsites, subjected to open burning or leaked into the environment (OECD, 2022)]

8. Landfilling of plastic wastes can have adverse effects on human health and the environment, in particular in non-engineered landfills or open dumpsites, such as the leaching of plastics additives, as well as leakage of microplastics and macroplastics into the wider environment. Gasification, pyrolysis and combustion, in particular open burning, of plastic wastes can also adversely affect human health and the environment due to emissions and releases of greenhouse gases and pollutants, such as unintentionally produced POPs and mercury.

9. The leakage of plastic and plastic wastes into the environment can occur from a variety of land-based and ocean-based sources in the form of macroplastics, microplastics and nano-size plastic particles. The sources include, but are not limited to, the uncontrolled dumping of waste, litter, wastewater, storm water run-off and sewers, microplastics intentionally added to products, loss of fishing gear and spillage of plastic pellets, as well as wear from the use of a variety of products containing plastics such as artificial turf, paints and synthetic textiles, unintentional releases from plastic materials in production processes and equipment[, potential microplastic releases from incinerator bottom ash,] and the fragmentation of oxo-degradable plastics [and failed dissolution of water-soluble plastics]. Leakages may notably be caused by insufficient and inefficient waste collection, transport and disposal systems, private consumer behaviour as well as business practices. Microplastic pollution is further compounded by the spreading on land of wastewater and sewage sludges that contain microplastic.

C. Types of plastics

1. What is plastic?

10. Plastic is a synthetic material or modified natural material, either a polymer or combination of polymers of high molecular mass modified or compounded with additives such as fillers, plasticizers, stabilizers, flame retardants and colourants. There are different definitions of plastic in current international or national documents. For example, according to the International Organization for Standardization (ISO) “plastic is a material which contains as an essential ingredient a high polymer

and which, at some stage in its processing into finished products, can be shaped by flow" (ISO, 2013). Other definitions are available, including from MARPOL[1].

11. Polymers are natural or synthetic substances composed of very large molecules, called macromolecules, that are multiples of simpler chemical units called monomers. There are a number of detailed definitions of the term "polymer", such as by the OECD[2].

2. Classification of polymers

12. Since polymer types are so diversified it is difficult to classify them in a comprehensive manner. One of the most common ways of classifying polymers is to separate them into thermoplastics and thermosets:

(a) Thermoplastics are polymers which soften when heated and solidify upon cooling, allowing them to be remoulded and recycled. Examples are polyethylene (PE), polypropylene (PP), and polystyrene (PS). Most common consumer plastics are thermoplastics;

(b) Thermosets are polymers that are set into a mould once, normally with a chemical reaction taking place, and cannot be re-softened or moulded again. Examples of thermosets include urea formaldehyde (UF) resins, phenol formaldehyde (PF) resins, and melamine formaldehyde (MF) resins. Thermosets are often used for high-heat applications such as electronic equipment, appliances, construction, and insulation.

13. Polymers can be produced either from materials produced from fossil fuels (fossil-based) or from biomass (bio-based). Both can be chemically identical and also have identical physical properties. Polymers can include additives to improve the base-polymer's physical properties~~.~~.

14. ~~[Plastics can be biodegradable or non-biodegradable.~~ Both fossil-based plastics and bio-based plastics can be biodegradable or non-biodegradable. Examples are shown in Figure 1.

~~14.~~15. Biodegradable plastics are broadly understood to refer to plastics that can be degraded under ~~certain~~ specific conditions, such as temperature, [UV radiation,] humidity, oxygen content and pH, by microorganisms in nature, such as bacteria, mould, and algae, and turn into water and carbon dioxide and other small molecules [(SAPEA, 2022)]. [[When a plastic is claimed] ~~[For a claim]~~ to be biodegradable, ~~[the producers of biodegradable plastics] [should] [must] [it is important to] include [on their products]~~ information [by the producer is needed] about the timeframe, the stages and level of biodegradation, and the environmental conditions required for biodegradation~~. - to be discussed with para 275] [The timeframe, the level of biodegradation, and the environment condition required for biodegradation need to be provided by the producer of the plastics, along with claim of biodegradability of plastics~~ (European Bioplastics, 2018). Some ~~[For this purpose, standard] [S][s]tandard[s] [specifications or protocols] are required [to prove the biodegradability of plastics] [for biodegradability of plastics].~~standards exist to determine biodegradability of plastics[3], however these standards are designed for specific conditions ~~[Some of the available standard protocols] [Standards] for assessment of biodegradation of plastics include ISO/17556 for aerobic biodegradability of plastic materials in soil, and ISO/15985 for anaerobic biodegradation under high-solids anaerobic-digestion conditions~~. Further ~~considerations~~ information on biodegradable plastics can be found in European Commission, 2022]~~.]~~

~~15. [There is a need to recognize the environmental impacts related to the use of biodegradable plastics, its durability, affordability, and ESM of biodegradable plastic when its turns to waste especially there is a need to have a proper environmental conditions and capacity. "Producing plastics from primary biomass can lead to direct or indirect land-use change, which in turn can result in biodiversity loss, ecosystem degradation, deforestation and water scarcity, as well as competition with crops intended for human consumption" (European Commission 2022).]~~

16. ~~[Both fossil-based plastic and bio-based plastic can be biodegradable or non-biodegradable under certain conditions. Examples of bio-based and fossil-based plastics as well as of biodegradable and non-biodegradable plastics are shown in Figure 1. [An example of] The [distinction] [classification] of plastics based on material and biodegradability is shown in Figure 1, where examples of some types of plastics are indicated.]~~

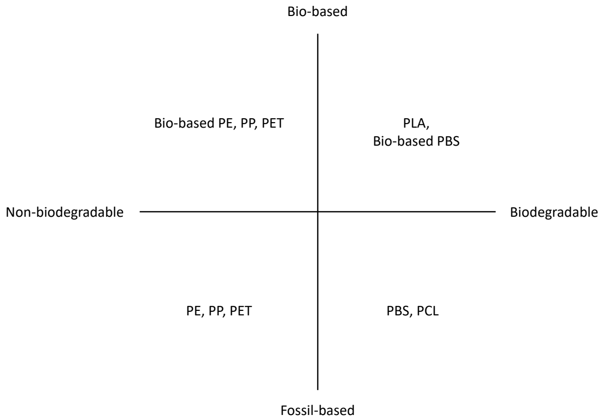
[[1] See MARPOL Annex V. Available from: https://www.imo.org/en/OurWork/Environment/Pages/Garbage-Default.aspx]

[2] https://www.oecd.org/env/ehs/oecddefinitionofpolymer.htm

[3] I[ISO/17556 is a standard for [determining the] aerobic biodegradability of plastic materials in soil][ISO22403:2020 on the intrinsic biodegradability of plastics in the marine environment]

17. Compostable plastics are a subset of biodegradable plastics designed to biodegrade under controlled conditions (European Commission, 2022). Compostable plastics are considered those plastics which have been tested and adhere to international standards for biodegradation in an industrial composting facility[4]. In addition, compostability may be certified by a third party. While compostable plastic waste does not contribute to the soil quality of the compost, it can be composted together with organic waste[5]. For compostable plastic waste to be fully composted together with organic waste, the composting must happen under specific conditions of temperature, moisture, oxygen level and microbial activity, normally found in controlled industrial composting facilities.

Figure 1: ~~[Examples of bio-based and fossil-based plastics as well as of biodegradable and non-biodegradable plastics] [Example of] [the distinction] [Classification] of plastics based on material and biodegradability under certain conditions.~~ Examples of bio-based plastics, fossil-based plastics, biodegradable plastics and non-biodegradable plastics



Source: Adapted from European Bioplastics (2018)

~~[ALT 17A Compostable plastics are a type of biodegradable plastic that are designed to biodegrade in soil conditioning material (i.e., compost) under a certain set of conditions. Composting utilizes microorganisms, heat and humidity to yield carbon dioxide, water, inorganic compounds, and biomass that is similar in characteristic to the rest of the finished compost product. For compostable plastics to be fully composted, disposal must happen under specific conditions of temperature, moisture, oxygen level and microbial activity, normally found in a controlled composting environment such as that found in industrial or commercial composting. Decomposition of the plastic must occur at a rate similar to the other elements of the material being composted (e.g., within 6 months) and leave no toxic residue that would adversely impact the ability of the finished compost to support plant growth. In order for a plastic to be labelled as commercially "compostable" it must have been tested and adhere to international standards for biodegradation in an industrial composting facility. Examples of such standards include the American Society for Testing and Materials ASTM D6400-21 and D6868 (ASTM, 2021) (in the U.S.) or European Standard EN 13432:2001 (European Standard, 2001) and EN 14995:2006 (European Standard, 2006) in Europe). In addition, compostability may be certified by a third party.]~~

~~[ALT 17B Compostable plastics are a subset of biodegradable plastics designed to biodegrade under controlled conditions (European Commission, 2022).] Compostable plastics are considered those plastics which have been tested and adhere to international standards [for biodegradation in an~~

[4] Examples of such standards include ISO 5413, ISO 17088, ISO 18606, American Society for Testing and Materials ASTM D6400-21 (ASTM, 2021) (in the U.S.), European Standard EN 13432:2000 (European Standard, 2000) and EN 14995:2006 (European Standard, 2006).

[5] It is noted that the term "bio-waste" is used as a synonym in some countries.

~~industrial composting facility[6].] [,such as] [Examples of such standards include] American Society for Testing and Materials ASTM D6400-21 (ASTM, 2021) (in the U.S.), [or] European Standard EN 13432:2000 (European Standard, 2000) and EN 14995:2006 (European Standard, 2006) in Europe), [for biodegradation in an industrial composting facility]. In addition, compostability may be certified by a third party. While compostable plastic waste does not contribute to the soil quality of the compost, it can be composted together with organic waste[7]][For compostable plastics [waste]to be fully composted, [together with organic waste] [disposal][the composting] must happen under specific conditions of temperature, moisture, oxygen level and microbial activity, normally found in controlled composting.~~

18. ~~[~~Oxo-degradable plastic are non-biodegradable plastics~~ that simulate biodegradable and compostable plastics~~. They are made by blending a pro-degradant additive into a~~the~~ non-biodegradable plastic ~~into a conventional non-biodegradable plastic~~ during the extrusion process, which accelerates the fragmentation of plastics ~~into plastic fragments~~ under ~~certain~~ specific conditions. However, unlike biodegradable and compostable plastics, once ~~the product~~ oxo-degradable plastics and ~~its~~ their fragments ~~is~~are buried in the soil, out of sunlight, the degradation process stops ~~[~~or~~]~~ ~~[~~slows significantly~~]~~ and ~~residual~~persistent small plastic particles remain intact, causing the release of microplastics. The resulting microplastics are made of oxidised ~~conventional~~ non-biodegradable polymers.~~]~~ ~~and are not biodegradable.~~

19. [Water-soluble plastics such as polyvinyl alcohol and its blends are used as protective films for laundry and dish[washing] [washer] detergents; sizing and finishing agents in the textile industry, and as thickening or coating agents for paints, glues, meat packaging, and pharmaceuticals in paper and food industries. While water-soluble plastics may dissolve in water under specific circumstances, these are not met in waste-water treatment plants, leading to significant water pollution with PVA microplastics, which concentrate environmental pollutants and amplify their uptake in the food chain. The discharge of PVA into water also triggers foaming and disrupts the oxygen exchange, harming aquatic life. Even when water-soluble plastics like PVA dissolve, their constituents (such as ethylene in the case of PVA) can remain intact in water, and harm aquatic fauna and flora.]

3. Common types of polymers

20. There are a wide range of polymers used in common plastics and they each have different properties which make them appropriate for different applications. Properties and typical applications of common polymer types, including those listed in entries Y48 and B3011 in Annex II and IX to the Basel Convention respectively, are shown in Table 1.

Table 1: Properties and typical applications of common polymer types including those listed in entries Y48 and B3011

Polymer Type	Labels (ASTM D7611)	Properties	Typical Applications
Polyethylene terephthalate (PET)	1 PETE	clear and resistant to heat, cold, and chemicals	plastic bottles (water, soft drinks etc.) food packaging film, strapping, carpets, vehicle tyre cords and fibres
High-density Polyethylene (HDPE)	2 HDPE	durable and resistant to shock and cold	packaging film, industrial film, bottles, tubs, cups, closures, toys, tanks, drums, cable insulation, pipes, gasoline tanks, shipping containers, seating and household goods

~~[[6] Examples of such standards include ISO 5413, ISO 17088, ISO 18606, American Society for Testing and Materials ASTM D6400-21 (ASTM, 2021) (in the U.S.), European Standard EN 13432:2000 (European Standard, 2000) and EN 14995:2006 (European Standard, 2006).]~~

~~[[7] It is noted that the term "bio-waste" is used as a synonym in some countries.]~~

Polymer Type	Labels (ASTM D7611)	Properties	Typical Applications
Polyvinyl chloride (PVC)	3 V	rigid or soft via plasticizers, resistant to water and solvents and flame retardant	piping, vinyl flooring, cabling insulation, window frames and roof sheeting
Low-density Polyethylene (LDPE)	4 LDPE	lightweight, flexible, and resistant to shock and cold	packaging film, cling-film, bags/sacks, lids, toys, coatings, flexible containers, tubing, irrigation pipes and vehicle dashboards
Polypropylene (PP)	5 PP	lightweight and resistant to heat, water and chemicals	yoghurt pots, snack wrappers, packaging films, bottles/caps, automotive battery cases, parts and body components, electrical components, carpet pile and backing, drainage goods
Polystyrene (PS)	6 PS	lightweight, structurally weak, and easily thermoformed or expanded	packaging applications, dairy product containers, cups, coat hangers and electrical appliances
Acrylonitrile butadiene styrene (ABS)	7 OTHER	durable, stiff, hard and resistant to shock	computers, televisions, kitchen appliances, toys, musical instruments, electrical products and automobile component parts
Polycarbonates (PC)	7 OTHER	clear, resistant to shock and heat and flame retardant	electronic applications, products in construction industry (e.g., for dome lights, flat or curved glazing, and sound walls), CDs, Blu-ray discs, automotive, aircraft and railway parts
Polyethers	7 OTHER	resistant to heat, chemicals,flame retardants, oils, grease and abrasion	electrical components, medical equipment, and automobile components

Source: ASTM (2022)

4. Other types of polymers

(a) Cured resins, condensation products and fluorinated polymers

21. Entries Y48 and B3011 listed in Annexes II and IX to the Basel Convention, respectively, make special mention of plastic wastes consisting of cured resins, condensation products or fluorinated polymers. Cured resins are plastics formed by cross-linking polymer chains and include (but are not limited to) UF resins, PF resins, MF resins, epoxy resins and alkyd resins. Condensation products are plastics formed by the removal of water or alcohol during polymerization and the final molecular weight of the polymer is controlled by the equilibrium concentration of water or alcohols in the molten polymer at the end of the polymerization. Examples of such polymers are polyamides and polyester. Fluorinated polymers (fluoropolymers) are fluorocarbon-based polymers with multiple carbon–fluorine bonds and can come in many different forms (powders, granules etc.). Properties and typical applications of cured resins and fluorinated polymers listed in entries Y48 and B3011 are shown in Table 2 and 3 respectively.

Table 2: Properties and typical applications of cured resins listed in entries Y48 and B3011

Polymer type	Properties	Typical Application
Urea formaldehyde (UF) resin	stiff, hard, and resistant to heat and solvent	glue resins in particle board, medium density fibreboard, plywood used in building material and furniture and kitchen worktops
Phenol formaldehyde (PF) resin	resistant to heat, oils and chemicals and flame retardant	glue resins in particle board, medium density fibreboard, plywood used in building material and furniture and kitchen worktops
Melamine formaldehyde (MF) resins	high tensile strength and resistant to water and shock	glue resins in particle board, medium density fibreboard, plywood used in building material and furniture and kitchen worktops
Epoxy resins	resistant to heat, chemically stable, high mechanical strength and anti-corrosive	coating and glue resin, glass fibre resins
Alkyd resins	compatible to materials and resistant to corrosion	coating

Source: Copps Industries (2020)

Table 3: Properties and typical applications of fluorinated polymers listed in entries Y48 and B3011

Polymer type	Properties	Typical Application
Perfluoroethylene/propylene (FEP)	resistant to corrosion, chemicals and wear	wiring, coaxial cable, wiring for computer wires and technical gear
Tetrafluoroethylene/perfluoro alkyl vinyl ether (PFA)	resistant to corrosion, chemicals and wear	extruded wire insulation, tubing, protective film, sheet linings, pump housings and non-stick materials
Tetrafluoroethylene/perfluoro methyl vinyl ether (MFA)	resistant to corrosion, chemicals and wear	non-stick coatings and anticorrosion coatings
Polyvinylfluoride (PVF)	flame retardant and resistant to weather	encapsulant in PV applications, vacuum bagging, coating and lamination
Polyvinylidenefluoride (PVDF)	high tensile strength and resistant to chemicals	piping products, sheet, tubing, films, plate and an insulator for premium wire

Source: Fang Liu et al. (2013), Rodney et al. (2014)

(b) Polymers that are biodegradable under certain conditions

22. Typical applications of polymers that are biodegradable under certain conditions are listed in Table 4.

Table 4: Typical applications of polymers that are biodegradable under certain conditions

Polymer Type	Typical Application
Polyglycolic acid (PGA)	controlled drug releases, implantable composites, bone fixation parts [subcutaneous sutures, and intracutaneous closures in surgeries]
Polylactic acid (PLA)	packaging and paper coatings, sustained release systems for pesticides and fertilizers, mulch films, and compost bags
Polybutylene succinate (PBS)	food packaging (e.g., cups and plates) and agricultural mulch films
Polycaprolactone (PCL)	mulch and other agricultural films, fibres containing herbicides to control aquatic weeds, seedling containers and slow-release systems for drugs
Polyhydroxybutyrate (PHB)	products like bottles, bags, wrapping film and nappies, as a material for tissue engineering scaffolds and for controlled drug release carriers
Polyhydroxyvalerate (PHBV)	films and paper coatings, biomedical applications, therapeutic delivery of worm medicine for cattle, and sustained release systems for pharmaceutical drugs and insecticides

Polymer Type	Typical Application
Polyvinyl alcohol (PVOH)	packaging applications which dissolve in water to release products such as laundry detergent, pesticides, and hospital washables
Polyvinyl acetate (PVAC)	adhesives, the packaging applications include boxboard manufacture, paper bags, paper lamination, tube winding and re-moistenable labels

Source: Shah et al. (2008)

5. Plastics in composites, plastic multilayers, and polymer blends

23. Composites may be made of plastics and non-plastics materials. The plastics may be bound to other materials to create multi-material packaging such as metal (e.g., metallized wrappers and sachets) or paper-based materials (e.g., in beverage cartons). Composite materials typically have properties superior to the individual materials themselves. Alternatively, the plastics and non-plastics materials may be integrated to produce a new material such as glass-fibre filled plastics which have superior physical mechanical properties or wood-plastics composites that look like wood but do not require the maintenance associated with wood. [Composites are used to improve durability and efficiency in a wide variety of applications in the aerospace, automotive, marine, energy, infrastructure, and defense industries. For example, wind turbine blades are typically constructed of fibreglass-reinforced plastics. High performance carbon-fiber reinforced thermoset and thermoplastic composite materials are used in the aerospace industry.] Such composite materials tend to be significantly more difficult to deconstruct and recycle.

24. Plastic multi-layered materials consist of bonded layers of different polymers that together provide superior properties to the individual polymer types used on their own. Multi-layer polymers provide certain characteristic specific functions in the use-phase (e.g., oxygen and ultraviolet (UV)-light barrier layers, sealing layers and surface finish layers). For example, food packaging films may contain 7 layers of material (e.g., metallized crisp packet). Multilayer structures are also more difficult to recycle.

25. Polymer blends, sometimes referred to as polymer alloys, combine different polymer types that each contribute desired properties in specific applications. Miscibility and compatibility increase between polymers of the same family (e.g., PE and PP belong to the polyolefin family and PS and ABS belong to the styrenics family). Furthermore, compatibility can be enhanced by the use of an additive to bring polymers together in a physical blend (compatibilizer additive technology). Tolerances will be highly dependent on the specific polymers being used.

6. Typical additives and processing aids

26. Most plastics are a blend of polymers and additives. Additives are substances that are added to plastics to bring about certain changes to the characteristics of the plastics as desired and are usually included in the polymer matrix by blending in the melt phase but are not necessarily chemically bonded. [This leads to the potential for them to be released into the environment during their production, use and waste phase.]

27. Processing aids refers to several different classes of materials and are used to improve the processability and handling of high-molecular-weight polymers. [Two main groups of processing aids are lubricants and fluoropolymer-based additives. Fluoropolymers are a unique group of processing aids that] can make plastics virtually chemically inert, non-wetting, non-stick, and highly resistant to temperature, fire, and weather.

28. Functions and concentration ranges of typical additives in plastic are listed in Table 5.

Table 5: Functions and concentration ranges of typical additives.

Additives	Functions	Concentration range (%w/w)
Plasticizers (e.g., adipates, azelates, citrates, benzoates, ortho-phthalates, terephthalates, sebacates and trimellitates)	To impart plasticity (softness and flexibility) to the material into which they are incorporated. Typical polymers without plasticizers are too rigid for certain applications.	10-70[8]
Flame retardants (e.g., brominated flame retardants and organophosphate flame retardants)	To prevent ignition of the plastic material and to reduce flammability risks in products.	3–25 (for brominated flame retardants)
Stabilizers, antioxidants and UV stabilizers (e.g., Hindered Amine Light Stabilizers	To prolong the lifetime of the polymer by suppressing degradation that results from UV-light, oxidation, and other	0.05–[10]

[8] 70% applies to a small range of applications.

Additives	Functions	Concentration range (%w/w)
(HALS), benzotrialozes, benzophenones and organic nickel compounds)	phenomena. Typical stabilizers absorb UV light or function as antioxidants.	
Biocides (e.g., compounds based on tin, mercury, arsenic, copper and antimony)	Protecting plastics in certain applications from attack and degradation by microorganisms	0.001-1
Fillers (e.g., mica, talc, kaolin, clay, calcium carbonate, limestone and barium sulphate)	To improve performance or reduce production costs.	up to 70
Colourants (e.g., pigments, soluble azocolourants and processing oils)	To produce plastics products in various colours.	0.25–5

Sources: Hansen et al, (2013), Hahladakis et al. (2018), Xanthopoulos,P (2014)

29. The addition of additives or processing aids has the potential to render plastic waste hazardous or [problematic] [difficult to recycle]. A study found that over 2,400 substances [used in the production of plastics] (as monomers, additives or processing aids) have been identified as substances of potential concern as they meet one or more of the persistence, bioaccumulation, and toxicity criteria in the European Union (EU) (Wiesinger et. al (2021). Table 6 [provides information on] [shows] POPs listed by the Stockholm Convention that have been or are used as plastic additives or processing aids and Table 7 provides information on some substances that have been or are used as plastic additives and have been identified as substances of very high concern (SVHC) [under EU REACH legislation[9]].

Table 6: [Information on] POPs listed in the Stockholm Convention that have been or are used as plastic additives or processing aids

Additives	Purpose	Plastics	Typical content
Hexabromobiphenyl (HBB) (UNEP, 2006a)	Flame retardant	ABS for construction machine housings, and electrical products, polyurethane foam for auto upholstery, coatings and lacquers	N/A
Hexabromocyclododecane (HBCD)	Flame retardant	Expandable polystyrene, XPS in insulation HIPS in electrical and electronic equipment	0.7–2.5% (EPS, XPS) 1–7% (HIPS) (UNEP, 2017a)
Decabromodiphenyl ether (decaBDE)	Flame retardant	HIPS, PA, PE, PP	5–16% (Buekens and Yang 2014)
Heptabromodiphenyl ether (heptaBDE)	Flame retardant		N/A
Hexabromodiphenyl ether (hexaBDE)	Flame retardant	as c-octaBDE in: ABS, HIPS, PBT, PA	12–18% (UNEP, 2017b)
Pentabromodiphenyl ether (pentaBDE)	Flame retardant		N/A
Tetrabromodiphenyl ether (tetraBDE)	Flame retardant	as c-pentaBDE in polyurethane (PUR), plastics in former printed circuit boards	0.5–5% (UNEP, 2017b)
Short chain chlorinated paraffins (SCCPs)	Plasticizer, flame retardant	PVC	
Perfluorooctanoic acid (PFOA), its salts and PFOA related compounds (UNEP, 2016a)	Processing aids, surfactants	Fluorinated polymers, such as polytetrafluoroethylene (PTFE), sidechain	N/A

[[9] See: https://echa.europa.eu/support/authorisation/substances-of-very-high-concern-identification]

Additives	Purpose	Plastics	Typical content
		fluorinated polymers such as fluoroacrylate;	
Perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (UNEP, 2006b)	Processing aids, plastic coatings	Fluorinated polymers	N/A

Source: Wagner et al. (2020)

Table 7: Information on some SVHCs listed on the ECHA website[10] that have been or are used as plastic additives.

Additives	Purpose	Plastics	Typical content
Bisphenol A (Food and Drug Administration, 2014)	Antioxidant	PS, PVC, PC	
Tris phosphite (TNPP)	Antioxidant	PS, PVC	
Diethylhexylphthalate (DEHP)	Plasticizer	PVC	30% (European Chemicals Agency 2007)
Benzylbutylphthalate (BBP)	Plasticizer	PVC	5–30% (European Chemicals Agency 2007)
Dibutyl phthalate (DBP)	Plasticizer	PVC	1,5% (Danish Environmental Protection Agency, 2009)
Diisobutyl phthalate (DIBP)	Plasticizer	PVC	Comparable to DBP (Gächter and Müller 1990)
The following lead compounds • Trilead bis(carbonate) dihydroxide (Basic lead carbonate) • Tetralead trioxide sulphate (Tribasic lead sulphate) • Pentalead tetraoxide sulphate (Tetrabasic lead sulphate) • Phthalato(2-)] dioxotrilead (Dibasic lead phthalate) • Lead oxide sulfate (Basic lead sulphate) • Dioxobis(stearato)trilead • Trilead dioxide phosphonate (Dibasic lead phosphite) • Sulfurous acid, lead salt, dibasic Fatty acids, C16-18, lead salts	Stabilizer	PVC	0.6-2.5%[11]
Short chain chlorinated paraffins (SCCPs)	Plasticizer, flame retardant	PVC	
Medium chain chlorinated paraffins (MCCPs) (UNEP, 2022f)	Plasticizer, flame retardant	PVC	
UV 328 2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol	UV stabilizer	ABS resin, epoxy resin, fibre resin, PVC, unsaturated polyesters, polyacrylates and polycarbonates, polyolefins, polyurethanes, PVC, polyacrylate, epoxy and elastomers	1[- 10]% (UNEP, 2021b, UNEP, 2022g)

[10] https://echa.europa.eu/candidate-list-table.

[11] Lead stabilizers are used as a proprietary blend of different stabilizers. The concentration range shown above reflects the total concentration contained in the blend.

Additives	Purpose	Plastics	Typical content
UV 327 2,4-di-tert-butyl-6-(5-chlorobenzotriazol-2-yl) phenol	UV stabilizer	Outdoor applications	Max 0.5% (De Kort, 2017)
UV 350 2-(2H-benzotriazol-2-yl)-4-(tert-butyl)-6-(sec-butyl) phenol	UV stabilizer	Outdoor applications	Max 0.5% (De Kort, 2017)
UV 320 2-benzotriazol-2-yl-4,6-di-tert-butylphenol	UV stabilizer	Outdoor applications	Max 0.5% (De Kort, 2017)

Source : Wagner et al. (2020)

II. Relevant provisions of the Basel Convention and international linkages

A. Basel Convention

1. General provisions

30. The Basel Convention, which entered into force on 5 May 1992, aims to protect human health and the environment against the adverse effects resulting from the generation, management, transboundary movements, and disposal of hazardous and other wastes. It does this via a set of provisions on the transboundary movement of wastes and their ESM. In particular, the Basel Convention stipulates that any transboundary movement (export, import or transit) of wastes is permissible only when the movement itself and the planned disposal of the hazardous or other wastes are environmentally sound. A set of provisions of the Basel Convention lays out Parties obligations to ensure the ESM of wastes. These are listed in paragraphs 31 to 34 below.

31. Article 2 ("Definitions"), paragraph 1, of the Convention defines wastes as "substances or objects which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law". Paragraph 4 of that article defines disposal as "any operation specified in Annex IV" to the Convention. Annex IV contains two categories of operations: those leading to the possibility of resource recovery, recycling, reclamation, direct reuse or alternative uses (R operations) and those not leading to this possibility (D operations). Paragraph 8 defines the ESM of hazardous wastes or other wastes as "taking all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner which will protect human health and the environment against the adverse effects which may result from such wastes."

32. Article 4 ("General obligations"), paragraph 1, establishes the procedure by which Parties exercising their right to prohibit the import of hazardous wastes or other wastes for disposal shall inform the other Parties of their decision. Paragraph 1 (a) states: "Parties exercising their right to prohibit the import of hazardous or other wastes for disposal shall inform the other Parties of their decision pursuant to Article 13." Paragraph 1 (b) states: "Parties shall prohibit or shall not permit the export of hazardous or other wastes to the Parties which have prohibited the import of such wastes when notified pursuant to subparagraph (a) above."

33. Article 4, paragraphs 2 (a)-(e) and 2 (g), and paragraph 8, contain key provisions of the Basel Convention pertaining to environmentally sound management, transboundary movement, waste minimization and waste disposal practices aimed at mitigating adverse effects on human health and the environment:

> Paragraphs 2 (a) – (e) and 2 (g): "Each Party shall take the appropriate measures to:
>
> (a) Ensure that the generation of hazardous wastes and other wastes within it is reduced to a minimum, taking into account social, technological and economic aspects;
>
> (b) Ensure the availability of adequate disposal facilities, for the environmentally sound management of hazardous wastes and other wastes, that shall be located, to the extent possible, within it, whatever the place of their disposal;
>
> (c) Ensure that persons involved in the management of hazardous wastes or other wastes within it take such steps as are necessary to prevent pollution due to hazardous wastes and other wastes arising from such management and, if such pollution occurs, to minimize the consequences thereof for human health and the environment;

(d) Ensure that the transboundary movement of hazardous wastes and other wastes is reduced to the minimum consistent with the environmentally sound and efficient management of such wastes, and is conducted in a manner which will protect human health and the environment against the adverse effects which may result from such movement;

(e) Not allow the export of hazardous wastes or other wastes to a State or group of States belonging to an economic and/or political integration organization that are Parties, particularly developing countries, which have prohibited by their legislation all imports, or if it has reason to believe that the wastes in question will not be managed in an environmentally sound manner, according to criteria to be decided on by the Parties at their first meeting;

(g) Prevent the import of hazardous wastes and other wastes if it has reason to believe that the wastes in question will not be managed in an environmentally sound manner.

Paragraph 8: "Each Party shall require that hazardous wastes or other wastes, to be exported, are managed in an environmentally sound manner in the State of import or elsewhere."

34. The Ban Amendment entered into force 5 December 2019, and it provides that Parties listed in Annex VII to the Convention (members of the European Union (EU), Organisation for Economic Cooperation and Development (OECD) and Liechtenstein) shall prohibit transboundary movements of hazardous wastes to States not listed in Annex VII of hazardous wastes which are destined for operations according to Annex IV-A and hazardous wastes under Article 1.1(a) which are destined to operations according to Annex IV-B[12].

2. Provisions relating to plastic wastes

35. According to article 1 ("Scope of the Convention"), the Basel Convention covers two types of waste subject to transboundary movement: "hazardous wastes" and "other wastes".

36. Paragraph 1 (a) of Article 1 sets out a two-step process for determining whether a "waste" is a "hazardous waste" covered by the Convention: first, the waste must belong to one of the categories listed in Annex I to the Convention ("Categories of wastes to be controlled"), and second, it must possess at least one of the characteristics listed in Annex III to the Convention ("List of hazardous characteristics").

37. Annex I wastes are presumed to exhibit one or more Annex III hazardous characteristics, which may include H4.1"flammable solids"; H6.1 "Poisonous (Acute)"; H6.2 "Infectious substances"; H11 "Toxic (delayed or chronic)"; H12 "Ecotoxic"; or H13 (capable after disposal of yielding a material which possess a hazardous characteristic), unless, through "national tests," they can be shown not to exhibit such characteristics. National tests may be useful for identifying a particular hazardous characteristic in Annex III of the Convention until such time as the hazardous characteristic is fully defined. Guidance documents for Annex III hazardous characteristics H4.1, H11, H12 and H13 were adopted on an interim basis by the Conference of the Parties to the Basel Convention at its sixth and seventh meetings.

38. [At its fourth meeting in February 1998, the Conference of the Parties added the two lists of wastes as two new annexes to the Convention, namely Annex VIII (list A) and Annex IX (list B). These were intended to provide greater certainty and clarity to the entries. List A and List B are kept under review by the Conference of the Parties; in addition, a process was established under Decision BC VIII/15 of the Conference of the Parties to the Basel Convention to facilitate the identification and agreement on new entries. However, please note that Annex I and Annex III remain the factors to characterize wastes as hazardous for the purpose of this Convention, and that List A and List B are not intended to be exhaustive.]

39. List A of Annex VIII describes wastes that are "characterized as hazardous under Article 1, paragraph 1 (a) of this Convention" although "their designation on this Annex does not preclude the use of Annex III [hazard characteristics] to demonstrate that a waste is not hazardous" (Annex I, paragraph (b)). List B of Annex IX lists wastes that "will not be wastes covered by Article 1, paragraph 1 (a), of this Convention unless they contain Annex I material to an extent causing them to exhibit an Annex III characteristic".

40. As stated in Article 1, paragraph 2, "Wastes that belong to any category contained in Annex II that are subject to transboundary movement shall be "other wastes" for the purposes of this Convention".

[12] For information on the status of individual Parties in relation to the amendment/s, please see the Status of Ratifications page on the Basel Convention website.

41. The Basel Convention contains three main entries on plastic wastes in Annexes II, VIII and IX of the Convention[13] as follows:

(a) Annex II (categories of wastes requiring special consideration, i.e., they are subject to the control procedure): entry Y48 covering all plastic waste, including mixtures of plastic waste, except for the plastic waste covered by entries A3210 (in Annex VIII) and B3011 (in Annex IX);

Y48[14,15]	Plastic waste, including mixtures of such waste, with the exception of the following: • Plastic waste that is hazardous waste pursuant to paragraph 1 (a) of Article 1[16] • Plastic waste listed below, provided it is destined for recycling[17] in an environmentally sound manner and almost free from contamination and other types of wastes:[18] - Plastic waste almost exclusively[19] consisting of one non-halogenated polymer, including but not limited to the following polymers: o Polyethylene (PE) o Polypropylene (PP) o Polystyrene (PS) o Acrylonitrile butadiene styrene (ABS) o Polyethylene terephthalate (PET) o Polycarbonates (PC) o Polyethers - Plastic waste almost exclusively consisting of one cured resin or condensation product, including but not limited to the following resins: o Urea formaldehyde resins o Phenol formaldehyde resins o Melamine formaldehyde resins o Epoxy resins o Alkyd resins - Plastic waste almost exclusively consisting of one of the following fluorinated polymers[20]: o Perfluoroethylene/propylene (FEP) o Perfluoroalkoxy alkanes: ▪ Tetrafluoroethylene/perfluoroalkyl vinyl ether (PFA) ▪ Tetrafluoroethylene/perfluoromethyl vinyl ether (MFA) o Polyvinylfluoride (PVF) o Polyvinylidenefluoride (PVDF) • Mixtures of plastic waste, consisting of polyethylene (PE), polypropylene (PP) and/or polyethylene terephthalate (PET), provided they are destined for separate recycling[21] of each material and in an environmentally sound manner and almost free from contamination and other types of wastes[14].

(b) Annex VIII (wastes presumed to be hazardous, subject to the control procedure): entry A3210 covering hazardous plastic waste;

[13] See decision BC-14/12.

[14] This entry becomes effective as of 1 January 2021.

[15] Parties can impose stricter requirements in relation to this entry.

[16] Note the related entry on list A A3210 in Annex VIII.

[17] Recycling/reclamation of organic substances that are not used as solvents (R3 in Annex IV, sect. B) or, if needed, temporary storage limited to one instance, provided that it is followed by operation R3 and evidenced by contractual or relevant official documentation.

[18] In relation to "almost free from contamination and other types of wastes", international and national specifications may offer a point of reference.

[19] In relation to "almost exclusively", international and national specifications may offer a point of reference.

[20] Post-consumer wastes are excluded.

[21] Recycling/reclamation of organic substances that are not used as solvents (R3 in Annex IV, sect. B), with prior sorting and, if needed, temporary storage limited to one instance, provided that it is followed by operation R3 and evidenced by contractual or relevant official documentation.

A3210[22]	Plastic waste, including mixtures of such waste, containing or contaminated with Annex I constituents, to an extent that it exhibits an Annex III characteristic (note the related entries Y48 in Annex II and on list B B3011).

(c) Annex IX (wastes presumed to be non-hazardous, not subject to the control procedure): entry B3011, which replaced the entry B3010 from 1 January 2021.

B3011[23]	Plastic waste (note the related entries Y48 in Annex II and on list A A3210): • Plastic waste listed below, provided it is destined for recycling[24] in an environmentally sound manner and almost free from contamination and other types of wastes[25]: - Plastic waste almost exclusively[26][19] consisting of one non-halogenated polymer, including but not limited to the following polymers: o Polyethylene (PE) o Polypropylene (PP) o Polystyrene (PS) o Acrylonitrile butadiene styrene (ABS) o Polyethylene terephthalate (PET) o Polycarbonates (PC) o Polyethers - Plastic waste almost exclusively[14] consisting of one cured resin or condensation product, including but not limited to the following resins: o Urea formaldehyde resins o Phenol formaldehyde resins o Melamine formaldehyde resins o Epoxy resins o Alkyd resins - Plastic waste almost exclusively[27] consisting of one of the following fluorinated polymers[28]: o Perfluoroethylene/propylene (FEP) o Perfluoroalkoxy alkanes: ▪ Tetrafluoroethylene/perfluoroalkyl vinyl ether (PFA) ▪ Tetrafluoroethylene/perfluoromethyl vinyl ether (MFA) o Polyvinylfluoride (PVF) o Polyvinylidenefluoride (PVDF) • Mixtures of plastic waste, consisting of polyethylene (PE), polypropylene (PP) and/or polyethylene terephthalate (PET), provided they are destined for separate recycling[29] of each material and in an environmentally sound manner, and almost free from contamination and other types of wastes21.

42. The entries Y48, A3210 and B3011 became effective on 1 January 2021, except for one Party for which these entries became effective on 10 February 2022[30].

43. In addition to the plastic waste entries referred to in paragraph 41~~2~~, Table 8 contains an indicative list of other entries relevant to plastic waste listed in Annexes I, II, VIII, and IX to the Convention.

[22] This entry becomes effective as of 1 January 2021.

[23] This entry becomes effective as of 1 January 2021. Entry B3010 is effective until 31 December 2020

[24] Recycling/reclamation of organic substances that are not used as solvents (R3 in Annex IV, sect. B) or, if needed, temporary storage limited to one instance, provided that it is followed by operation R3 and evidenced by contractual or relevant official documentation.

[25] In relation to "almost free from contamination and other types of wastes", international and national specifications may offer a point of reference.

[26] In relation to "almost exclusively", international and national specifications may offer a point of reference.

[27] In relation to "almost exclusively", international and national specifications may offer a point of reference.

[28] Post-consumer wastes are excluded

[29] Recycling/reclamation of organic substances that are not used as solvents (R3 in Annex IV, sect. B), with prior sorting and, if needed, temporary storage limited to one instance, provided that it is followed by operation R3 and evidenced by contractual or relevant official documentation.

[30] http://www.basel.int/Countries/StatusofRatifications/PlasticWasteamendments/tabid/8377/Default.aspx.

Table 8: Indicative list of other entries [with direct reference to plastics wastes and other entries that are] relevant to plastic wastes listed in Annexes I, II, VIII and IX of the Convention[31]

Entries with direct reference to plastic wastes	
Y13	Wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives
A1181[32]	**Electrical and electronic waste (note the related entry Y49 in Annex II)[33]** • Waste electrical and electronic equipment (a) containing or contaminated with cadmium, lead, mercury, organohalogen compounds or other Annex I constituents to an extent that the waste exhibits an Annex III characteristic, or (b) with a component containing or contaminated with Annex I constituents to an extent that the component exhibits an Annex III characteristic, including but not limited to any of the following components: – glass from cathode-ray tubes included on list A – a battery included on list A – a switch, lamp, fluorescent tube or a display device backlight which contains mercury – a capacitor containing PCBs – a component containing asbestos – certain circuit boards – certain display devices – certain plastic components containing a brominated flame retardant • Waste components of electrical and electronic equipment containing or contaminated with Annex I constituents to an extent that the waste components exhibit an Annex III characteristic, unless covered by another entry on list A Wastes arising from the processing of waste electrical and electronic equipment or waste components of electrical and electronic equipment, and containing or contaminated with Annex I constituents to an extent that the waste exhibits an Annex III characteristic (e.g. fractions arising from shredding or dismantling), unless covered by another entry on list A
A1190	Waste metal cables coated or insulated with plastics containing or contaminated with coal tar, polychlorinated biphenyls (PCB)[34], lead, cadmium, other organohalogen compounds or other Annex I constituents to an extent that they exhibit Annex III characteristics
A3050	Wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives excluding such wastes specified on list B (note the related entry on list B B4020
B1115	Waste metal cables coated or insulated with plastics, not included in list A A1190, excluding those destined for Annex IVA operations or any other disposal operations involving, at any stage, uncontrolled thermal processes, such as open burning.
B3026	The following waste from the pre-treatment of composite packaging for liquids, not containing Annex I materials in concentrations sufficient to exhibit Annex III characteristics:

[31] Refer to Annexes I, II, VIII and IX to the Basel Convention to see the full entries.

[[32] This entry becomes effective as of 1 January 2025.]

[33] PCBs or PBBs are at a concentration level of 50 mg/kg or more in equipment, in a component, or in wastes arising from the processing of waste electrical and electronic equipment or waste components of electrical and electronic equipment.]

[34] PCBs are at a concentration level of 50mg/kg or more.

	• Non-separable plastic fraction • Non-separable plastic-aluminium fraction
B4020	Wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives, not listed on list A, free of solvents and other contaminants to an extent that they do not exhibit Annex III characteristics, e.g., water-based, or glues based on casein starch, dextrin, cellulose ethers, polyvinyl alcohols (note the related entry on list A A3050)
Other entries relevant to plastic waste	
Y1	Clinical wastes from medical care in hospitals, medical centres and clinics
Y3	Waste pharmaceuticals, drugs and medicines
Y4	[Wastes from the production, formulation and use of biocides and phytopharmaceuticals]
Y10	Waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs and/or polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBs)
Y12	Wastes from production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish
Y18	Residues arising from industrial waste disposal operations
Y24	Arsenic; arsenic compounds
Y26	Cadmium; cadmium compounds
Y27	Antimony, antimony compounds
Y29	Mercury; mercury compounds
Y31	Lead; lead compounds
Y41	Halogenated organic solvents
Y42	Organic solvents excluding halogenated solvents
Y45	Organohalogen compounds other than substances referred to in this Annex (e.g., Y39, Y41, Y42, Y43, Y44)
Y46	Wastes collected from households
Y49[35,36]	**Electrical and electronic waste** • Waste electrical and electronic equipment (a) not containing and not contaminated with Annex I constituents to an extent that the waste exhibits an Annex III characteristic, and (b) in which none of the components (e.g. certain circuit boards, certain display devices) contain or are contaminated with Annex I constituents to an extent that the component exhibits an Annex III characteristic • Waste components of electrical and electronic equipment (e.g. certain circuit boards, certain display devices) not containing and not contaminated with Annex I constituents to an extent that the waste components exhibit an Annex III characteristic, unless covered by another entry in Annex II or by an entry in Annex IX Wastes arising from the processing of waste electrical and electronic equipment or waste components of electrical and electronic equipment (e.g. fractions arising from shredding or dismantling), and not containing and not contaminated with Annex I constituents to an extent that the waste exhibits an Annex III characteristic, unless covered by another entry in Annex II or by an entry in Annex IX

[[35] This entry becomes effective as of 1 January 2025.
[36] Note the related entry on list A A1181 in Annex VIII.]

A1160	Waste lead-acid batteries, whole or crushed
A1170	Unsorted waste batteries excluding mixtures of only list B batteries. Waste batteries not specified on list B containing Annex I constituents to an extent to render them hazardous
A1180[37]	Waste electrical and electronic assemblies or scrap[38] containing components such as accumulators and other batteries included on list A, mercury-switches, glass from cathode-ray tubes and other activated glass and PCB-capacitors, or contaminated with Annex I constituents (e.g., cadmium, mercury, lead, polychlorinated biphenyl) to an extent that they possess any of the characteristics contained in Annex III (note the related entry on list B B1110)[39].
A3120	Fluff - light fraction from shredding
A3140	Waste non-halogenated organic solvents but excluding such wastes specified on list B
A3150	Waste halogenated organic solvents
A3180	Wastes, substances and articles containing, consisting of or contaminated with polychlorinated biphenyl (PCB) polychlorinated terphenyl (PCT), polychlorinated naphthalene (PCN) or polybrominated biphenyl (PBB), or any other polybrominated analogues of these compounds, at a concentration level of 50 mg/kg or more[40]
A4020	Clinical and related wastes; that is wastes arising from medical, nursing, dental, veterinary, or similar practices, and wastes generated in hospitals or other facilities during the investigation or treatment of patients, or research projects
A4070	Wastes from the production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish excluding any such waste specified on list B (note the related entry on list B B4010)
A4110	Wastes that contain, consist of or are contaminated with any of the following: • Any congenor of polychlorinated dibenzo-furan • Any congenor of polychlorinated dibenzo-p-dioxin
A4130	Waste packages and containers containing Annex I substances in concentrations sufficient to exhibit Annex III hazard characteristics
B1090	Waste batteries conforming to a specification, excluding those made with lead, cadmium or mercury
B1110[41]	Electrical and electronic assemblies: • Electronic assemblies consisting only of metals or alloys • Waste electrical and electronic assemblies or scrap[42] (including printed circuit boards) not containing components such as accumulators and other batteries included on list A, mercury switches, glass from cathode-ray tubes and other activated glass and PCB-capacitors, or not contaminated with Annex I constituents (e.g., cadmium, mercury, lead, polychlorinated biphenyl) or from which these have been removed, to an extent that they do

[37] Entry A1180 is effective until 31 December 2024.
[36] This entry does not include scrap assemblies from electric power generation.
[37] PCBs are at concentration level of 50 mg/kg or more.
[40] The 50 mg/kg level is considered to be an internationally practical level for all wastes. However, many individual countries have established lower regulatory levels (e.g., 20 mg/kg) for specific wastes.
[41] Entry B1110 is effective until 31 December 2024.
[42] This entry does not include scrap from electrical power generation.

	not possess any of the characteristics contained in Annex III (note the related entry on list A A1180) • Electrical and electronic assemblies (including printed circuit boards, electronic components and wires) destined for direct reuse[43], and not for recycling or final disposal[44]
B1250	Waste end-of-life motor vehicles, containing neither liquids nor other hazardous components
B3030	Textile wastes[45]
B3035	Waste textile floor coverings, carpets
B4010	Wastes consisting mainly of water-based/latex paints, inks and hardened varnishes not containing organic solvents, heavy metals or biocides to an extent to render them hazardous (note the related entry on list A A4070)
B4030[46]	Used single-use cameras, with batteries not included on list A

B. International linkages

1. Stockholm Convention

44. The Stockholm Convention on Persistent Organic Pollutants (POPs) is a global treaty aimed at protecting human health and the environment from POPs.

45. The objective of the Stockholm Convention, which entered into force on 17 May 2004, is set forth in Article 1 (“Objective”): “Mindful of the precautionary approach as set forth in Principle 15 of the Rio Declaration on Environment and Development, the objective of this Convention is to protect human health and the environment from persistent organic pollutants.”

46. The POPs listed in Annexes A, B, or C of the Stockholm Convention that are relevant in relation to plastic waste, inter alia as additives or processing aids, are:

(a) Hexabromobiphenyl (HBB);

(b) Hexabromocyclododecane (HBCD);

(c) The following polybromodiphenyl ethers: decabromodiphenyl ether (decaBDE), heptabromodiphenyl ether (heptaBDE), hexabromodiphenyl ether (hexaBDE), pentabromodiphenyl ether (pentaBDE) and tetrabromodiphenyl ether (tetraBDE);

(d) Short-chain chlorinated paraffins (SCCPs);

(e) Perfluorooctanoic acid (PFOA), its salts and PFOA related compounds;

(f) Perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride;

(g) Unintentionally produced POPs.

47. For further information on the general provisions and the waste-related provisions of the Stockholm Convention, refer to section II.B of the General technical guidelines on POPs.

48. For further information on the specific provisions related to these POPs, it is referred to the specific technical guidelines on POP-BDEs (UNEP, 2019d), HBCD (UNEP, 2015a), SCCPs (UNEP, 2019c), PFOS and PFOA (UNEP, 2022a) and unintentionally produced POPs (UNEP, 2019e).

2. Minamata Convention

49. The Minamata Convention on Mercury, which entered into force on 16 August 2017, is a global treaty with the objective according to Article 1, “to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. For further information on the general provisions and the waste-related provisions of the Minamata Convention,

[43] Reuse can include repair, refurbishment or upgrading, but not major reassembly

[44] In some countries these materials destined for direct re-use are not considered wastes.

[45] Refer to Annex IX to the Basel Convention to see the full entry

[46] Entry B4030 is effective until 31 December 2024.

refer to section II.B of the technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds (UNEP, 2022c).

50. Some plastics contain mercury, including residual mercury from the manufacturing process of PVC, and pigments containing mercury sulphide. Mercury and methylmercury also adsorb onto marine plastics.

3. Montreal Protocol

51. The Montreal Protocol on Substances that Deplete the Ozone Layer is a global treaty aimed at protecting the Earth's ozone layer by phasing out the chemicals that deplete it. The agreement entered into force in 1989. Under the Montreal Protocol), Parties are obligated to phase out the production and consumption of ozone-depleting substances (ODS) according to specified controls schedules, as well as to phase down the production and consumption of hydrofluorocarbons (HFCs). HFCs do not deplete the ozone layer but are greenhouse gases that were introduced to replace some uses of ODS.

52. Several of the substances controlled by the Montreal Protocol are used or have been used as blowing agents in the manufacture of rigid plastic foams. In foams used mainly for insulation purposes, in particular rigid polyurethane foam, trichlorofluoromethane (CFC-11), 1,1-dichloro-1-fluoroethane (HCFC-141b) and 1,1,1,3,3-pentafluoropropane (HFC-245fa) have been used, among other substances controlled by the Protocol. While there are no obligations pertaining to the destruction of these substances under the Protocol, the Parties agreed through Decision IV/24 to urge "all parties to take all practicable measures to prevent releases of controlled substances into the atmosphere", including "to destroy unneeded ozone-depleting substances where economically feasible and environmentally appropriate to do so". Furthermore, Parties to the Montreal Protocol have approved a list of destruction technologies and related minimum destruction removal efficiencies applicable to controlled substances[47], and a Code of Good Housekeeping Procedures[48], which outlines measures that should be considered to ensure that releases to the environment of controlled substances are minimized during the disposal of plastic wastes containing substances controlled by the Protocol.

4. Work under the United Nations Environment Assembly (UNEA) on marine plastic litter and microplastics

53. Concerns about global marine litter including plastic pollution and microplastics and the related risks to the environment and potentially human health are increasing. The negative effects on ecosystems, biota, societies and economies have been globally recognised and governments are committing to reducing plastic pollution. Four resolutions on marine plastic litter and microplastics have been adopted by UNEA at its sessions in 2014, 2016, 2017 and 2019 to address this global challenge. The issue has also been addressed in separate resolutions, detailed below, on sustainable consumption and production, waste management and single-use plastics in 2019.

54. UNEA-1 resolution 6 on "Marine plastic debris and microplastics" (UNEP/UNEA, 2014) formally brought the issue within the scope of UNEA's agenda and emphasized the challenges of marine debris, particularly plastic and microplastic pollution, the need for urgent action, further information and research and encouraged multi-stakeholder engagement.

55. UNEA-2 resolution 11 on "Marine plastic litter and microplastics" (UNEP/UNEA 2016) addressed the challenges related to marine litter, the issues of microplastic and nano-size particles, transport of plastic through freshwater systems, slow degradation processes and the release and adsorption of chemicals such as POPs.

56. In 2017, UNEA-3 resolution 7 on "Marine litter and microplastics" (UNEP/UNEA, 2017) addressed the importance of preventive actions through waste minimization, environmentally sound waste management, actions in areas with large sources of marine plastic litter and recognized that measures exist to provide cost-effective solutions. UNEA members also recognized the importance of long-term elimination of discharges of litter and microplastics to the oceans and avoiding detriment to marine ecosystems, and the human activities dependent on them, from marine litter and microplastics.

57. The resolution also established an open-ended ad hoc expert group (AHEG) to further examine barriers to and options for combating marine plastic litter and microplastics. The AHEG discussed the adequacy of existing global governance frameworks (UNEP/AHEG, 2018a), and addressed issues

[47] https://ozone.unep.org/treaties/montreal-protocol/meetings/thirtieth-meeting-parties/decisions/annex-ii-destruction-technologies-and-status-their-approval.

[48] https://ozone.unep.org/meetings/fifteenth-meeting-parties-montreal-protocol/decisions/annex-iii-code-good-housekeeping.

related to information, monitoring and governance and possibilities for enhancing existing efforts or identifying new governance structures for marine plastic litter (UNEP/AHEG, 2018b).

58. UNEA-4 resolution 6 on "Marine plastic litter and microplastics" (UNEP/UNEA 2019) extended the mandate of the AHEG to address development of indicators to harmonize monitoring, the need for effective monitoring of sources, the quantities and impacts of marine litter, and invited member states to promote environmentally sound waste management and marine plastic litter recovery; a multi-stakeholder platform was also established to strengthen coordination and cooperation. UNEA-4 resolution 9 on "Addressing single-use plastic products pollution" encourages member states to develop and implement actions to address the environmental impacts of single-use plastic products, identify environmentally friendly alternatives to single-use plastics, promote improved waste management and more resource-efficient design, production, use and sound management of plastics across their life cycle. At its third and fourth AHEG meetings in November 2019 and November 2020, AHEG discussed stocktaking of existing activities and the effectiveness of existing and potential responses to address marine litter issues (UNEP/AHEG 2019 and UNEP/AHEG 2020). In 2020, AHEG completed its mandate, however, potential options for continued work on the global level will be considered at UNEA-5.

59. At UNEA 5.2, a resolution titled, ['End plastic pollution: Towards an international legally binding instrument' was adopted. By this resolution, the Assembly agreed to convene] an Intergovernmental Negotiating Committee (INC) to [develop an international legally binding instrument on plastic pollution, including in the marine environment, with the ambition to complete its work by the end of 2024. The instrument will be based on a comprehensive approach that addresses the full lifecycle of plastics. The resolution indicates that provisions to promote sustainable production and consumption of plastics, including, among others, product design and environmentally sound management of plastic waste [should be included in the instrument.] [It was also decided to promote cooperation and coordination with relevant regional and international conventions, instruments and organizations, while recognizing their respective mandates, avoiding duplication and promoting complementarity of action.] [Microplastics and chemicals in plastic products are issues with emerging evidence of environment and human health risks identified in the Global Chemicals Outlook II (UNEP, 2019f).]

5. Strategic Approach to International Chemicals Management (SAICM)

60. SAICM was developed to support the achievement of the global goal of sound chemicals and waste management by 2020, agreed at the 2002 Johannesburg World Summit on Sustainable Development. It is a multi-stakeholder, multi-sector voluntary international policy instrument focussed on the achievement of the Sustainable Development Goals relating to sound chemical and waste management. Its work is governed by the following documents: Dubai Declaration; Overarching Policy Strategy; Global Plan of Action and Overall Orientation and Guidance.

61. The International Conference on Chemical Management (ICCM) under SAICM assesses and calls for appropriate action on emerging policy issues and issues of concern. Chemicals in Products (CiP) was identified as an issue of concern at the ICCM2 in 2009 "with a view of taking appropriate cooperation actions, to consider the need to improve the availability of and access to information on chemicals in products in the supply chain and throughout their life cycle." The CiP Programme, a voluntary framework activity, was welcomed by the fourth session of the ICCM4. The Programme's activities are focussed on greater access to the information on chemicals in products that actors need for the sound management of chemicals, and the products that contain them, throughout their life cycle. One of the potential outcomes of the Programme is "enhancing the safe recycling and reuse of materials and products". The CiP Programme focuses specifically on four sectors: textiles, toys, electronics, and building materials.

62. Other emerging issues under SAICM relevant to plastics include hazardous substances within the life cycle of electrical and electronic products, perfluorinated chemicals and the transition to safer alternatives, and endocrine disrupting chemicals. In addition, it is recognized that actions have been taken to address microplastic use in cosmetics and personal care products, but actions addressing other major sources of microplastics are limited (UNEP, 2020a).

63. SAICM shares common goals with multilateral environmental agreements such as the Basel, Rotterdam and Stockholm Conventions. In 2019 the Conference of the Parties to the Basel, Rotterdam and Stockholm Conventions requested the Secretariat (decisions BC-14/21; SC-9/19; RC-9/9) to continue to enhance cooperation and coordination with relevant initiatives including SAICM.

III. Guidance on environmentally sound management (ESM) of plastic wastes

A. General considerations

64. Environmentally sound management (ESM)[49] is a broad policy concept that is understood and implemented in various ways by different countries, organizations and stakeholders. The provisions and guidance documents pertaining to the ESM of hazardous wastes and other wastes under the Basel Convention provide for a common understanding and international guidance to support and implement the ESM of hazardous wastes and other wastes. OECD has also produced core performance elements related to ESM.

65. The 2013 Framework for the environmentally sound management of hazardous wastes and other wastes, adopted by decision BC-11/1 ("ESM framework") (UNEP, 2013) establishes a common understanding of what ESM encompasses and identifies tools and strategies to support and promote the implementation of ESM. In addition, a set of practical manuals for the promotion of the environmentally sound management of wastes (UNEP, 2017c and UNEP,2019h) has been developed. The ESM framework and the practical manuals are intended as practical guides for governments and other stakeholders participating in the management of hazardous wastes and other wastes and complement the Basel Technical guidelines. Moreover, guidance on how to address the environmentally sound management of wastes in the informal sector (UNEP, 2019a) and a practical manual for stakeholders to ensure that notifications of transboundary movements meet environmentally sound management requirements (UNEP, 2022f) have been developed.

66. As presented in paragraph 33 of this document, Article 4 of the Basel Convention contains provisions related to the ESM of hazardous wastes and other wastes. ESM is also the subject of the following declarations:

(a) The 1999 Basel Declaration on Environmentally Sound Management, which was adopted at the fifth meeting of the Conference of the Parties to the Basel Convention, calls on the Parties to enhance and strengthen their efforts and cooperation to achieve ESM, including through prevention, minimization, recycling, recovery and disposal of hazardous and other wastes subject to the Basel Convention. This takes into account social, technological and economic concerns, and through further reduction of transboundary movements of hazardous and other wastes subject to the Basel Convention;

(b) The 2011 Cartagena Declaration on the Prevention, Minimization and Recovery of Hazardous Wastes and Other Wastes was adopted at the tenth meeting of the Conference of the Parties to the Basel Convention. The Declaration reaffirms that the Basel Convention is the primary global legal instrument for guiding the ESM of hazardous wastes and other wastes and their [disposal, including efforts to prevent and minimize their generation, and efficiently and safely manage that which cannot be avoided.

67. The waste management hierarchy is a guiding principle for the ESM of waste and covers prevention, minimization, reuse, recycling, other recovery including energy recovery, and final disposal. The hierarchy encourages treatment options that deliver the best overall environmental outcome, taking into account lifecycle thinking[50].The waste management hierarchy has also been recognised by the Strategic Framework (adopted by decision BC-10/2), the ESM framework (see its paras. 11, 14, 18, 26 and 43) and in the Guidance to assist Parties in developing efficient strategies for achieving the prevention and minimization of the generation of hazardous and other wastes and their disposal (UNEP, 2017d). UNEA-2 resolution 11 on marine plastic litter and microplastics also called on countries to establish and implement necessary policies, regulatory frameworks and measures consistent with the waste hierarchy.[51] The waste hierarchy was also defined and described in UNEP's Global Waste Management Outlook (UNEP, 2015b).

68. Parties should consider a systemic approach to harmonizing and developing policy frameworks related to plastic wastes. Such an approach may address the root causes of the problem and take a long-term perspective that considers the long-lasting consequences of plastic in the environment, including the marine environment.

[49] See paragraph 31 for the definition of ESM in the Basel Convention.

[50] Decision BC-10/2: Strategic framework for the implementation of the Basel Convention for 2012-2021.

[51] http://web.unep.org/unea/list-resolutions-adopted-unea-2.

69. In addition, Parties should develop a range of measures (strategies, legislation, regulations and programmes) and monitor their implementation to support the meeting of ESM objectives. The implementation of national strategies, policies and programmes are effective methods to ensure a structured approach to the implementation of legislation and regulations; monitoring and enforcement; incentives and penalties; technologies; and other tools in which all key stakeholders participate and cooperate (UNEP, 2013). The following sections should be taken into account when establishing, implementing or evaluating ESM.

B. Legislative and regulatory framework

70. Parties to the Basel Convention should examine their national and subnational strategies, policies, controls, standards and procedures to ensure that they are in agreement with the Convention and with their obligations under it, including those that pertain to the transboundary movement and ESM of plastic wastes.

71. Most countries already have in place some form of legislation that outlines broad environmental protection principles, powers and rights. Such legislation should make ESM operational and include requirements for protection of both human health and the environment. Such enabling legislation can give governments the power to enact and enforce specific rules and regulations on the ESM of plastic wastes, including provisions for inspections and for establishing penalties for violations (e.g., on illegal traffic).

72. Such legislation should enable relevant authorities to monitor whether facilities where plastic wastes are disposed of, for example plastic waste recycling facilities, have obtained all the necessary approvals and can demonstrate due diligence in compliance to ensure such facilities are fully protective of human health and the environment. In addition, any legislation should establish whether actors involved in plastic waste management (e.g., collectors, transporters, and recyclers) ensure that the collection, transportation, storage and disposal of wastes are environmentally sound.

73. The legislation should require adherence to ESM principles, ensuring that countries provide ESM of plastic wastes, including environmentally sound disposal as described in the present guidelines. Specific components or features of a regulatory framework that would meet the requirements of the Basel and Stockholm Conventions and other international agreements are addressed in relevant guidance documents developed under these conventions.[52]

74. The legislation should cover plastic product policies to increase the recycling rates of plastic wastes or stimulate sustainable use of plastic products.

1. Extended producer responsibility

75. Extended Producer Responsibility (EPR) systems for plastic and plastic packaging have been introduced in many industrialized countries. EPR is an approach that promotes reduction in the environmental impact of products, throughout their lifespan, from production to the waste stage. EPR assigns the responsibility of the whole lifecycle of a product to the producer of the goods, including environmentally sound waste disposal.

76. In addition to plastic packaging, products partly consisting of plastic such as electrical and electronic equipment and vehicles are, in some developed and emerging economies, under relevant EPR schemes. For example, in Canada, EPR schemes are in place in many provinces and territories and cover a range of plastic products including plastic film, bags, containers, and products partially consisting of plastic, such as electronics (Environmental and Climate Change Canada, 2021 and Electronic Products Recycling Association, 2020). In the European Union (EU) for example, Member States must establish EPR schemes for certain single use plastic products to ensure that producers contribute to the cost of waste collection, transportation and treatment of the waste, of awareness raising measures and of cleaning up litter (European Union, 2019). In a few countries, such as China, France, Italy, Spain and Sweden, EPR has, for example, been introduced for agricultural plastic film, and Argentina has introduced EPR for agrochemical plastic containers. Other products such as toys, housewares, furniture, mattresses, fishing gear and textiles (such as carpets) can also be covered by EPR schemes.

77. Components of effective EPR programs related to plastic products can include:

[52] Further guidance on Basel Convention regulatory frameworks can be found in the following documents: *Manual for the Implementation of the Basel Convention* (UNEP, 2015d) and *Basel Convention: Guide to the Control* (UNEP, 2015e). Parties to the Stockholm Convention should also consult the *Guidance for Developing a National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants* (UNEP, 2017e).

(a) Clear definitions of products covered;

(b) Mandatory compliance with legally binding requirements;

(c) Responsibility with producers furthest up the chain that is under the jurisdiction of the government (this may be the manufacturer, importer, distributor, brand owner, etc.), as the entity that can have the most influence on product design;

(d) Financial responsibility borne by producers;

(e) Measurable targets for plastic waste prevention and reduction, for reusability, durability and reparability of plastic products, for exclusion of hazardous additives, and for mechanical recycling;

(f) Effective enforcement provisions, including dissuasive fines or financial remediation plans for non-compliance and the ability for public oversight;

(g) Protection for existing informal waste collection workers;

(h) Public education programmes;

(i) Publicly accessible reporting.

78. Further guidance on EPR is available in the practical manual on extended producer responsibility adopted by decision BC-14/3, in "Extended Producer Responsibility - Guidance for efficient waste management" (OECD, 2016) and in "Development of Guidance on Extended Producer Responsibility (EPR)" (European Commission, 2014).

2. End-of-waste status

79. The text of the Basel Convention does not clarify when a waste ceases to be a waste. The Glossary of Terms of the Basel Convention provides explanatory notes in this regard (UNEP, 2017f). Possibilities for waste to cease to be waste referenced in the Glossary of terms include when:

(a) It has been prepared for reuse;

(b) It has undergone a recycling operation and that operation is completed;

(c) It has otherwise gained end-of-waste status as a result of a recovery operation.

80. Some Parties have adopted conditions in their national legislation that can determine the point at which a material need no longer be classified as waste, such as the European Union (European Union, 2008) and the UK (English Environment Agency, 2016).

3. Transboundary movement requirements

81. Transboundary movements of hazardous wastes and other wastes must be kept to a minimum consistent with their environmentally sound and efficient management and conducted in a manner that protects human health and the environment from any adverse effects that may result from such movements. Y48 in Annex II and A3210 in Annex VIII are categorized as other wastes and hazardous wastes respectively and should, as far as is compatible with their ESM, be disposed of in the country where they were generated. Transboundary movements of such wastes are permitted only under the following conditions:

(a) If the country of export does not have the technical capacity and the necessary facilities, capacity or suitable disposal sites in order to dispose of the wastes in question in an environmentally sound and efficient manner;

(b) If the wastes in question are required as a raw material for recycling or recovery industries in the country of import;

(c) If the transboundary movements in question are in accordance with other criteria decided by the Parties.

82. Any transboundary movements of hazardous wastes and other wastes considered under the Basel Convention are subject to prior written notification from the exporting country and prior written consent from the importing and, if appropriate, transit countries. Parties shall not permit the export of hazardous wastes and other wastes if the country of import prohibits the import of such wastes in accordance with the Basel Convention.

83. Parties listed in Annex VII to the Convention (members of the EU, OECD and Liechtenstein), that are bound by the Ban Amendment, shall prohibit transboundary movements to states not listed in

Annex VII of hazardous wastes which are destined for operations according to Annex IVA and hazardous wastes under Article 1.1(a) which are destined to operations according to Annex IVB[53].

84. The Basel Convention also requires that information regarding any proposed transboundary movement of hazardous wastes and other wastes be provided using the accepted notification form and that the approved consignment be accompanied by a movement document from the point where the transboundary movement commences to the point of disposal. Furthermore, hazardous wastes and other wastes subject to transboundary movements should be packaged, labelled and transported in conformity with international rules and standards[54].

85. When a transboundary movement of hazardous wastes and other wastes to which consent of the countries concerned has been given cannot be completed, the country of export shall ensure that the waste in question is taken back into the country of export for their disposal if alternative arrangements cannot be made. In the case of illegal traffic (as defined in Article 9, paragraph 1), as the result of conduct on the part of the exporter or the generator, the country of export shall ensure that the wastes in question are taken back into the country of export for their disposal or otherwise disposed of in accordance with the provisions of the Basel Convention (as per Article 9, paragraph 2). For further information, see the Guidance on the implementation of the Basel Convention provisions dealing with illegal traffic, adopted by COP13 in 2017 (UNEP, 2017g).

86. No transboundary movements of hazardous wastes and other wastes are permitted between a Party and a non-Party to the Basel Convention unless a bilateral, multilateral or regional agreement or arrangement exists as required under Article 11 of the Convention.

4. [Considerations on][Interpretation of]terms contained in the entries Y48 and B3011

87. In the entries Y48 and B3011 the terms “almost free from contamination and other types of wastes” and “almost exclusively consisting of” appear. The purpose of these terms is to distinguish between entries Y48 and B3011.

88. When implementing the entries B3011 and Y48 at the domestic level, Parties may interpret the terms “almost free from contamination and other types of wastes” and “almost exclusively consisting of” used in these entries in different ways. Examples of approaches to interpreting these terms are the following:

(a) A quantitative approach using quantitative criteria. Guidance following this approach has for example been issued in the European Union (European Commission, 2021). Such guidance, inter alia, contains that, for the first indent of entry B3011, the content of contamination, other types of wastes or non-halogenated polymers, cured resins or condensation products, or fluorinated polymers other than the one non-halogenated polymer, cured resin or condensation product, or fluorinated polymer that makes up the bulk of the plastic waste should not exceed a total maximum percentage of the weight of the consignment of 2%;

(b) An approach drawing on an assessment of quantitative elements and qualitative criteria. Guidance following this approach has for example been issued by the Scottish Environment Protection Agency (Scottish EPA, 2020). This guidance says that to be classified under entry B3011, a consignment of a certain type of plastic waste must contain only minimal amounts of other plastic wastes and only minimal amounts of contamination or other wastes. The assessment of the minimal amounts is based on the quantity, type and quality of contaminants in the waste and on the specific type of waste.

89. Parties and their competent authorities should share information on the national legislation and relevant guidance they have issued in a transparent and efficient manner.

90. It is the responsibility of persons involved in shipments of plastic wastes, such as exporters, importers, and carriers, to ensure they comply with the national legislation and apply the relevant guidance issued by the States of export, import and transit. [However, national procedures for the import of plastic waste should not be considered a replacement for prior-informed consent procedure for all Parties concerned by a transboundary movement.]

[53] For information on the status of individual Parties in relation to the amendment, please see the Status of Ratifications page on the Basel Convention website http://www.basel.int/Countries/StatusofRatifications/BanAmendment/tabid/1344/Default.aspx.

[54] In this connection, the United Nations Recommendations on the Transport of Dangerous Goods (Model Regulations) of 2019 (UNECE, 2019) or later versions should be used.

5. Specifications for containers and storage sites

91. To meet the requirements of ESM and specific clauses in the Basel and Stockholm Conventions (for example, Basel Convention Article 4, paragraph 7, and Stockholm Convention Article 6, paragraph 1), Parties may need to enact specific legislation that describes the types of containers and storage areas that are acceptable for particular plastic waste streams.

92. Parties should ensure that containers that may be subject to transboundary movement meet international standards such as those established by the International Air Transport Association (IATA), the International Maritime Organization (IMO) and the ISO.

6. Requirements for plastic waste treatment and disposal facilities

93. Most countries have legislation in place that requires the operators of waste treatment and disposal facilities to obtain approval to operate. Approvals may contain specific conditions that must be adhered to for these approvals to remain valid. A permitting or approval process based on established and transparent criteria on, inter alia, how to operate facilities, emission levels, monitoring, as well as an inspection regime may be an appropriate approach. It may prove necessary to add requirements specific to plastic wastes to meet the requirements of ESM, and to comply with the specific requirements of the Basel and Stockholm Conventions.

7. Other legislative controls

94. Examples of other aspects of the life-cycle management of plastic wastes that could be regulated through legislation and or a permitting/approval process may include:

(a) Environmental impact assessment of facilities disposing of plastic wastes, if appropriate;

(b) Citing provisions and requirements relative to the storage, handling, collection and transportation of plastic wastes;

(c) Public participation in the permitting or approval process for plastic waste disposal facilities as referred to in section III, J;

(d) Requirements for health and safety of workers;

(e) Decommissioning requirements for plastic recycling facilities, including:

- (i) Inspection prior to and during decommissioning;
- (ii) Procedures to be followed to protect worker and community health and the environment during decommissioning;
- (iii) Post-decommissioning site requirements;

(f) Emergency contingency planning, spill and accident response, including:

- (i) Clean-up procedures and post-clean-up concentrations to be achieved;
- (ii) Worker training and safety requirements;
- (iii) Waste prevention, minimization and management plans;
- (iv) Obligations to ensure best-practice management systems, including requirements for annual reporting and regular third-party auditing and verification after the accident;

(g) Restrictions on greenhouse gas (GHG) emissions across the life cycle of plastics including their management as wastes, including such restrictions as are required to meet nationally determined contributions for parties to the Paris Agreement.

C. Waste prevention and minimization

1. General considerations

95. ~~Prevention and minimization of wastes are the most important steps in the waste management hierarchy. The third preambular paragraph to the Basel Convention, affirms that the most effective way of protecting human health and the environment from the dangers posed by hazardous wastes and other wastes is the reduction of their generation to a minimum in terms of quantity and/or hazard potential.~~ ~~[~~The Basel Convention affirms that reducing the generation of hazardous wastes and other wastes to a minimum in terms of quantity and/or hazard potential is the most effective way of protecting human health and the environment from the dangers posed by such wastes.~~]~~

96. In Article 4, paragraph 2, the Basel Convention calls on Parties to "ensure that the generation of hazardous wastes and other wastes is reduced to a minimum". Waste prevention should be the preferred option in any waste management policy, so that the need for waste management is reduced, enabling resources to be used more efficiently.

97. At the tenth meeting of the Conference of the Parties to the Basel Convention, the Parties, in adopting the Cartagena Declaration committed "to enhancing the active promotion and implementation of more efficient strategies to achieve prevention and minimization of the generation of hazardous waste and other wastes and their disposal".

98. One of the multiple benefits of plastic waste prevention and minimization is the reduction in the release of plastic waste into the terrestrial and marine environments. The Conference of the Parties to the Convention addressed the prevention and minimization of the generation of plastic waste in its decision BC-14/13: Further actions to address plastic waste under the Basel Convention, in particular in part II of the decision.

99. According to the ESM framework, the need to manage wastes and/or the risks and costs associated with waste management can be reduced by not generating wastes and by ensuring that generated wastes are less hazardous (UNEP, 2013).

100. The ESM framework states that "companies that generate wastes (waste generators) are responsible for ensuring the implementation of best available techniques (BAT) and best environmental practices (BEP) when undertaking activities that generate wastes". In doing so, they act to minimize the wastes generated by ensuring research, investment in design, innovation and development of new products and processes that use less resources and energy and that reduce, substitute or eliminate the use of hazardous materials (UNEP, 2013).

101. Waste management efforts require multi-stakeholder involvement in the development of waste management plans with a strong emphasis on prevention and minimization, in partnership with waste generators, industrial users and civil society.

102. A practical manual on waste prevention, as part of the set of practical manuals for the promotion of the environmentally sound management of wastes (UNEP, 2017c), provides stakeholders with general guidance on waste prevention principles, strategies and possible measures and tools. The Guidance to assist Parties in developing efficient strategies for achieving the prevention and minimization of the generation of hazardous wastes and other wastes and their disposal (UNEP 2017d) identifies elements of a waste prevention and minimization programme that apply also to plastic wastes.

2. Policy instruments and measures on waste prevention and minimization

103. ~~Countries [are encouraged to] [should] adopt policies and measures to prevent and minimize plastic waste generation throughout the [entire] life cycle of plastics [from bottom to top approach] [, taking into account national circumstances, [and] [capabilities] needs and priorities]. Examples of policy instruments and measures on waste prevention and minimization [that may be applied] are provided in Table 9[55]~~.

[103 ~~ALT~~ .Waste prevention and minimization~~, including recycling,~~ are essential elements in the transition from a linear to a circular economy. [Examples of policy instruments and measures on waste prevention and minimization can be found in (OECD, 2019)]Table 9 provides a non-exhaustive list of examples of measures that have been adopted in some countries to support plastic waste prevention and minimization. The examples, which are expanded upon in paragraphs 104 to 120, may not be suitable for adoption in all countries. Consequently Parties, ~~[and to some extent]~~and where appropriate local authorities, businesses, and community groups, should consider which measures are most appropriate for their needs [. The adoption of this "bottom-up approach" should ensure] [so] that the selection of waste prevention and minimization measures takes full account of national resources, capability, circumstances, needs and priorities]

[103.ALT Waste prevention and minimization are essential elements in the transition from a linear to a circular economy. Examples of policy instruments and measures on waste prevention and minimization can be found in (OECD, 2019). Table 9 provides a non-exhaustive list of examples of measures that have been adopted in some countries to support plastic waste prevention and minimization. The examples, which are expanded upon in paragraphs 104 to 120 and in table 9, may not be suitable for adoption in all countries. Consequently Parties, and where appropriate local

~~[55] More information on the examples can be found in OECD, 2019.~~

authorities, businesses, and community groups, should consider which measures are most appropriate for their needs and capability. For most countries policies and legislation will be determined at a national level, aligned with national strategies, and will consider some policies that fall within the capability "bottom-up approach". This approach should ensure maximum plastic waste minimization measures adopted by a country takes full account of national resources, capability, circumstances, needs and priorities.]

Table 9: Examples of policy instruments and measures on waste prevention and minimization[56,][57]

Policy instruments	Waste prevention and minimization measures
Regulatory	- Design requirements [- Ban on certain single-use plastic products [, such as single-use plastic bags or cutlery][58]] [- Ban on oxo-degradable plastics] - Restrictions on [toxic or] hazardous substances in plastics and of microplastics in products - Consumption reduction measures[59] - Targets on recovery/recycling - Targets on recycled content - Deposit return schemes to increase reuse and recycling - Labelling and identification of products - Extended Producer Responsibility (EPR), e.g., including fee modulation with respect to recycled content or other design aspects - Green procurement criteria [- Landfill ban/incineration ban] [- Measures to [Reduce][ban/restriction][Restrictions on] the use of hard-to-recycle plastics]
Market-based	- Taxes on products (e.g. packaging, plastic bags[, virgin plastic]) - Tax exemptions [and other positive economic incentives] (e.g. for reuse and repair) - Pay-as-you-throw schemes (PAYT) - Deposit return schemes - Extended producer responsibility (EPR) - Landfill tax/incineration tax [- Tax on virgin plastic] [- Economic incentives for reusable and repairable products and packaging, packaging-free businesses]
Information-based	- Awareness campaigns/school education - Labelling and identification of products - Procurement guidelines - Providing practical information, e.g., via information exchange platforms, to businesses and consumers - Environmental certification schemes
Voluntary	- Product standards (e.g., eco design) and specifications [- Stakeholder recognition and incentive programs] - Labelling and identification of products - Extended producer responsibility (EPR) [- Green procurement criteria] [- Sustainable procurement]

(a) Regulatory instruments and measures

104. [Design requirements for products are a central feature in successful waste prevention and minimization policy. It has been shown that eco-design, for all products, determines almost 80 percent of a product's environmental impact (European Commission, 2012).

105. Design requirements can reduce the amount of plastic waste generated by limiting the use of plastics in new products. This can be achieved either by using alternative materials with less

[56] More information on the examples can be found in OECD, 2019.
[57] Some measures are relevant to more than one policy instrument.
[58] For example, see European Union, 2019.
[59] For example, see European Union, 1994, and European Union, 2019.

environmental impact or by reducing the size of the products. In addition, the volume of plastic packaging could be reduced, e.g., in order to prevent excessive use of packaging that is not necessary.

106. For some plastic products, the most relevant design feature would be to focus on an extended lifespan, thereby postponing and reducing waste generation. This can be achieved through integrating aspects of durability, reusability, repairability and upgradability in the design process.

~~[~~106 bis Design requirements could be tailored to ensure the use of certain hazardous substances in plastics are avoided or minimized. Restrictions on the use of intentionally added microplastics in products, such as in certain cosmetics and paints, could also be considered at the design stage.~~]~~

107. ~~The choices made at the design stage will also influence the options available for recycling, once the product has become waste. [Measures to reduce the use of hard-to-recycle plastics could be taken]. Using materials that lead to hard-to-recycle plastic waste could be avoided [, such as carbon black in black plastics, which are found in products such as packaging, as these plastics are difficult to detect by automatic sensor sorting.] Composite products where the individual parts or layers are difficult to separate should [also] be avoided, as they typically consisting of a combination of plastics and other material types or of different plastic polymers. [The use of carbon black in black plastics, found in certain products, e.g. in packaging, could also be avoided since these plastics are difficult to detect by automatic sensor sorting.]~~ ~~[~~Choices made at the design stage can have impacts on how products are managed in an environmentally sound manner when they become waste. For example, the use of carbon black in consumer packaging could be avoided as these black plastics ~~are~~ may be difficult to detect by automatic sensor sorting ~~[~~thereby impeding recycling~~]~~. Any selection of materials or additives that contribute to difficult-to-recycle plastic waste should also be carefully considered to determine whether their use is necessary for the specific application. Typical examples include composite products, plastic multilayers or other products where the individual parts or layers are difficult to separate as they consist of a combination of plastics and other material types or of different plastic polymers (see paragraphs 23-25).~~]~~

108. ~~Specific waste prevention and minimization measures can be applied to single-use products and other products that are known be frequently littered, such as plastic bags, [disposable] [single-use] cutlery and products made of EPS. A ban on certain single-use plastics could be formulated. Oxo-degradable plastics could also be banned since this plastic type leads to [significant] release of microplastics. Consumption reduction measures could also be a relevant initiative for these articles, leading to a substantial reversal of increasing consumption trends [(see paragraph 18)].~~ ~~[~~Selective waste prevention and minimization measures, such as bans or consumption reduction measures, have been applied in some countries to specific single-use plastic products and/or other plastic products that are frequently found in litter, such as cutlery, plastic bags and other packaging products. For example, in certain countries measures have been adopted to address food packaging ~~[~~made from EPS~~]~~ as this has been identified as a particular problem in litter because it can be easily dispersed by wind and is easily broken up. In addition, measures to reduce the consumption of these products could also be relevant and may lead to a reversal of increasing consumption.~~]~~

109. ~~[In addition, measures to restrict the use of certain plastic polymer types that are known to cause problems in the waste management chain, such as PVC, could be considered]~~ ~~[~~Other selective waste prevention and minimization, measures may focus on the use of certain plastics that are known to cause problems. For example, oxo-degradable plastics, which are designed to degrade quickly into smaller pieces, contributing to litter problems and the release of microplastics (see paragraph 18) could be considered.~~]~~

110. [Left for consistency of paragraph number.]

111. ~~Setting targets for recycled content in plastic products and/or targets on recovery/recycling could increase the demand for secondary raw materials and strengthen their market position, thereby stimulating recycling activities. [This is also expected to increase general public awareness on the importance of sound disposal and separate collection.] In addition, the implementation of deposit return schemes for plastic products, such as PET beverage bottles, typically leads to high levels of collection and provides a clean stream of plastics for reuse [or of plastic waste for recycling].~~ ~~[~~Setting targets for the use of recycled content in plastic products and/or targets for recovery/recycling could increase the demand for secondary raw materials and strengthen their market position, thereby stimulating plastic waste collection and recycling activities. This may also increase general public awareness of the importance of separate waste collection and environmentally sound waste management. In addition, the implementation of deposit return schemes for plastic products, such as PET beverage bottles, typically leads to improved levels of plastic waste segregation, collection and recycling.~~]~~

112. [Businesses, including manufactures, suppliers and retailers should disseminate product design information through the use of standards, claims, labels and identification schemes regarding plastic products, e.g., for clear and well-designed recyclability labels. This will enable consumers to make informed choices when buying products, thereby contributing to the ~~leading to waste~~ prevention and minimization of waste. Such claims and labels could also enable plastic waste disposal facilities to access information about ~~waste containing~~ additives or processing aids present in the plastic waste which may ~~to an extent to~~ render it ~~the waste~~ hazardous or problematic, for example ~~notably~~ POPs or SVHC (see tables 6 and 7 and paragraph 218). ~~,~~ Information contained in claims and labels may therefore assist measures to ~~in order to~~ avoid contamination of subsequent recycling and manufacturing processes.]

113. [Principles such as reliability, relevance, clarity, transparency and accessibility should serve as the main guiding principles of standards, claims, labels and identification schemes related to plastic packaging (UNEP, 2020b).]

114. [EPR systems aim to shift a large part of the costs of waste management back to producers, thereby stimulating investment in eco-design, leading to waste prevention and increased recycling. ~~In order to~~ To be effective, the EPR systems should include ~~implement~~ incentives for waste prevention and recycling for each ~~individual~~ producer, for instance through modulating the fees that producers pay according to certain criteria, such as recycled content or other design aspects. For further information on EPR, see section B.1 above.]

115. [Green public procurement criteria may be developed to facilitate the inclusion of green requirements in ~~public~~ tender documents, including specific requirements on [the use of products that meet certain design requirements (e.g., setting requirement for~~the use of~~ minimum recycled content)] ~~[waste prevention and recycling]~~. Since the public sector's purchasing accounts for a large proportion of the economic activity in society, such criteria could have an important influence on ~~services and works within~~ the marketplace.]

116. ~~Introducing a [total or partial] ban on landfilling of plastic waste could be considered. It could also be relevant to ban [energy recovery] [incineration] of recyclable plastics, except in cases where certain plastic types or additives represent a particular health risk or environmental hazard and require destruction. [This could increase recycling and stimulates waste prevention and increase recycling, if alternative waste management infrastructure is in place] [after careful analysis to determine that such a measure would be unlikely to result in improper disposal to avoid compliance with such measures (e.g., open dumping). For example, in jurisdictions with low rates of collection and developing recycling markets, enacting a ban on landfilling could unintentionally create an incentive to improperly dispose of waste unless alternative management options are available]~~. [Other measures may be employed to divert the management of plastic waste higher up the waste hierarchy. For example, a ban on sending recyclable plastic waste to energy recovery activities, except in cases where the plastic waste contains hazardous substances which represent a particular health risk or environmental hazard and require destruction could be considered. Countries could also implement a ban on the landfilling or incineration (without energy recovery) of plastic waste. These measures could increase recycling and stimulate waste prevention; but may require careful consideration to ensure any risk of improper disposal of plastic waste, (e.g., open dumping or open burning) is minimised.]

(b) Market-based instruments and measures

117 ~~ALT~~Market-based measures may be used to incentivize the prevention and minimization of plastic waste. For example, tax exemptions, subsidies, or grants/loans could be used to support businesses that sell products without plastic packaging or to support enterprises that engage in the re-use or repair of plastic products or the recycling of plastic waste. Pay-as-you throw (PAYT) schemes with variable pricing for waste collection by weight or volume, could be used to encourage businesses and/or residents to [generate less plastic waste] and to incentivize separation of plastic waste at source~~[put less plastic waste in the residual waste]~~. Conversely, market-based measures may be used to discourage activities that either increase the generation of plastic waste or impact negatively on the reuse or recycling of plastic waste. These may take the form of increased taxation of the use of virgin raw materials in plastic products or selective taxes or surcharges on single-use plastic products or plastic products that do not comply with specified criteria, such as recycled content. Increased taxation could also be applied to non-hazardous recyclable plastic waste sent to energy recovery activities or to incineration without energy recovery or any plastic waste sent to landfill with the intention of encouraging the diversion of plastic waste to reuse or recycling activities. These types of instruments could, since they are linked to the economy, be more sensitive to national circumstances, needs and priorities than regulatory instruments.]

(c) **Information-based instruments and measures**

117. Kept empty for consistency purposes

~~117.~~118. ~~Actions for the prevention and minimization of plastic waste would benefit from a change of public awareness relating to production and consumption. Creating awareness amongst the general public as well as the business community can e.g. be achieved through targeted campaigns and education. Sharing practical information and guiding tools about how individuals and companies can prevent and reduce plastic waste in their daily lives, is also a useful step.~~ [Raising awareness of plastic waste prevention and minimization measures amongst the public and businesses may support the increased adoption of these activities. Furthermore, this can lead to a change of public awareness relating to production and consumption. Examples of awareness raising include targeted public campaigns and education initiatives which may involve sharing practical information and tools on how individuals and businesses can reduce the amount of plastic waste they generate. Raising awareness amongst school pupils may also help to change the behaviour of parents.]

~~[ALT 118. Raising awareness among the general public and business community about ways to prevent and minimize the generation of plastic waste can also be an effective way to spur action. [Furthermore, this can lead to a change of public awareness relating to production and consumption] Examples of [such] [relevant] measures include targeted campaigns education, and the sharing of practical information and guiding tools about how individuals and companies can prevent and reduce plastic waste in their daily lives.]~~

~~118.~~119. [Additionally, local authorities should consider the promot~~ion~~e of community-based waste prevention initiatives by working ~~-based community building through communication~~ with local businesses and residents.~~commerce and industries, as well as consumers.~~ For further information, see section III.J.]

(d) **Voluntary instruments and measures**

~~119.~~120. ~~Some of the instruments and measures on waste prevention and minimization described above are applicable to more than one policy instrument. This is for instance the case for some regulatory measures that can also be applied voluntarily by various actors, such as product standards and specifications, labelling and identification of products, EPR and green procurement criteria.~~[Local authorities, businesses, schools and communities could also voluntarily adopt a range of the waste prevention and minimization measures outlined above. Measures can also be adapted to fit specific national and local circumstances. For example, some regulatory measures could be applied voluntarily by various actors, such as product standards and specifications, labelling and identification of products, [EPR] and green procurement criteria.]

[~~ALT 120. Voluntary measures encompass a range of activities undertaken by stakeholders and other actors and can include many of the instruments and measures identified as regulatory in Table 9, such as product standards and specifications, labelling and identification of products, EPR and green procurement criteria. Voluntary measures can include also programs established by governments or other organizations that incentivize stakeholders to prevent and reduce waste without regulatory action, e.g., stakeholder recognition programs, that highlight actions taken by stakeholders that go beyond mandated requirements.]~~

120.bis [Governments can also foster voluntary waste prevention and minimisation initiatives as an alternative or an addition to regulatory measures. For example, through government recognition or certification programs that publicise positive actions taken by local authorities, businesses, schools or communities that go beyond mandated requirements.]]

3. **Reduction of plastic leakage through waste prevention and minimization**

~~120.~~121. [Waste prevention and minimization measures described above should ~~will in general~~ reduce the leakage~~s~~ of plastics from the waste phase. In addition, special care should be taken to reduce the release of plastics to the environment ~~leakages~~ from the unintended loss of plastic products, such as fishing gear, plastic pellets and artificial turf. Most of these losses occur in the use phase of products, ~~whereas~~ the loss~~es~~ of pellets may also occur in the production, transport, ~~or use~~and- storage phases (Karlsson et al, 2018)[60] ~~as well~~.]

[60] See also the Operation Clean Sweep® voluntary program: https://www.opcleansweep.eu/

~~121.~~122. [The leakage~~s~~ of plastics from the production, transport and use phase can be addressed through various ~~policy instruments, such as~~ regulatory, voluntary and information-based measures. In general, procedures and best practices for handling of the products should be applied to minimize ~~, in order to reduce~~ the risk of their [loss~~][losing] [them]~~ to the environment. For some product types, notably plastic pellets, this should be done for several handling steps along the value chain, since losses can occur from any of the steps. Leakages of plastics and the relevant sources may ~~could typically~~ differ from country to country, so ~~regulations and other~~ measures to prevent leakages should be tailored to ~~each country's~~ national circumstances.]

~~122.~~123. [Text may be added based on activities undertaken by the Working Group 1 on Prevention and Minimization of Waste established under the Plastic Waste Partnership (PWP).]

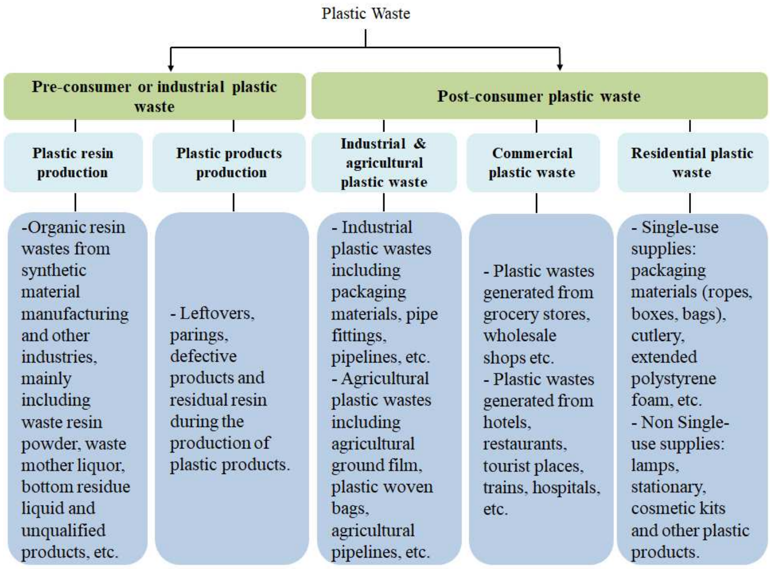
D. Identification and inventories

1. Identification of plastic wastes sources

~~123.~~124. The identification of plastic waste is the starting point for their effective ESM. To enable effective action to prevent, minimize and manage plastic wastes, it is important that Parties identify the sources of plastic waste generation and quantify the amount of plastic wastes generated.

~~124.~~125. Plastic wastes can be categorised into two main categories: pre-consumer and post-consumer wastes (see Figure 2). Post-consumer plastic wastes are found mainly in municipal solid waste (MSW) and in the following economic sectors: industry, agriculture, [building and] construction [and demolition], commercial, institutional, automotive, electrical and electronic equipment, and textiles (see Table 10 for main sources and examples of plastic wastes.)

Figure 2: Classification of plastic wastes



Source: Based on Yang et al., 2018.

Table 10: Main sources and examples of plastic wastes:

Source	Examples of waste types generated	Detailed examples
Pre-consumer plastic wastes		
Polymer production and compounding	Wastes from: · Industrial packaging · Pre-production offcuts · Sweepings · Off-specification plastic	Off-specification colour pellets, compounder purge, clean-down waste, pellet conveying systems line-purge waste, handling and bulk loading spillages.
Plastic conversion	Wastes from moulding and extrusion	Sheet edge trimmings and mould flow sprues.
Plastic assembly or installation	Wastes from plastic assembly and installation processes	Damaged assemblies, intentional 'press-out' blanks, component handling tabs, screw thread covers, body panel covers, failed trial polymer applications
Post-consumer plastic wastes		
Municipal solid waste	Consumer plastic packaging	Plastic bottles, pots, tubs, trays, films and wrappers.
	Garden plastics	Outdoor seats and tables, toys, buckets, flowerpots, paddling pools.
	Household products	Crates, filing boxes, washing baskets, kitchenware.
	Furnishings	Seating foams, upholstery textiles, legs, feet, mouldings, and mattresses.
	Sports and leisure equipment	Rackets, balls, cushion mats, protective headwear and footwear.

Commercial and large industrial plastic wastes	Packaging and containers	Waste of bags, drums and containers from the food and chemical industries, packaging films, industrial equipment, crates.
Agriculture plastic wastes	Flexible films, fibres, string and nets Tanks, drums, containers and pipes	Greenhouses covers, fertilizer sacks, mulch and fumigation films, silage bale-wraps, bird protection nets and baling twine. Water tanks, chemical drums, fertilizer bottles, irrigation pipes and valves.
Plastic wastes from hospitals, health and safety, and laboratories	Single-use plastic packaging, medical and laboratory supplies and personal protective equipment	Infusion bottle (bag), dialysis bucket, plastic packaging, packing box, packing barrel, masks, protective clothing.
Plastic wastes from WEEE	Refrigerators, computers, vacuum cleaners, small domestic appliances, mobile phones and office equipment.	Printed circuit board, fans, shells, PUR foams, pipes, inner tank, coil, plastic capacitor, and resistance
Plastic wastes from end-of-life vehicles waste (ELV)	-	Car bumpers, body mouldings, interior trim panels, seat foams, flexible cooling pipes, battery shell.
Plastic wastes from Fishing/aquaculture	Nets and other fishing gear	Fishing nets, trawls, ropes, strapping bands, floats, buoys
Wastes from construction and demolition		Plastic from window frames and doors, construction off-cuts, roofing sheets, insulation panels, textiles, drainage pipes.
Plastic wastes from textiles	Textile wastes	Clothing and textiles such as towels, curtains, bedding, and carpets.
Plastic wastes from cables		Cable jackets

2. Identification of plastic products/wastes according to the resin type

~~125.~~126. The ASTM D7611—Standard Practice for Coding Plastic Manufactured Articles for Resin Identification provides a set of symbols appearing on plastic products that identify the plastic resin out of which the product is made (See Table 1).

3. Identification of hazardous ~~[~~and non-hazardous~~]~~ plastic wastes

~~126.~~127. According to Article 1 paragraph 1(a) of the Convention, plastic waste that belongs to any category contained in Annex I is to be considered hazardous waste, unless it does not possess any of the hazardous characteristics contained in Annex III. For example, the following plastic wastes should therefore be presumed to be hazardous waste[61]:

(a) ~~[~~Plastic wastes covered under the category Y13 (wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives) and entry A3050. For example, wastes of formaldehyde resins, epoxy resins and alkyd resins, in particular when uncured, may exhibit [possess] the hazardous characteristics H6.1, H8, H11 and H12 ~~;~~ and H13~~]~~:

(b) [Plastic wastes containing or contaminated with heavy metals covered under the categories Y24 (arsenic; arsenic compounds), Y26 (cadmium; cadmium compounds), Y29 (Mercury; mercury compounds) and Y31 (lead; lead compounds). For example, [waste of] rigid PVC [waste] [that contains] ~~[may contain]~~ [containing] cadmium and lead stabilizers and plastic components separated from waste lead-acid batteries (A1160), such as battery casings, may [possess] [exhibit] the hazardous ~~Annex III~~ characteristics~~]~~ H6.1, H11, H12 and H13, in which case they would fall under entry A3210]:

(c) ~~[~~Plastic wastes containing or contaminated with brominated flame retardants (BFRs), in particular BFRs that are POPs according to the Stockholm Convention, covered ~~[~~under category Y45 (organohalogen compounds other than substances referred to elsewhere in Annex I) and ~~] [under]~~ entry A3210. In ~~general~~addition, ~~[~~plastic waste containing BFRs may, ~~fall under Annex I category Y45 (organohalogen compounds other than substances referred to elsewhere in Annex I) and,]~~ if antimony compounds are used as synergists of the BFRs, fall under category Y27 (Antimony, antimony compounds). Depending on the concentration and the chemical properties of the BFRs and

[61] It should be noted that some of the entries in Annex VIII have references to entries in Annex IX. See also Table 8.

Commented [CV1]: Co-lead to harmonize all sub-items with the word possess

Commented [CV2]: Co-leads to harmonize this part in all sub-items their synergists, plastic wastes containing or contaminated with BFRs, for example plastic components separated from waste electrical and electronic equipment (A1180[62], A1181[63]), may possess ~~Annex III~~ the hazardous characteristics H6.1, H11, H12 and H13.~~]~~

(d) ~~[~~Textile wastes made of plastic containing or contaminated with PFAS compounds after treatment for waterproofing covered under ~~Annex I~~ category Y45 (organohalogen compounds other than substances referred to elsewhere in Annex I). PFAS compounds such as PFOS and PFOA that are listed as POPs under the Stockholm Convention, may possess the hazardous characteristics H6.1, H11, H12 and H13~~–~~, in which case they would fall under entry A3210~~]~~;

(e) Plastic wastes contaminated with hazardous materials such as solvents covered under the categories Y41 (halogenated organic solvents) and Y42 (organic solvents excluding halogenated solvents), and entry A3140 ~~[and material covered under categories Y39 such as Bisphenol A]~~ and A3150. For example, a waste solvent plastic tank may possess the hazardous characteristics H11 and H12;

(f) ~~[~~Plastic wastes from medical care in hospitals, medical centres and clinics covered under the category Y1(clinical wastes from medical care in hospitals, medical centers and clinics) and entry A4020, plastic wastes contaminated with waste pharmaceuticals, drugs and medicines under the category Y3 (Waste pharmaceuticals, drugs and medicines). For example, waste plastic articles from medical care such as waste syringes may possess the hazardous characteristics H6.1, H6.2, H11 and H12.~~]~~

(g) Plastic wastes containing certain additives such as MCCPs covered under Annex I category Y45 (organohalogen compounds other than substances referred to elsewhere in Annex I) and entry A 3210 may possess the hazardous characteristics H11 and H12.

(h) ~~[~~Plastic wastes from metal cables containing or contaminated with organohalogen compounds covered under category Y45 (organohalogen compounds other than substances referred to elsewhere in Annex I) and entry A1190. Such plastic waste ~~[include Fluoropolymers (ETFE, FEP, MFA, PFA and PTFE) used as cable insulation] [and]~~may exhibit the hazardous characteristics H6.1, H11, H12 and H13~~]~~;

(i) ~~[~~Plastic wastes from waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs) and/or polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBs) covered under category Y10 (waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs) and/or polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBs)) and entry A3180, and possibly under entries A1160, A1170, A1180[64], A1181,[65] A3120 and A4130. PCBs and HBB, a PBB, are listed as POPs under the Stockholm Convention. Waste containing PCBs, PCTs and PBBs may possess the hazardous characteristics H6.1, H11, H12 and H13, depending on their concentration levels in a waste~~]~~;

(j) ~~[~~Plastic wastes from production, formulation and use of inks, dyes, pigments, paints, lacquers and varnish covered under the category Y12 (wastes from production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish) and entry A4070. For example, wastes of azo dyes may exhibit the hazardous characteristics H11, H12 and H13~~]~~;

(k) ~~[~~Plastic wastes that contain or are contaminated with any congenor of polychlorinated dibenzo-furan and/or any congenor of polychlorinated dibenzo-p-dioxin covered under the category Y43 (any congenor of polychlorinated dibenzo-furan) and Y44 (any congenor of polychlorinated dibenzo-p-dioxin) and entry A4110~~, [for example incomplete burned plastic wastes A1090, A1150]~~. These plastic wastes may exhibit the hazardous characteristics H6.1, H11 and H12~~]~~;

(l) ~~[~~Plastic wastes covered under category Y4 (Wastes from the production, formulation and use of biocides and phytopharmaceuticals) and entry A4030, and possibly under entries A3210 and A4130. For example, an empty plastic container for biocides may exhibit the hazardous characteristics H6.1, H11, H12 and/or H13~~]~~;

(m) ~~[~~Plastic wastes covered under category Y18 (Residues arising from industrial waste disposal operations. For example, residues from the processing of hazardous plastic wastes, such as

[62] This entry is effective until 31 December 2024

[63] This entry becomes effectives as of 1 January 2025

[64] This entry is effective until 31 December 2024

[65] This entry becomes effectives as of 1 January 2025

from sorting or shredding, may exhibit the hazardous characteristics H6.1, H11, H12 and H13, in which case they would fall under entry A3210~~]~~;

(n) [Plastic waste packages and empty containers from waste streams (Y1 – Y18) or contaminated with constituents (Y19-Y45), entry A4130 may exhibit hazardous characteristic H13 and the specific hazard of the substance contained];

~~(o) [Plastic wastes having as constituent organohalogenated compounds covered under Annex I category Y45 (organohalogen compounds other than substances referred to elsewhere in Annex I) and entry A3210, may exhibit hazardous characteristics H11, H12 and H13].~~

[127bis. According to Article 1 paragraph 2, wastes that belong to any category contained in Annex II that are subject to transboundary movements shall be "other wastes" for the purposes of the Convention. For example, the following plastic wastes may fall under Y48 entry, if not excepted:

(a) Plastic waste [having constituents that consists of] the polymers FEP, PFA, MFA, PVF, PVDF from post-consumer waste covered under category Y48 or not intended for recycling operation R3;

(b) Plastic waste that consist of the polymers and cured resins listed in Annex IX entry B3011, that are not destined for an R3 operation covered under category Y48.]

~~127.~~128. Annex II to the Basel Convention lists category Y46 (Wastes collected from households) which may contain or be contaminated with certain plastic wastes referred to in paragraph 127 [and 127bis].

4. Identification of non-hazardous contaminants

~~128.~~129. Contaminants are unwanted materials present in plastic wastes., including non-hazardous contaminants. The composition of plastic wastes depend not only on the intrinsic composition of the different plastics but may also contain certain non-hazardous contaminants which derive from the production, use or waste phases of the plastic lifecycle.

~~129.~~130. Plastic wastes from industrial processes often arise in large volumes of clean material consisting of a single polymer type with low levels of contamination. However, it can have a higher contamination than virgin plastics (Huysveld et al. 2019) and be non-homogenous when it is generated in the manufacture of composite materials. The majority of residential post-consumer plastic wastes is a much wider range of mixed items and material types, where the contamination levels may be significant.

~~130.~~131. Mixed polymer waste streams may be more difficult to recycle. For instance, small amounts of PVC mixed with other polymers (PE, PP or PET) can prevent effective recycling. Clear PET and PVC (i.e., from packaging) have a particular problem with cross-contamination as their visual appearance is very similar. The density ranges of PET and PVC also overlap making it more challenging to separate the polymers using float-sink technology. Film types such as PP, PET and multi-layer laminates are considered contaminants in a mixed LDPE stream (Mepex Consult AS, 2017).

~~131.~~132. Paper labels can contaminate recyclable plastic wastes (e.g., stock identification labels on pallet wraps). Inks, that are used to print information directly on the surface of the packaging material, can bleed during the recycling washing process and discolour the recyclate and waste liquid effluent.

~~132.~~133. Plastic wastes can be contaminated with either non-ferrous or ferrous metals. Plastic wastes from cables may contain residual metals. Post-consumer plastic packaging wastes may contain aluminium which may be difficult to remove.

~~133.~~134. Contamination can also appear at the use phase of plastic. Plastic waste can also be contaminated with food or beverage residues. Many packaging items contain a residual level of the original contents and require washing during recycling, leaving a clean plastic material for onward processing.

~~134.~~135. Plastic film wastes from agriculture may contain high percentages of soil and traces of pesticides, and emptied plastic containers may still contain and be impregnated with agrochemicals, that could render the waste hazardous under Art. 1, paragraph. 1 (a) and (b) of Basel Convention.

5. Specifications

~~135.~~136. Specifications (see the footnotes related to “almost free from contamination and other types of waste” and “plastic waste almost exclusively consisting of” in entries B3011 and Y48 that refer to international and national specifications that may offer a point of reference) can be sourced from industry-wide standards, regional and national quality standards linked to the plastic waste trade. Under the Plastic Waste Partnership, a compilation of national and international specifications is under development.

~~136.~~137. [Text may be added based on activities undertaken under the Plastic Waste Partnership (PWP).]

6. Inventories

~~137.~~138. Inventories can be an important tool for identifying, quantifying and characterizing wastes. When developing an inventory for plastic wastes, priority should be given to the identification of important waste streams (e.g., hazardous plastic wastes).

~~138.~~139. National inventories may be used to:

(a) Establish a baseline quantity of plastic products, articles and plastic wastes and products with a relevant content of plastic and related wastes;

(b) Establish an information registry to assist with safety and regulatory inspections;

(c) Assist with the preparation of emergency response plans;

(d) Track progress towards minimizing and phasing out specific plastic waste streams (e.g., single-use plastics).

~~139.~~140. For further information on the development of national inventories Parties may consult the methodological guide for the development of inventories of hazardous wastes and other wastes under the Basel Convention. (UNEP, 2015c). The guide focuses on the actions recommended to develop the national information systems that produce the information needed to assist countries in fulfilling their reporting obligations under the Basel Convention. In addition, Practical guidance on the development of an inventory of plastic wastes has been developed (UNEP, 2022f).

~~140.~~141. [Kept for consistency of paragraphs numbers]

E. Sampling, analysis and monitoring

~~141.~~142. Sampling, analysis and monitoring are important activities in the management of plastic wastes enabling the manager of the wastes and those who regulate its management to identify the composition of plastic types in some waste streams, the degree of contamination of the plastic wastes, as well as the presence and concentration of hazardous substances within plastic wastes.

~~142.~~143. Monitoring and surveillance serve as elements for identifying and tracking environmental concerns and human health risks.

~~143.~~144. The information obtained from the monitoring should be used:

(a) To detect any releases which cause any change to the quality of the surrounding environment;

(b) To ensure that different types of plastic wastes are managed in an environmentally sound manner;

(c) To identify potential issues relating to possible exposure to humans and determine whether adjustments to the management approach might be appropriate.

~~144.~~145. Sampling, analysis and monitoring should be conducted by trained professionals in accordance with a well-designed programme and using internationally accepted or nationally approved methods, carried out using the same method each time over the duration of the programme. They should also be subjected to rigorous quality assurance [(QA)] and quality control [(QC)] measures. Mistakes in sampling or analysis, or deviation from standard operational procedures, can result in meaningless data or even programme-damaging data.

~~145.~~146. Each Party should identify its sampling, analysis and monitoring needs and ensure it has laboratory and equipment capacity that will meet the required operating standards. Training and protocols should be in place to ensure that standards can be met, and that quality data and meaningful results can be obtained.

~~146.~~147. As there are different reasons for sampling, analysis, and monitoring, and because wastes come in so many different physical forms, many different sampling, analysis, and monitoring methods are available. For information on good laboratory practices the OECD series (OECD, various years) and the Handbook on Good Laboratory Practices (WHO, 2009) may be consulted. The next three sections consider key elements that should be included in sampling, analysis, and monitoring.

1. Sampling

(a) General considerations

~~147.~~148. The overall objective of any sampling activity is to obtain a sample that can be used for the targeted purpose, e.g., waste characterization, compliance with regulatory standards or specifications or suitability of proposed treatment or disposal methods, and environmental monitoring. This objective should be identified before sampling is started. It is essential that quality requirements for equipment, transportation and traceability are met.

~~148.~~149. Standardised sampling procedures should be established and agreed before the start of a sampling campaign. Elements of these procedures include the following:

(a) The number of samples to be taken, the sampling frequency, the duration of the sampling project and a description of the sampling method (including [QA] procedures put in place, e.g., field blanks and chain-of-custody);

(b) Selection of location or sites and time or stage of sample-taking (including description and geographic localization);

(c) Identity of the person who took the sample and conditions during sampling.

(d) Full description of sample characteristics – labelling;

(e) Preservation of the integrity of samples during transportation and storage (before analysis);

(f) Close cooperation between the sampler and the analytical laboratory;

(g) Appropriately trained sampling personnel.

~~149.~~150. Sampling should comply with specific national legislation, where it exists, or with international regulations and standards. Sampling procedures include the following:

(a) Development of a standard operational procedure for sampling plastic wastes;

(b) Application of well-established sampling procedures;[66]

(c) Establishment of [QA] and [QC] procedures.

~~150.~~151. All these steps should be followed for sampling programmes to be successful. Similarly, documentation should be thorough and rigorous.

(b) Sampling of plastic wastes

~~151.~~152. Sampling of plastic wastes may be carried out to identify the composition of plastic types in some waste streams and the degree of non-hazardous contamination of the plastic wastes, as well as the presence and concentration of hazardous substances within plastic wastes. This information may be used to determine the suitability of disposal methods.

~~152.~~153. Microplastics samples can be sorted according to characteristics such as location, shape, polymer type, amount, size, colour or surface condition. The sampling methods for microplastics will differ depending on the compartment being sampled (sea surface or water column) and the size range of litter being monitored. A common challenge in any sampling effort is for the information collected to be as representative as possible. The abundance and distribution of plastic in the water surface and water column compartments are highly variable due to seasonal changes in river outputs, ocean currents or mechanisms of degradation and fragmentation. Some of the methods used for sampling

[66] Such as procedures developed by ISO, ASTM, the EU, the United States Environmental Protection Agency (EPA), the Global Environment Monitoring System (GEMS), and the European Committee for Electrotechnical Standardization (CENELEC) (See Standard on Collection, logistics and treatment requirements for WEEE (Waste Electrical and Electronic Equipment) – Part 1: General Treatment Requirements, in particular specifications for de-pollution), and the European Committee for Standardization (CEN) (see EN 14899:2005 Characterization of waste - Sampling of waste materials - Framework for the preparation and application of a sampling plan and the series of CEN/TR 15310 1-5: 2006 Characterization of waste - Sampling of waste materials).

microplastics include using ship intake water for sampling, bulk water sampling, pump sampling, Continuous Plankton Recorder (CPR), etc. Although standardized methods for sampling microplastics have not been established, some countries have developed specific methods for sampling microplastics in seabed and biota. (UNEP/GESAMP, 2019)

~~153.~~154. When carrying out sampling of plastic wastes, locations should be determined based on the objective of the sampling being undertaken. These could include:

(a) Points of collection of plastic wastes, including collection of marine litter;

(b) Input and output of disposal facilities (e.g., material recovery and re-processing facilities);

(c) Points of reception of imported plastic wastes, e.g., ports.

(c) Sampling for environmental monitoring and biomonitoring

~~154.~~155. Pollutant emissions related to disposal and treatment of plastic wastes at respective facilities can include liquids, solids, gases, and others, which can be determined following the specific national legislation or international regulations and standards. Waste matrices typically sampled for monitoring emissions include:

(a) Liquids:

(i) Wastewater from plastic waste treatment/disposal facilities as well from the sewage treatment facilities (inlet and outlet);

(ii) Leachate from dumpsites and landfills;

(iii) Water (surface water, drinking water and industrial and municipal effluents);

(b) Solids:

(i) Consumer products;

(ii) Solids from industrial sources and treatment or disposal processes (e.g., fly ash, bottom ash, filter and scrubber residues, sludge and wastewater treatment sludge still bottoms, other residues, clothing, ash from dumpsite and landfill fires;

(iii) Soil, sediment (including in drains and water bodies near plastic waste disposal facilities), rubble and compost;

(c) Gases:

(i) Air (indoor);

(ii) Air (emissions);

(d) Biota and human biological samples (for the purpose of biomonitoring):

(i) Trout and other fatty fish in water bodies as well as soil living organisms, chicken and other biota feeding from the ground in the vicinity of plastic waste disposal facilities;

(ii) Bodily fluid and hair samples from workers in plastic waste-management and communities located near facilities.

~~155.~~156. Sampling for the purpose of monitoring should prioritize the investigation of pollutants specifically associated with the disposal of plastic wastes including, but not limited to, the following:

(a) Bisphenols and phthalates;

(b) Short chain chlorinated paraffins;

(c) Medium chain chlorinates paraffins;

(d) Per- and polyfluoroalkayl substances;

(e) Brominated flame-retardants;

(f) Relevant UV stabilizers such as UV 320, UV 327, UV 328 and UV 350;

(g) Relevant aldehydes such as formaldehyde;

(h) Heavy metals, in particular antimony, cadmium, lead and mercury;

(i) Polychlorinated dibenzodioxins (PCDDs)/ polychlorinated dibenzofurans (PCDFs);

(j) Polybrominated dibenzo-p-dioxins and dibenzofurans (PBDD/PBDFs).

2. Analysis

~~156.~~157. Normally, plastic waste analysis is performed in a dedicated laboratory. However, rapid developments in process instrumentation and real-time online detection equipment have enabled very sophisticated high-speed sensors to be used in-situ on sorting equipment and in the field (e.g., hand-held X-ray fluorescence (XRF) detection of metals in plastics; online X-ray transmission sorting systems).

~~157.~~158. For analysis in laboratories, there are several analytical methods available. Therefore, Parties should verify the availability and costs of methods of chemicals, including POPs, relevant to plastics before developing a monitoring and sampling programme.

~~158.~~159. The main steps in the analysis are:

(a) To scope the sample group(s) e.g., source separated plastic, plastic from residual household waste, reprocessed plastic;

(b) To proceed with pre-treatment of samples;

(c) To select target analytes;

(d) To prepare samples (e.g., microwave assisted digestion with magnetic stirring);

(e) To select chemical analysis method (e.g., Inductively coupled plasma mass spectrometry);

(f) To proceed with statistical analysis of samples.

~~159.~~160. The analysis of microplastics is related to their particle size, shape, concentration, and chemical composition. For microplastics, it is often difficult to describe the sizes, shapes and polymer types fully and reliably, from complex environmental matrices, using a single analytical method. In general, microplastic analysis consists of two steps: physical characterization of potential plastics (e.g., microscopy) followed by chemical characterization (e.g., vibration spectroscopy) for confirmation of plastics. In special cases, co-contaminant chemical analysis is performed on extracted chemicals. Through physical characterization (done by visual observation with the naked eye, or by using microscopy), size (maximum dimension or particle image), shape and colour can be observed and recorded. Chemical characterization is a final step to identify microplastics from the other natural materials, when visual and microscopic observation is not enough to confirm the particle nature. The most common method used in chemical characterization of microplastic particles is spectroscopy (e.g., Fourier-Transform Infra-Red and Raman) (UNEP/GESAMP, 2019).

3. Monitoring

~~160.~~161. Article 10 (“International Cooperation”) paragraph 2 (b) of the Basel Convention requires Parties to “cooperate in monitoring the effects of the management of hazardous wastes on human health and the environment”.

~~161.~~162. Monitoring programmes should be implemented for facilities managing plastic wastes if appropriate, as they provide an indication of whether a plastic waste management operation is functioning in accordance with its design and complying with environmental regulations and serve as elements for identifying and tracking environmental concerns and human health risks.

~~162.~~163. Information collected from monitoring programmes can feed into science-based decision-making processes and can be used for the evaluation of the effectiveness of risk management measures, including regulations. Monitoring of plastic litter, both in the marine environment and on land, can provide information on the nature, extent and impact of plastic pollution, notably on which products are prone to be discarded outside the waste management system. Monitoring can also give information on the effectiveness of policy measures related to plastic waste management.

~~163.~~164. To measure the effectiveness of ESM practices at a facility, accurate and up-to date data are required on the precise effects of the activities of the facility on the environment as well as on individuals. Therefore, a planned, regular sampling and monitoring programme should be conducted.

~~164.~~165. Monitoring is not restricted to analytical measuring, it also includes regular maintenance, visual and safety checks.

F. Handling, separation, collection, packaging, compaction, transportation and storage

~~165.~~166. Handling, separation, collection, packaging, compaction, transportation and storage are important elements in the management of plastic wastes, including in relation to the prevention of plastic leakage. Procedures and processes for managing wastes should be considered for these activities, both for hazardous and non-hazardous plastic wastes, to prevent spills and leaks, e.g., through wind, resulting in worker exposure, releases to the environment or exposure of the community.

1. Handling

~~166.~~167. Plastic wastes should be handled appropriately to minimize risk to human health and the environment. It should be taken into account that wastes from polymer manufacturing and blending processes are often in the form of powders or granulates contained in bulk bags or containers. Post-consumer wastes are likely to be in bulky form and may require baling or bagging for transportation to waste processors. Employees should be supplied with appropriate protective clothing, trained in the safe handling of large/heavy containers and equipped with equipment such as sack-barrows, pallet trucks and fork-lift trucks.

2. Separation

~~167.~~168. Separation at source of generated plastic wastes increases efficiency and reduces costs related to segregating mixed waste and can improve the quality of the outputs from downstream pre-treatment, sorting and recovery operations. Source separation entails the sorting of plastic waste from other types of waste before collection as opposed to separation from other waste after collection. In order for source separation to be an effective approach, plastic waste generators should be given clear instructions and information about the required separation method prior to collection (e.g., by means of on-pack recycling labels or other simple separation instructions such as ‘clear drink bottles only’).

~~168.~~169. Source separation can be described as a form of multi-stream collection system in which the waste generator is responsible for manually sorting plastic wastes and placing them into designated bins or bags, to keep them separate by type or according to certain established criteria.

~~169.~~170. Source separation of post-consumer plastic packaging wastes may be performed in:

(a) Mono-material separation systems, where plastic wastes are segregated at source as one material fraction including more than one type of plastic together (as mixed plastics) or targeting specific plastic types (e.g., PET bottles, or rigid plastic such as pots, tubs and trays);

(b) Co-mingled separation systems, where several types of source separated dry wastes (e.g., metal and plastic wastes) are collected together.

~~170.~~171. The collection of clean plastic wastes that have been separated at source should be a priority as this will facilitate a simpler recycling process system and will generally produce recyclate polymers with a higher quality, with lower waste fractions and improved environmental performance (i.e., lower energy cost per tonne, reduced washing effluent flows).

3. Collection

~~171.~~172. Care should be taken in establishing and operating collection programmes for plastic wastes in order to increase the efficiency of the waste collection system.

(a) Household plastic wastes collection schemes

~~172.~~173. The three main recognized household plastic wastes collection schemes are:

(a) Source-separated or multiple-stream collection scheme;

(b) Co-mingled fractions or single-stream collection scheme;

(c) Residual waste or mixed waste collection scheme.

~~173.~~174. These schemes utilise the following collection systems for the collection of plastic wastes:

(a) Kerbside collection system: The system includes containers at ground level for collection from the street. Packaging plastic wastes are collected as a single stream or together (co-mingled) with a different waste fraction i.e., plastic and metal wastes are collected in the same bin;

(b) Door-to-door collection system: Door-to-door collection schemes involve a system whereby plastic waste streams in bags, bins, and/or containers are collected directly at households with regular frequency. Packaging plastic wastes are collected as a single stream or together (co-mingled) with different dry waste fractions i.e., plastic and metal wastes are collected in the same bin;

(c) Bring system (Drop-off) system: Consumers bring their plastic wastes such as plastic bottles and plastic bags to a certain collection site. While this is generally used for enhancing collection of plastic bottles, it could also be used for plastic bags and wraps, like grocery bags, zipper sandwich bags and some cereal bags, to be dropped off at depots and stores. Collection sites may include municipal staffed collection sites where several types of wastes (e.g., WEEE and bulky waste from households) can be brought by residents (civic amenity sites).

~~174.~~175. Deposit-and-return system (DRS): DRS is a system whereby consumers buying a product pay an additional amount of money (a deposit) that will be reimbursed upon the return of the packaging or product to a collection point. The system is based on offering an economic incentive for consumers to return empty containers to any shop to ensure that they will be reused or recycled. For beverage containers, these systems are already operating in many countries. The DRS could be expanded to other types of plastic packaging.

~~175.~~176. The highest quality plastic wastes are typically from separate collection via DRS, followed by kerbside separated/door-to-door collection. The quality will, however, also depend on the type and quality of further pre-treatment before recycling, such as washing.

~~176.~~177. The possibility of organizing selective collection schemes depends mainly on the volume of plastic waste collected separately and the frequency of collection. Collection schemes may be much more difficult for drop-off systems than for kerbside systems and in rural areas compared to urban or semi-urban areas. When selective collection is organized with compartmentalized trucks, both plastic wastes and residual household wastes can be collected simultaneously.

~~177.~~178. The informal sector, including individuals and small enterprises, is involved in the collection of plastic wastes. This is a common practice in geographies where the formal sector provides insufficient waste management (Wilson et al., 2006; Kumar et al., 2018; Hande, 2019). Collection of recyclables takes place from all possible places where access is possible, for example, (open) dumpsites, the streets, and door-to-door collection. For further information on these types of situations, see the guidance on how to address the environmentally sound management of wastes in the informal sector (UNEP, 2019a).

~~178.~~179. Communities in mountainous [and remote] regions face challenges, due to the terrain, isolation, and remoteness, for the collection of plastic waste that may not be experienced in other regions. [Such communities may rely heavily on the informal sector for plastic waste collection (see paragraph 178).] Challenges in collection of plastic waste in these communities can stem from transportation, influx of plastic waste from those outside the community, e.g. tourists, or lower volumes of recyclable waste to make separate collection realistic. Community-based solutions for the collection of plastic waste should be explored, such as raising community awareness of the value of plastics, incentivizing the return of plastics, e.g., through a deposit program, and targeting tourist lodge owners to collect and [recycle] their plastic waste (Alfthan *et al.,* 2016).]

(b) Industrial, commercial, institutional, and agricultural plastic and other waste collection schemes

~~179.~~180. Collection of industrial and institutional plastic wastes, commercial packaging plastic wastes and agricultural plastic wastes could be organized by waste generators themselves, or with large drop-off containers rented by the generators and collected regularly by private operators. The collection systems should be designed in such a manner that the plastic wastes are transported to specialized treatment facilities. In the European agriculture sector, many countries have implemented collection schemes, funded by producers, which allow farmers to bring collected farm plastic wastes to organised hubs on specific dates and times during the year. This facilitates efficient manual sorting and baling of the various plastic types at those hubs using mobile baling equipment, prior to transportation to reprocessing facilities. Plastic packaging waste from hazardous pesticides, herbicides and other bio-active substances should be separately collected.

~~180.~~181. Plastic wastes originating from maritime activities such as aquaculture and fisheries, both as their own waste and marine litter that gets caught in the fishing gear of commercial fishing vessels (e.g., nets, trawls and ropes), should be brought back on land and delivered to port reception facilities.

~~181.~~182. Waste leakages from marine activities, e.g., loss of fishing gear, should also be collected and delivered to a municipally or privately operated waste management system, as should plastic wastes from clean-ups along beaches, rivers and waterways and other water bodies. This also applies to the unintended leakage of other plastics, such as plastic pellets. Special collection schemes may be applied to retrieve unintentionally lost plastic products. For instance, lost fishing gear can be located, e.g., by equipping the gear with GPS thereby ensuring targeted retrieval of lost gear. Plastic wastes from marine litter, collected by clean-ups or by fishing vessels, typically contain significant amounts of ropes and nets. Extra separation operations will therefore be needed to untangle the materials in order to facilitate recycling of the waste.

4. Separating and extracting plastic wastes from other waste streams

~~182.~~183. Efforts should be made to separate and extract plastic waste from other waste streams which contain a considerable volume of plastics such as WEEE, waste vehicles, construction and demolition waste, waste cables and waste textiles. Source separation is the most desirable option. When this is not possible, effort should be made to separate plastics from the respective waste stream post collection to the extent that is feasible. Some of these wastes are large, and it should be ensured that collection and treatment infrastructure is in place that is capable of handling them. The method of separation of plastics from the waste stream will depend on factors like characteristics of the waste stream in consideration, availability of sorting technology, possibility of automation and associated cost. A 'one size fits all' approach may not be possible, and the appropriate method used for separation should be chosen based on the factors mentioned above.

~~183.~~184. For example, in very dense urban environments, source separation of plastic wastes can be difficult. In these cases, plastic wastes can be sorted out of mixed MSW. By using advanced sensor sorting technology and avoiding contamination with organic and paper waste in the mixed MSW, the quality of the resulting plastic wastes can be similar to the quality of plastic wastes from source separation systems. Other simpler techniques may result in plastic wastes of an inferior quality, in terms of physical/mechanical and other properties, to plastic wastes collected from source separation systems. For example, recyclate produced from plastic wastes from simple post-sorting operations can have a strong odour, particularly when the original mixed MSW contained organic waste. This can limit the possibility, or potentially make it impossible, to use the material in consumer applications.

5. Packaging

~~184.~~185. Packaging of plastic wastes falls into two categories: packaging for transportation and packaging for storage.

~~185.~~186. Packaging for transportation of hazardous plastic wastes is often controlled by national dangerous goods transportation legislation. For packaging specifications for transportation, reference materials published by IATA, IMO, United Nations Economic Commission for Europe (UNECE), and national governments should be consulted.

~~186.~~187. Plastic wastes, whether hazardous or not, should be properly packed for both ease of transportation and as a safety measure to reduce the risk of leaks and spills. For certain plastic wastes, baling might be appropriate. However, if this is an inappropriate size, transportation in big bags or closed bulk containers can be a reasonable measure.

~~187.~~188. Packaging of plastic wastes for storage should be conducted as follows:

(a) Plastic wastes should be properly packaged;

(b) In most cases packaging that is acceptable for transportation is suitable for storage, unless more stringent storage requirements are specified. Plastic wastes in the original containers of plastic products before becoming plastic wastes are generally safe for storage if the packaging is in good condition;

(c) Plastic wastes should not be stored in containers that were not intended to contain such wastes, that have labels on them that incorrectly identify their contents, or which may be contaminated;

(d) Containers that are deteriorating or deemed unsafe should be emptied or placed inside a sound outer package (overpack). When unsafe containers are emptied, the contents should be placed in appropriate new or refurbished containers. All new or refurbished containers should be clearly labelled as to their contents;

(e) Smaller containers can be packaged together in bulk by placing them in appropriate or approved larger containers containing absorbent material.

6. Compaction, shredding, compressing and baling

~~188.~~189. Plastic wastes from semi-finished product conversion, packaging wastes and other plastic wastes may be bulky and may contain more than one type of plastic waste. For economical transportation and storage some compaction may be necessary. The most common compaction processes are shredding, compressing and baling. Some plastics, such as EPS, should not be shredded but can be compacted. Compaction may destroy the plastic corpus which may contain important labels or markings from which technical information can be derived for the recycler [. As such, compaction may not be appropriate if such technical information needs to be retained.] With complete plastic items, it can be determined what the material it is and what additives it contains.

~~189.~~190. Shredding, compressing and baling should take place spatially separated from other technical equipment / process steps and a fire-prevention system should be installed. This is because explosive substances may be contained in the waste (e.g., lithium-ion batteries in electrical appliances or spray cans with residual contents) due to incorrect disposal or sorting.

~~190.~~191. Shredding may be either a dry or a wet process. Wet shredding is used not only to achieve compaction but also to begin the process of cleansing the plastic residues of paper labels, glue and dirt. Both baling and shredding require properly trained and equipped personnel, including occupational exposure protection strategies for the processes, as well as processes for handling wastewater and other wastes from the shredding.

~~191.~~192. Wherever possible, sorting into single material streams should be undertaken before the compaction process. However, shredded material may not be accepted in certain cases because quality standards beyond common sorting processes are required.

~~192.~~193. Mixed plastic wastes should only be shredded if there is an assured application for the mixed output or if a post-shredding sorting system is available to produce single material streams of acceptable quality.

~~193.~~194. Shredding should be conducted as follows:

(a) Shredders should be constructed and installed so as to protect the operator from flying fragments, hazardous substances, entangling film waste and noise, in addition to protection from other types of health hazards during the process;

(b) Shredders should be protected from metallic contamination by metal detector/removal systems, if a shredder is not able to handle metal contamination;

(c) Before shredded material is re-processed it should be dried and/or conditioned to the specification used by downstream industry/waste processors.

~~194.~~195. Baling is suitable for component, film and bottle wastes. Baling should be conducted as follows:

(a) The size and form of the bale should be optimized for its transportation and further processing;

(b) Over-compaction of baled plastic waste may weld the waste together producing a solid mass that can be difficult to separate;

(c) It should be considered that compacted bales contain considerable mechanical energy. The rust-resistant steel or polyester strapping should be strong enough to contain the long-term load of the compacted material;

(d) Care should be taken when opening bales to avoid injury caused by the sudden release of compacted materials;

(e) It should be taken into account that under-compacted bales may be unstable;

(f) Bales should only be handled by means of a pallet truck or fork-lift truck due to the potential large weights involved.

~~195.~~196. The compressing of plastic waste may be carried out to facilitate storage and transportation, depending on the nature of the wastes and the method of subsequent treatment. For example, wastes with high moisture content may not be suitable for compression.

7. Transportation

~~196.~~197. The transportation of shredded or baled plastic waste requires considerable attention to the stability and protection of the load. Bags and bales should be stacked no more than 2.5 meters high, and the load should be secured either with strong ropes or tarpaulins. Loads should be protected from weather and vandalism. When loading and unloading plastic wastes, particular care should be taken to ensure the safety of workers. Plastic wastes should be prevented from entering the environment during transportation.

8. Storage (D15 or R13)

~~197.~~198. Plastic wastes in shredded or baled form should be stored on clean concrete floors. If plastic wastes are stored indoors, a fire-prevention system should be available to prevent fires and ease firefighting. If plastic wastes are stored outdoors, it should be protected from contamination and weather damage by means of tarpaulins or [other suitable weatherproof covering. This will also help prevent plastic leakage, e.g., through wind drift. Protection against fire should also be in place. Contamination of plastic wastes from dust and dirt can be avoided by the use of pallets.

~~198.~~199. Plastic wastes stored outside should be covered with a UV-protective material as polymers degrade with prolonged exposure to UV light, resulting in the deterioration of the physicochemical properties of the plastic.

~~199.~~200. Storage space should not be completely occupied by plastic wastes. There should be access to all areas for handling equipment and for emergency services vehicles. There should be sufficient exit paths from the storage area for employees and they should be well marked and easy to find. The storage area should be secured against unauthorised entry. Fire-fighting equipment should also be readily available (see section H below).

G. Environmentally sound disposal

1. General considerations

~~200.~~201. According to the waste management hierarchy, prevention, minimization, reuse and recycling should be prioritized over other recovery operations and final disposal operations. For pursuing recycling and recovery of plastic wastes, the guidance to assist parties in developing efficient strategies for achieving recycling and recovery of hazardous wastes and other wastes (UNEP, 2019c) may be useful.

~~201.~~202. Disposal operations relevant to plastic waste and provided in Annex IV, part A and B of the Basel Convention are the following, ordered according to the waste management hierarchy, whereby operations that take place prior to the submission to the following operations are addressed in paragraph 214:

~~(a)~~ R3 Recycling / reclamation of organic substances which are not used as solvent;

~~(b)~~ R1 Use as a fuel (other than in direct incineration) or other means to generate energy;

~~(c)~~ D5 Specially engineered landfill and D10 Incineration on land.

~~202.~~203. Some disposal operations that occur prior to the submission to any operations referred to in paragraph 202 above are applicable to plastic wastes. These operations are addressed in sections F.5, F.6, F.8 and G.2 and include the following operations:

R12 Exchange of wastes for submission to operations R1, R3, or R13;
R13 Accumulation of material intended for operations R1, R3, or R12;
D9 Physico-chemical treatment prior to submission to operations D5, D10, D14 or D15;
D13 Blending or mixing prior to submission to operations D5, D9, D10, D14 or D15;
D14 Repackaging prior to submission to operations D5, D9, D13 or D15;
D15 Storage pending operations D5, D9, D10, D13 or D14.

~~203.~~204. It should be noted that some applicable disposal operations for plastic wastes containing or contaminated with mercury or POPs are different than those identified in paragraph 205 and 206. Specific guidance on the environmentally sound disposal operations applicable to plastic wastes containing or contaminated with mercury or mercury compounds or POPs is provided in the technical guidelines on the ESM of wastes consisting of, containing, or contaminated with mercury or mercury compounds (UNEP, 2022c) and the general technical guidelines on the ESM of wastes consisting of, containing or contaminated with POPs (UNEP, 2022), respectively.

~~204.~~205. Plastic waste recycling (operation R3) can be categorized as follows:

(a) Mechanical recycling, whereby plastic waste is processed by sorting, size reduction, cleaning and drying, thermal melt-extrusion and pelletizing, and compounding;

(b) Physical recycling, whereby plastic waste is dissolved in a solvent and the polymer is separated from constituents (e.g., flame-retardants) from plastic waste using solvents while keeping the plastic polymer molecules chain largely intact (solvent-based purification);

(c) Chemical recycling, whereby plastic polymer molecules are broken down into smaller component parts (monomers or oligomers), subjected to further processing and used as base chemicals, including feedstock for plastic manufacture (feedstock recycling).

~~205.~~206. Plastic waste recycling can be hindered by other methods of plastic waste disposal. For example, energy recovery of plastic wastes may become competitive in financial terms and reduce plastic waste recycling. Parties may consider introducing policy, regulatory and financial instruments to prioritise plastic waste recycling over other recovery and final disposal.

~~206.~~207. The recycling of plastic wastes can be challenging because of the wide variety of uses, additives, and blends that are used in a multitude of products. Recycling can be either reprocessing into the original product application with equivalent properties (closed-loop recycling) or a different plastic application with similar material properties (open-loop recycling).

~~207.~~208. As noted above, closed-loop recycling refers to a recycling method in which recycled plastic wastes are processed and returned to their original use. A well-established example of closed-loop recycling is bottle-to-bottle recycling. Open-loop recycling refers to the recycling process whereby plastics wastes are converted into new use. An example of open-loop recycling is the recycling of waste PET bottles into polyester staple fibre, polyester filament, film, etc. When choosing closed-loop recycling or open-loop recycling, inter alia the physical properties, and the environmental benefits should be considered. Improving the quality of the recycled materials, as well as supporting and improving markets for secondary materials, should be promoted.

2. Mechanical recycling (covered by R3)

~~208.~~209. Mechanical recycling [refers to the processing of plastic wastes by physical means. It] is commonly used to treat thermoplastic polymers such as PP, PE and PET. Thermoplastics polymers are better suited for mechanical recycling compared to thermosetting polymers because thermoplastics can be re-melted and reprocessed into new products with relative ease.

~~209.~~210. Mechanical recycling can be divided into the following main process stages:

(a) Physical sorting, size reduction, cleaning and drying to make purified, polymer flakes (see subsections (i) to (iv) below);

(b) Thermal melt-extrusion and pelletizing to make shaped profiles or wide sheets, or homogenous polymer pellets (see subsection (v) below); and/or compounding to make recyclate pellets with improved mechanical properties to meet the quality specifications for end-use product applications (see subsection (vi) below).

~~210.~~211. There are multiple configurations of equipment and individual unit operations to create a complete mechanical recycling process. Various designs, methods and approaches having been developed for the very wide range of different plastic waste streams. Some of such methods are 'mature technologies' (e.g., PET bottle recycling), while others are new and still evolving (e.g., robotic artificial intelligence (AI) sorting machines, or combined laser light, X-ray and induction sensor sorters).

~~211.~~212. Direct recycling of plastic wastes refers to the direct thermal plasticization of plastic wastes, followed by profile or shaped product forming. Normally this simplified 'direct' process can only be applied to clean, single-polymer industrial waste streams (e.g., the waste mould-flow sprues ejected from an injection forming process being immediately granulated and re-moulded). However, when this practice is conducted within an existing industrial process facility, the material may not become 'waste'.

~~212.~~213. Table 14 describes some of the generic processing unit operations employed for mechanical recycling of plastic wastes. However, it should be noted that every individual design of a facility will utilize its own set of equipment items, machinery layout and sequence of techniques needed for obtaining high-quality output recyclates from the particular mix, type and format of the incoming plastic waste streams.

Table 14: Mechanical recycling operations (not necessarily sequential)

Process	Description
Sorting: 1. To remove non-plastic materials 2. To separate individual polymers or similar plastic types 3. To remove plastics containing	Sorting methods are used to separate plastic wastes, remove [non-target materials including unwanted contaminants] and purify to a single polymer type. The main separation methods are manual separation, size & shape sorting, induction sorting, magnetic ferrous removal, eddy current metal separation, air-flow separation, automatic sensor sorting of materials, float-sink density separation

Process	Description
unwanted additives [4. To separate hazardous plastic waste] [5. To sort by colour]	and hydro-cyclone density separation. Other novel techniques are employed based upon any detectable physical differences in materials.
Size Reduction: Granulation / grinding Shredding / chopping Milling / comminution Crushing / impaction	Size reduction is used to chop plastic wastes into small flakes or chips, liberating joined materials & enables downstream separation (e.g., metals, glass, paper) and separating different plastic types (e.g., PET bottles from PP lids).
Cleaning / Washing	Manual or machine cleaning methods are used to remove various [non-target materials or contaminants] [, such as] oils, dust, dirt, biodegradable waste[, labels, adhesives and printing inks] from the surface of waste plastics. Can be wet or dry-friction methods.
Drying	Drying is used to remove surface moisture after wet washing.
Melting	Heating and melting plastic wastes into raw materials or products, including single-type plastic wastes and composite plastic wastes.
Extrusion	Extrusion is used to melt similar plastic flakes in a heated screw-barrel. Blending, mixing, vapour venting and melt-filtration can be applied to create a homogenous and uniform polymer material. Other additives can be added to the infeed mix to create a specific plastic compound grade. Polymer melt exits through a die-head, typically to allow for pelletisation. Direct formation of product is also feasible – e.g., thin sheets, or shaped profiles or filaments.
Pelletizing	Pelletizing can be done via chopping of water-cooled strands OR by direct die-face cutting to make small, regular free-flowing pellets.
Compounding	Compounding may be conducted through physical modification (by mixing of additive components before extrusion) or chemical modification (by adding active ingredients before extrusion).

~~213.~~214. Some examples of mechanical recycling steps for specific types of post-consumer plastic wastes are the following [, not necessarily taking place in the same facility]:

(a) PET bottles: Sorting (including colour sorting) → grinding → washing → separating → drying → processing into PET bottles, polyester fibres, sheets or containers;

(b) LDPE films used in agriculture and industrial packaging: Pre-washing → grinding → washing → separating → drying → melt-filtration → processing for example into refuse bags or agricultural films;

(c) PVC pipes: Grinding → washing → separating → drying → reprocessing into similar or other applications;

(d) EPS fish boxes: Sorting → washing and drying → grinding → regranulation and melt filtration → reprocessing into PS or EPS pellets or product;

(e) Mixed WEEE and/or ELV plastic waste: Sorting and separation → shredding and separating of plastic from metal fractions → screening and size reduction → air-separation of fluff and dust removal → density separation in modified liquid media → spin-drying → sensor sorting → colour sorting rubber and elastomer removal → bulk-mixing in silo → extrusion compounding → de-gassing → melt-filtration → pelletisation.

~~214.~~215. The following potential environmental impacts from the mechanical recycling of plastic wastes should be avoided or reduced [in respect of the following]:

(a) Air emissions in the form of dust and volatile organic compounds (VOCs) (He et al., 2015);

(b) Wastewater emissions [for example] from the washing of plastics flakes;

(c) Indirect air emissions associated with heat production (e.g., for flake washing), if the heat is generated on-site by gas, oil, etc;

(d) Site littering;

(e) [Unsound residuals management such as dumping and open burning of unrecycled fractions;]

(f) [Excessive] water [consumption] [use] [intensity], e.g., for washing, sink float separation, agglomeration, and pellet cooling;]

(g) [Reintroduction of hazardous substances into recyclates e.g., from additives or contaminants;]

(h) Contamination of the recycling site and surrounding areas with POPs as well as other hazardous substances (Tang et al., 2015);

(i) Pellet loss (Karlsson et al., 2018).

~~215.~~216. In most cases, well managed material handling, process safety procedures and good housekeeping can minimize the risk of these adverse impacts taking place, when carried out under professional supervision and within a waste management regulatory control system.

~~216.~~217. Certain types of plastic wastes are not suitable for mechanical recycling. This can for example be due to the complexity of the physical structure of the wastes and the way different polymer types and other materials have been combined within the original product design. Examples include thermosetting plastic composites, where the plastic resin cannot be thermally re-formed and the fibres are very difficult to remove, and thin-walled, multi-layer packaging films made with various plastic and metallic layers bonded together.

~~217.~~218. [It is important to remove plastics that contain or are contaminated with additives or processing aids, which are listed in Tables 6 and 7 of this document, in order to avoid contamination of subsequent recycling and manufacturing processes.] It is important to remove plastics that contain or are contaminated with additives, processing aids [or other substances,] notably POPs or SVHC (see Tables 6 and 7), to an extent to render the waste hazardous[, difficult to recycle] or [otherwise] problematic, in order to avoid contamination of subsequent recycling and manufacturing processes. Where such removal is not possible or difficult, it is important to manage the subsequent recycling and manufacturing processes accordingly.

~~218.~~219. [With the currently applied pre-treatment technologies, such as sorting, washing, float-sink and grinding, there may still be contaminants present in the post-consumer plastic waste, as these techniques are not able to thoroughly clean the polymers and remove the impurities embedded in the polymer structure. [Other] [Solvent-based extraction] methods can be applied to remove target additives from the polymer matrix without dissolving (Kol et al 2021).[67]]

~~219.~~220. [In case recycled plastic, for example PET or HDPE, is used in food contact materials, strict national legislation for using recycled plastics in food contact materials should be in place to minimize migration of substances into food.]

[ALT 220. Regarding recycled plastic applications with direct human exposure such as in food-contact materials, strict national legislation for using recycled plastics in such applications should be in place to meet national health and safety requirements (e.g. the US Food and Drug Administration (FDA).]

(a) Sorting

~~220.~~221. Sorting can be classified into manual sorting, automated/mechanical sorting, float-sink separation, liquid density separation, electrostatic separation and sorting by hydro-cyclones and centrifugal sorting. Automated/mechanical sorting technologies can be broadly classified into screen separators, air separators, ballistic separators and film grabbers based on their ability to sort items based on particle shape, size and density (see table 15). Furthermore, based on their ability to remove different types of metals from the waste stream, they can be classified into overband/conveyer head-roller magnets, eddy current separators, and induction sensors. Sensor based sorting and robotic sorting are examples of advanced forms of automated sorting.

~~221.~~222. Since plastic wastes may be mixed with impurities and other types of plastic wastes, which may not only cause difficulty in recycling plastic wastes but may also greatly affect the quality of the products produced, plastic wastes should be separated from non-plastic wastes (e.g., metals, rubber, sand, fabrics) through sorting and, where appropriate and feasible, sorted into single polymer types.

[67] Solvent-based extraction techniques such as the dissolution-precipitation technique have shown to be able to remove target additives from the polymer matrix as well as to selectively recover different polymers.

~~222.~~223. Manual sorting involves identification [notably] by shape, colour, appearance [and trademark] of the plastic that distinguishes it for visual identification by the operators (Ruj et al., 2015). Manual sorting operations may be a pre-sorting stage before or after mechanical sorting in order to remove unwanted or contaminated input materials and improve the efficiency of a downstream-automated process. Manual sorting may also be used in final quality checks at the end of a sorting process to ensure that sorted plastics meet technical specifications.

~~223.~~224. Manual sorting may be suitable when larger plastic items are present in large amounts in mixed waste and have not yet been size reduced to small flakes, or when separating different polymer types from mixed plastic wastes. In most cases, when plastic items or particles to be sorted are below circa 75 to 100mm in size, then manual sorting will become overly laborious and not be practicable.

~~224.~~225. Manual separation of plastic wastes into single plastic material streams could be performed directly from piles of plastic wastes or from the surface of sorting conveyors. In both cases manual sorting requires experience, knowledge, dexterity and concentration for long time periods. In many cases, the use of polymer-type labels (see Table 1) on individual items or components is not practical.

~~225.~~226. Manual sorting can be augmented by the use of hand-held analytical instruments and sensors to rapidly test individual polymer pieces in the field or sorting yard. However, sample test times above circa 30 seconds per item can make this impracticable for all but the largest items (e.g., whole car bumper assemblies).

~~226.~~227. For workers involved in manual sorting, there should be appropriate working conditions (e.g., provision of personal protective equipment, adequate safety training, proper ergonomics to reduce worker strain (see for example Illinois Recycling Association, 2010)).

~~227.~~228. Automated/mechanical sorting should be used where appropriate to increase the separation efficiency and is most effective at industrial scale (i.e., 5,000 to >50,000 tonne per annum input waste volume). The exact method of identification, separation and sorting can depend upon a wide range of physical and chemical properties of the plastic and the contaminant materials, as well as the size, shape and format in which it is presented to the sorting equipment. Automated mechanical sorting systems for plastic wastes can include a very wide range of technologies and separation methods.

~~228.~~229. Screen separators, air classifiers and ballistic separators are used for the removal of small, light, 2D pieces such as film and paper and for removal of heavy pieces such as glass and stone. The separation method depends upon the physical size, shape (i.e., 2 or 3 dimensions), density and mass of the sorted items. The creation of a waste stream which has a uniform range of particles or items within a controlled size and shape format is important for the successful application of downstream sorting methods. Table 15 below provides an overview of size, shape and density sorting technologies.

Table 15: Overview of size, shape and density sorting technologies (automated/mechanical sorting)

Technology	Sub- Type	Description
Screen separators	Trommel screen	An angled rotating cylinder with holes that allows wastes of a given size to fall through.
	Disk Screen	A bed of vertical-spaced discs that transports large waste items but allows smaller items to drop through the gaps.
	Oscillating screen	A vibrating/oscillating declined bed that allows smaller waste to pass through holes in the mesh deck while transporting larger wastes to the end.
	Flip-flop screens	A flexible, oscillating screen deck is used to transport material down an inclined belt. The resulting motion allows smaller items to pass through the set size of hole in the screen deck. Particularly useful for sticky or wet materials which have a tendency to clog screen holes.
Air separators	Zigzag air classifier	Waste is dropped through an upward air current in a zig-zag shaped flue. Light wastes are blown to the top, while heavier wastes fall to the bottom.
	Rotary air classifier	A trommel screen separator with an air current that captures the lightweight fraction.
	Cross-current air classifier	Wastes are fed on a conveyor and dropped through an air stream. The light components are blown horizontally to a collection point and the heavy components drop through.

	Suction hood	Sucks light weight wastes directly from the conveyor belt.
Ballistic Separator	N/A	A steeply inclined bed with a perforated plate screen deck, with alternate vibrating elements. Light fractions are lifted by cams to the top of the bed, heavy fractions fall to the bottom.
Film grabber	N/A	Wastes are accelerated onto a rotating drum with spikes. These hook plastic film and let other waste drop.

Source: International Solid Waste Association (ISWA) 2017

~~229.~~230. In most cases it is sensible to remove unwanted metallic contaminant prior to any size reduction or further material-type separation. Normally this follows a logical three-step approach to metal removal:

(a) First – Ferrous and magnetic metals (cast iron, mild-steel);

(b) Second – Non-ferrous metals (aluminium, copper, brass, zinc etc.);

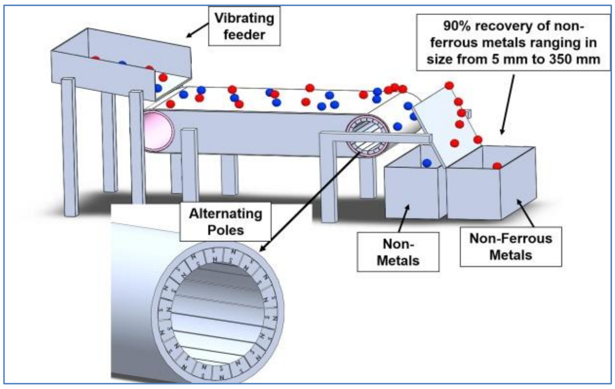
(c) Third – Stainless-steels and metal composites (304 / 316– stainless grades).

~~230.~~231. Based on their ability to remove different types of metals from the waste stream, automated sorting technologies can be classified into overband/conveyer head-roller magnets (removal of magnetic/ferrous metals), eddy current separators (sorting of non-ferrous metals), and induction sensors (sorting of stainless steel and composites).

~~231.~~232. Overband magnets can be used to lift ferrous metal from the moving waste stream, and often move the trapped metal items away to a side-located metal waste bin. Belt-conveyor head-roller magnets attract and hold ferrous metal items onto the conveyor belt as it passes over and back under the cylindrical top-roller, while other non-magnetic waste drops down its natural ballistic path under gravity. A splitting plate is normally positioned just below the roller, between the two different falling paths, to ensure a good separation and capture of the recovered metal parts.

~~232.~~233. Eddy current separators (see Figure 3) are used to separate non-ferrous metal contaminant items, e.g., copper, aluminium, brass, zinc with pieces at 5 to 30 mm nominal size. The plastic waste stream is passed over a very high-speed rotating magnetic roller that induces a rapidly changing magnetic flux field up through the transfer conveying belt and this causes an induced electric current inside each moving conductive metal particle. The resulting repulsive force causes the metal item to 'jump up' and away from the belt, so that it follows a higher trajectory ballistic path, enabling a separation plate to divert most metals away from the bulk plastic stream.

Figure 3: Eddy Current Separator – generic operating principle

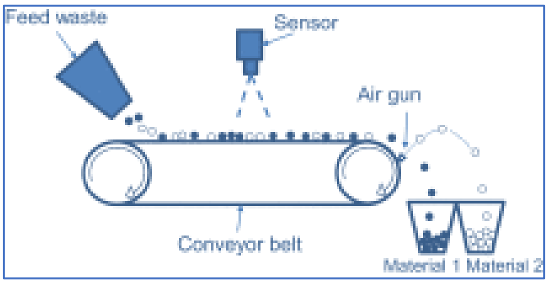


Source: York et al (2019)

~~233.~~234. Sensor-based sorting machines, with induction loops positioned immediately below the sorting conveyor belt, can be used to detect and then eject stainless steel and/or composite conductive items as they pass through the electro-magnetic field generated by the induction sensor loop. The exact position and approximate size of the metallic item are detected by the electric signal induced in the loop and this information is rapidly analysed to trigger an air-jet pulse that blows the unwanted contaminant particle away from the bulk flow of plastics as it leaves the end of the belt. In many cases, this type of detection technology is combined with over-belt optical and X-ray sensor methods to provide additional identification and characterization information during a single pass along a multi-material sorting (e.g., Near Infrared (NIR) / XRF / Induction combined).

~~234.~~235. Automatic sensor-based technology can be used to sort materials according to its type. Sensor-based sorting technology (see Figure 4) including, but not limited to, near infrared (NIR), mid infrared (MIR), laser-induced breakdown spectroscopy (LIBS), visual spectrometry (VIS), XRF and, (X-ray transmission (XRT) enables separation of plastics by polymer type, plastic density or colour, as well as removing other materials (e.g., paper/cardboard, glass and metals) thus optimizing the plastic waste recycling process and ensuring a higher final quality. In most applications, mixed plastic wastes are transported on a fast-moving conveyor under strong light or X-ray source where high-speed sensing cameras record the position, shape and reflected light or wave signals and make instant analysis of the received spectrum. This allows the polymer type and certain additive chemicals to be identified. Immediately post-detection precisely controlled compressed air-jets are used to eject the sorted items away from the bulk material flow at the end of the transport cover, with splitting plates positioned to affect the final separation process.

Figure 4: Generic layout for most over-belt, sensor-based sorting detect-and-eject methods



Source: Serranti et al (2019)

~~235.~~236. Advanced, automated sensor sorting can also be used to separate plastic wastes from mixed, residual MSW. In addition, these technologies can be used to sort plastic wastes separated and extracted from bulk flow streams of other waste streams, such as mixed WEEE, ELV and mixed construction waste, as described in section F.4. Table 16 provides an overview of available sensor sorting technologies. Constant and rapid technology developments are continually adding new and novel sorting methods to this family of sorting methods. Modern flake sorting designs of sensor equipment can operate on particles as small as 3 to 10mm, but for whole packaging items the normal size of sorted items is in the 40 to 300mm range.

Table 16: Overview of sensor sorting technologies

Near infrared (NIR)	Used to differentiate between plastic types (PET, HDPE, PVC, PP and PS) and to differentiate plastic waste from mixed, residual MSW and other materials such as paper and metals.
Visual spectrometry (VIS)	Used to identify materials based on colour
X-ray Fluorescence (XRF)	Used to differentiate between metals / alloys (for example, copper from steel). Also used for potential POPs or SVHC screening of brominated, chlorinated and fluorinated plastic additives
X-ray Transmission (XRT)	Identifies materials based on atomic density – for example, halogens and organic components, mineral fillers, hidden metal particles inside plastic parts etc.

Source: Cuauhtémoc et al (2021)

~~236.~~237. Robotic sorting is an advanced form of automated sorting. Robots can identify specific products using cameras and analyse images against an internal database of products identified by shape, size, colour, and texture. Typically, rapid speed mechanical arms and grabbers are used to pick and deflect the selected items from the bulk material flow. These systems can also utilize a wide range of detection sensors and camera types, in a similar approach to the over-belt sorting equipment described above.

~~237.~~238. In certain cases, float sink separation and liquid density separation can be used to separate various types of polymers. For float-sink separation, small flakes or particles of mixed plastic are fed into a vessel or tank filled with liquid of a known and controlled density. Plastics in the mix which have a solid density lower than the liquid separation medium will float; those plastics heavier than the liquid density will sink.

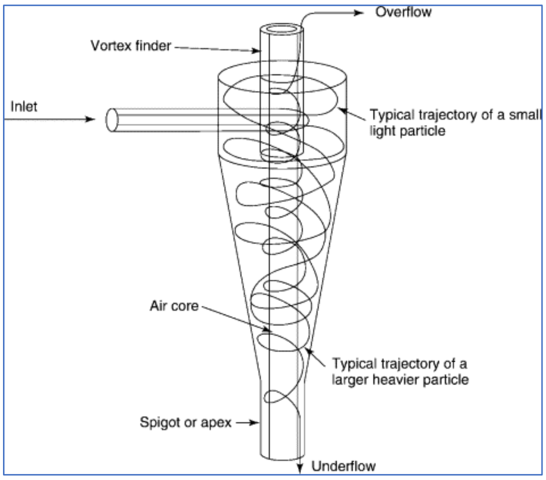
~~238.~~239. Water is most commonly used as the separation liquid, to create a density separation at a specific gravity of 1.00. Other fluid densities can be achieved by making controlled salt solutions or adding suspended solids as fine powders to create density split points at up to a specific gravity of 1.40 (Ragaert et al, 2017).

~~239.~~240. Float-sink separation in water can effectively separate polyolefins (PP, HDPE, LDPE) from PVC, PET and PS, with higher liquid salinity, for sink-float sorting of PS and ABS (in the range of a specific gravity of 1.08 to 1.20). Use of different media can allow separation of PS from PET, but PVC cannot be removed from PET in this manner as their density ranges overlap. In fact, a density gap of 0.1 to 0.2 g/cm^3 is recommended to enable a successful float-sink separation with reasonable purity of fractions.

~~240.~~241. Float-sink separation is not effective for separating plastics with similar density. Electrostatic separation can be used to separate polymeric materials of the same or very similar density (e.g., ABS and PS). The principle of electrostatic separation is based on differences in electrostatic forces acting on particles of the mixture exposed to the electric field. The effectiveness of electrostatic separation depends, among others, on the size and shape of particles in the mixture (which has a stochastic character), environmental conditions like humidity, pressure and temperature, the moisture content of the mixture as well as its voltage level, the configuration of the electrode system, and the position of the feeding unit. (Rybarczyk et al, 2020) A plastic containing BFR additives has a higher density (circa +10% higher) than the same plastic without BFR. This density technology can be used to sort plastic waste separated and extracted from WEEE and ELV, as the polyolefin and styrenics floated fraction obtained are almost free of BFRs. BFRs (minor impurities in the ppm range) can persist, but the vast majority of BFRs should be separated into the denser plastic residuals.

~~241.~~242. Hydro-cyclones are based on the principle of centrifugal acceleration to separate plastic waste mixtures by density. A hydro-cyclone transfers fluid pressure energy into high-speed rotational fluid motion (see Figure 5). This rotational motion creates a strong centripetal force within the spinning liquid chamber (i.e., a G-force of multiple times gravity) causing a rapid and strong relative movement of solid particles suspended in the fluid in relation to the particle and fluid density, thus permitting rapid density separation of materials from one another. Hydro-cyclones have a very high throughput rate and result in highly accurate density separation if plastic particle size is small (<6mm nominal size) and of a regular shape.

Figure 5: General configuration liquid hydro-cyclones



Source: Makenji (2009)

~~242.~~243. A similar sorting process for shredded plastics is centrifugal sorting. A cylindrical water-filled centrifuge is used for this purpose and the whole body of the chamber is rotated at very high speed to induce a centrifugal force within the liquid suspension (with up to ~300 G-force). The technique can selectively separate plastic flakes from a mixture of polymer waste materials (Karaman et al., 2015). Various designs of industrial scale continuous power-driven centrifuges are available to provide very accurate density separations of plastics.

(b) Size reduction

~~243.~~244. Shredding, granulation, crushing, cutting, chopping, milling and grinding are mechanical methods for the size reduction of plastic waste items. Selection of the appropriate machinery and method will depend upon the input size of the waste stream, the size and thickness of the items and the toughness of the plastic type as well as the plastic waste format (e.g., solid mouldings, flexible films, woven textiles etc). Size reduction is a necessary process for plastic waste recycling, which delivers a controlled particle size range to the downstream sorting process while also enabling separation of different material types from complex waste components (e.g., HDPE screwcaps from PET beverage bottles; brass screw inserts from electronics casings). Size reduction methods for plastic wastes can be divided into dry and wet systems, but the dry method is most commonly used for cleaner plastic waste streams.

~~244.~~245. When using a dry method to shred or grind plastic wastes, dust prevention and noise reduction equipment is recommended. When using a wet method to crush plastic wastes, the use of a liquid effluent filtration system is recommended to prevent small particles from entering the wastewater.

~~245.~~246. Regardless of which size reduction method is used it is advisable to acquire efficient, energy-saving technology, equipped with effective safety protection measures. Cutting blade wear rates and replacement parts also contribute significantly to operating costs.

(c) Cleaning

~~246.~~247. Plastic wastes may be contaminated with dirt, dust, oils and greases and other wastes. Effective surface cleaning of plastic wastes is vital to reduce impurities before entering a thermal extrusion or granulation process and to reduce consumption of polymer-melt waste in particle filtration screens.

~~247.~~248. Many designs and configurations of cleaning machinery using liquids, in particular water, exist, as well as complete multi-stage plastic washing processes. Mixing, stirring, scrubbing, surface friction, abrasion and high-pressure liquid jets are all employed to remove surface dirt, dust, oils, paints, adhesives and paper-labels etc. The addition of chemical detergents and other cleaning agents (e.g., caustic soda) is common, as is the use of hot-water to provide more effective cleaning (e.g., for label-glue removal from bottles)

~~248.~~249. A circulating liquid system can be used for cleaning plastic wastes and fresh liquid should only be used to supplement the system losses. Phosphorus free cleaning agents or other green cleaning agents are preferable.

~~249.~~250. The cleaning liquid should be collected, assessed for contamination and treated before release to the environment or recycled within the recycling unit.

~~250.~~251. Dry cleaning recycling systems, where water is not required, may be used to pre-clean plastics from sand, stones, glass, paper, etc.

(d) Drying

~~251.~~252. Drying of plastic wastes is carried out to remove excess moisture.

~~252.~~253. Commonly used plastic waste drying technologies include centrifugal spin-drying, air-blast drying, fluidized bed drying, infra-red drying and these often include heated airflow to increase the drying rate.

~~253.~~254. Most common plastic types (e.g., PE, PP and PS) need to be dried to below circa 0.5% water prior to feeding into thermal melt processing equipment. Certain polymer types require much longer drying times to remove all traces of absorbed moisture from within the plastic granules (e.g., PET, ABS, PC, Nylon), otherwise cosmetic and structural problems will result post-extrusion and during moulding.

~~254.~~255. The gas produced by drying of plastic wastes should be treated appropriately before being released to the atmosphere in particular if it is odorous or it contains harmful volatile contaminants.

(e) Thermal melt-extrusion and pelletizing

~~255.~~256. Plastic extrusion processing equipment is the most commonly used method for the final stages of mechanical recycling. Electrical power is used to rotate mechanical screw elements within a heated metal barrel. The combined effects of the physical screw mass-transfer forces and the applied barrel heaters melts the waste polymer flakes and mixes and blends the input raw material components to make a homogenous polymer compound with consistent material properties.

(a) Melt-Filtration - Metal wire-mesh melt-filter screens are often used to remove the final traces (to reach below ~0.5% of plastic mass) of solid particulate contaminants during high-pressure polymer melt flow through a heated extruder screw-and-barrel machine. Used filters should be collected and re-processed;

(b) Pelletizing - The molten output flow leaving the extruder is normally shaped into the form of filament strands by a multi-port die-head, and then cutting or ‘chipping’ is applied to create small (circa 2 to 3 mm) solid plastic pellets. Cooling water baths plus strand-chippers or die-face cutters with pumped water-rings are frequently used to solidify the plastic pellets ready for bagging or bulk storage in silo;

(c) Profile Extrusion - Alternatively, thermal extrusion equipment can be fitted with direct shape-forming die heads to make continuous shaped profiles (e.g., PVC window frames) or wide sheets to create rolls of thin plastic suitable for onward shape forming (e.g., vacuum forming of flowerpots and trays).

(f) Compounding

~~256.~~257. The main purpose of compounding is to make recyclate pellets with improved mechanical properties to meet the quality specifications for end-use product applications. Cosmetic improvements to colour, odour and surface finish can also take place during extrusion compounding of plastic. All of these improvements increase the quality of the recyclate. Compounding may be conducted through physical or chemical modifications, as follows:

(a) Physical Modification - The most common methods for compounding involve the physical mixing of additive components at an accurately controlled mass-ratio to the main recycled plastic waste infeed at the extruder barrel inlet-port. Typical additives that effect physical changes to the output recyclate properties are fillers, impact- and flow-modifiers, fibre re-enforcements, plasticizers, antioxidants, UV-stabilizers etc. Pigments and dyes are commonly added to meet a defined output plastic colour specification. In all cases, a thorough and complete blending, dispersion and mixing of the additive components is important to create a consistent and homogenous output recyclate quality (as described in Table 5 – Additives);

(b) Chemical Modification – during compounding it is possible to effect chemical changes to the recycled plastic waste input by the addition of active ingredients to the input mixture and by control of the physical conditions within the extrusion barrel (e.g., temperature-time profile, degree of shear-mixing and barrel pressure). Typically, chemical improvements to the polymer molecular structure are the desired outcome, with re-building of chain-length, cross-linking bonds, modified crystallinity and improved phase-mixing being examples of this technique. Increasing the polymer viscosity of PET bottle flakes by polycondensation during the extrusion recycling phase is a well-known example of this approach.

3. [Physical Recycling] [Solvent-based recycling] (covered by R3)

~~257.~~258. [During solvent-based recycling the solid plastic's physical macro-structure is dissolved while the original molecular structure of the individual polymer chains is preserved.] [ALT. Physical recycling refers to solvent-based purification which dissolves the solid plastic's physical macro-structure but preserves the original molecular structure of the individual polymer chains.] This method can be used to separate and remove additive chemicals and fillers bound within the waste polymer compound. The resulting cleaned polymer molecules can then be recovered (e.g., by precipitation), dried and re-formed into the original plastic material at close to 100% product purity and mass yield.

~~258.~~259. Based on the similar compatibility between solvent and solute molecules, solvent-based recycling separates the plastic resin from various additives and fillers. Solvent-based recycling is a novel technology allowing the recycling of, among others, complex polymer compounds like multilayer packaging or contaminated polystyrene using selective dissolution.

4. [Chemical recycling (covered by R3)

~~259.~~260. ~~[~~The term 'chemical recycling' describes a broad range of ~~-~~methods, which have significantly different outputs arising from the applied process techniques. The various methods can be classified into, but not limited to, three categories:

(a) Solvolysis (monomer recycling);

(b) Pyrolysis (falls under chemical recycling in case the output ~~[~~of the facility~~]~~ is used as material for base chemicals ~~[~~and~~-~~ is not used as ~~for~~ fuel or for energy production~~not as a fuel~~]);

(c) Gasification (falls under chemical recycling in case the output ~~[~~of the facility~~]~~ is used as material for base chemicals ~~[~~and is not used as~~for~~ fuel or for energy production~~not as a fuel~~]).~~]~~

~~260.~~261. ~~[~~Solvolysis is the collective term used for various types of solvent-specific methods, including 'glycolysis', 'methanolysis' etc. Solid plastic is dissolved into a liquid phase solvent and the polymer molecules then further break-down into smaller component parts ~~[~~(mainly monomer or oligomers)~~]~~. This technique ~~[is]~~ ~~[~~can be~~]~~ used for polymers with specific targetable bonds. ~~For example, it is used for, such as polyurethane, where the original polymerisation reaction is reversed in the liquid solvent phase and the resulting building-blocks, or intermediates, can be purified (i.e., to remove pigments and fillers), prior to being fed-back into the original polymerization process (Dow, 2021; Sołtysiński et al, 2018).~~ This approach preserves the useful chemical components of the waste polymer molecules, and these can be re-used back into full-scale industrial reactors, as direct replacement for primary feedstock raw materials. In the process of purification, hazardous wastes may be generated which should be treated appropriately. The mass of output polymer material recovered by this method ~~can be classified as~~ could be used as the basis for 'recycled plastic'.~~]~~

~~261.~~262. ~~[~~In the context of chemical recycling, pyrolysis is a method that refers to ~~sealed-reactor~~a thermal process without oxygen. Plastic wastes are subjected to intense heat and~~/or~~ chemical break-down during a thermal reaction process which~~and~~ ~~normally~~ results in output streams that are a mixture of gases, liquids and waxes, plus a residual carbonaceous char. In this process, hazardous wastes may be generated which should be treated appropriately. Often the lightest gaseous output fractions are incinerated within the process to generate some of the~~-~~ heat energy for the chemical break-down. In most cases this is carried out in the absence of oxygen or moisture. Pyrolysis may be used for polymers consisting exclusively of hydrocarbons such as polyethylene, polypropylene and polystyrene.~~]~~

~~262.~~263. ~~[~~Some of the resulting output mass fractions ~~[~~from pyrolysis~~]~~ can be used as chemical feedstock to replace prime (e.g., oil-derived) naphtha materials, as part of the cracking and polymerization reaction stages that make-up large-scale petrochemical process plants. However, the tracking and tracing of the exact end-destination for the waste-derived monomer and short-chain fractions is ~~[difficult]~~ ~~[~~usually not possible.~~][, so]~~ ~~[~~M~~][m]~~ass-balance approaches (a type of chain of custody model) are ~~[needed]~~[a means~~]~~ to estimate the actual mass-flow from input plastic waste into the polymer end-products.~~]~~

~~263.~~264. [~~ISO 22095 (Chain of custody — General terminology and models) can be used as the basis for the definition and description of chain of custody models.~~ Within the mass-balance ~~[chain of custody model]~~[approaches], there can be significant variation ~~[between the precise approaches]~~ used for this type of chemical recycling with respect to allocation of inputs to outputs. There are various measurement schemes to certify mass-balance processes, which vary in their definitions of recycling and recycled content (Edwards, 2021). ISO 22095 (Chain of custody — General terminology and models) can be used as the basis for the definition and description of chain of custody models. Out of the Chain of Custody models according to the terminology described in ISO 22095, book and claim removes all physical links between inputs and outputs and therefore is not considered a valid approach for chemical recycling of plastic wastes.]

~~264.~~265. [In the context of chemical recycling, gasification involves plastic wastes being subjected to high-temperatures in the presence of an oxidizing agent to break down the polymer to a 'syngas' containing carbon dioxide, monoxide, water and hydrogen (Solis, 2020). This can, in some cases, be converted into ethanol and then used to make new hydrocarbons (e.g., polyethylene).]

~~265.~~266. [Chemical recycling, compared to mechanical recycling, is generally an energy-intensive process [and ~~may [emit] a significant amount of [greenhouse gases]~~ [may lead to a significantly higher amount of greenhouse gas emissions]]. Additionally, hazardous substances can be found in liquid and solid residues and [in air emissions from chemical recycling] (European Chemicals Agency, 2021). As such, [the following potential adverse effects on human health and the environment~~environmental impacts~~ from the chemical recycling of plastic wastes [should be avoided or ~~reduced~~minimized][The following [releases] caused by the chemical recycling of plastic wastes, that potentially cause adverse effects on human health and the environment should be avoided or minimized.]:]

(a) Emissions of greenhouse gases [into the atmosphere];

(b) [Impacts][Disposal or releases] of unrecycled fractions and other wastes generated from chemical recycling [due to][, notably any impacts from] their unsound management such as dumping and open burning;

(c) Reintroduction of hazardous substances into [the][output], including~~[and/or]~~ [recycled][fractions from the process] e.g., from additives or contaminants;

(d) Wastewater [discharges into any environmental media such as water bodies and land] ~~[emissions]~~;

(e) Site littering;

(f) [Use of][Effects from] hazardous solvents in solvolysis (Ügdüler, 2020)]

~~266.~~267. [Chemical recycling, an evolving field, may be a complementary technology to mechanical recycling for certain plastic waste types[68]. Various examples of chemical recycling methods for plastic wastes are available at the pilot-plant stage and also at close to full-scale operating throughput. There is a lack of evidence to generate conclusions around the viability of many technologies, and a lack of understanding of the life-cycle impacts (Hann et al., 2020)]. Therefore, more evidence is needed on the applicability of the ESM concept to chemical recycling. [For these reasons it is not yet fully proven that chemical recycling can be considered an ESM operation for all applications]]

~~267.~~268. For further information refer to the report "Chemical Recycling of Polymeric Materials from Waste in the Circular Economy" (European Chemicals Agency, 2021), "Chemical recycling: A critical assessment of potential process approaches (Quicker et al, 2022)", "Chemical Recycling of Plastic Waste: Comparative Evaluation of Environmental and Economic Performances of Gasification- and Incineration-based Treatment for Lightweight Packaging Waste" (Voss et al, 2022) and "Chemical Recycling: State of Play" (Hann et al, 2020).**]**

5. Energy recovery (R1)

~~268.~~269. Plastic wastes suitable for energy recovery may, for example, be non-recyclable or hard-to-recycle plastic wastes, plastic wastes consisting of small items dispersed among other waste materials, plastic wastes with a POP content at or above the low POP content limit values and residues from the recycling process containing plastic wastes which cannot themselves be recycled. In line with the waste hierarchy, [recycling of plastic wastes should be prioritized over energy recovery], except in the case where certain plastic types or additives represent a particular health risk or environmental hazard and require destruction in a controlled system.

[68] Par. 217 considers certain types of plastic wastes that are not suitable for mechanical recycling.

~~269.~~270. For energy recovery, plastic wastes can inter alia be thermally treated through incineration with energy recovery with other kinds of waste, e.g., MSW and industrial wastes, or through co-incineration in blast furnaces and power plants, and through co-processing in cement kilns.

~~270.~~271. Most plastics are hydrocarbon polymer compounds that can burn and have a high calorific value (see Table 17). [Due to its] high calorific value, plastic waste should be mixed with other compatible waste fractions with a low calorific value in order to achieve a preferably constant calorific value of the mixture.

Table 17: Energy values of plastic wastes, including mixed plastic wastes, in comparison with other waste and fuels.

Single polymers / *Fuels or wastes*	**Lower calorific value[69](MJ/kg)**
LDPE / HDPE	45
PP	45
PS	41
ABS, *Oil*	40
Coal	25
PET	23
PVC	22
Packaging Derived Fuels (PDF)	20
Refuse Derived Fuel (RDF)	15-17
MSW, Wood	8-10
Mixed polymers (Plastic Fuels)	
LDPE/PP/ HDPE (food packaging)	45
PP/ABS/HDPE (computers)	43
LDPE/PP/PVC (mixed packaging) PP/ LDPE/PVC (non-food packaging)	37 37
PU/PP/PVC/ABS (bumpers/fuel tanks)	33

~~271.~~272. Plastic wastes can be part of fuels derived from waste such as Solid Recovered Fuel (SRF) in accordance with the European standard (EN 15359) and RDF. SRF usually has a higher calorific value than RDF. RDF is produced by removing non-combustible components such as metals, glass and putrescible materials from MSW and then pelletizing the combustible material. As this is processed MSW, RDF has a higher concentration of plastic waste than MSW and consequently a higher energy value.

~~272.~~273. For further information on incineration with energy recovery of plastic wastes containing or contaminated with POPs, refer to the General technical guidelines on the environmentally sound management of wastes consisting of, containing, or contaminated with persistent organic pollutants (UNEP, 2022a). For further information on incineration with energy recovery of plastic wastes other than plastic wastes containing or contaminated with POPs, refer to the technical guidelines on the environmentally sound incineration of hazardous wastes and other wastes as covered by disposal operations D10 and R1 (UNEP, 2022d). For information on the reduction of mercury releases from the energy recovery of plastic waste containing or contaminated with mercury, refer to the technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds (UNEP, 2022c).

~~273.~~274. For further information on the co-processing of plastic wastes in cement kilns, refer to the technical guidelines on the environmentally sound co-processing of hazardous wastes in cement kilns (UNEP, 2011).

~~274.~~275. For further information on the disposal of incineration residues, refer to the technical guidelines on the environmentally sound incineration of hazardous wastes and other wastes as covered by disposal operations D10 and R1 (UNEP, 2022d), and the technical guidelines on the environmentally sound disposal of hazardous wastes and other wastes in specially engineered landfill (D5) (UNEP, 2022e). For further information on the disposal of incineration residues containing or contaminated with POPs, refer to the General technical guidelines on the environmentally sound

[69] Other terms meaning the same as “lower calorific value” are “lower heating value”, “net heating value”, and “net calorific value”. It is noted there are different methods for calculating it.

management of wastes consisting of, containing, or contaminated with persistent organic pollutants (UNEP, 2022).

6. Final disposal operations (D5, D10)

~~275.~~276. According to the waste management hierarchy, final disposal of plastic wastes is the least preferred option. Final disposal operations that may be relevant to plastic wastes include specially engineered landfill (D5), and incineration on land (D10).

~~276.~~277. Since plastics can be very light, special care should be taken to ensure plastic wastes are not blown off-site by wind.

~~277.~~278. Some additives such as phthalates, decaBDE, HBCD, PFOS and PFOA contained in plastics could enter the leachate of landfills (Teuten et al., 2009; Wowkonowicz & Kijenska, 2017; Stuart et al., 2019).

~~278.~~279. When carrying out incineration on land (D10) of plastic waste, a preferably constant calorific value of the mixture should be achieved (see paragraph 272 and Table 17).

~~279.~~280. For further information on landfilling of plastic wastes, refer to the technical guidelines on the environmentally sound disposal of hazardous wastes and other wastes in specially engineered landfill (D5) (UNEP, 2022e). For further information on landfilling of plastic wastes containing or contaminated with POPs, refer to the General technical guidelines on the environmentally sound management of wastes consisting of, containing, or contaminated with persistent organic pollutants (UNEP, 2022). For information on the reduction of mercury releases from plastic wastes containing or contaminated with mercury from specially engineered landfill (D5), refer to the technical guidelines on the environmentally sound management of wastes consisting of, containing, or contaminated with mercury or mercury compounds (UNEP, 2022c).

~~280.~~281. For further information on incineration on land (D10) of plastic wastes containing or contaminated with POPs, refer to the General technical guidelines on the ESM of wastes consisting of, containing or contaminated with Persistent Organic Pollutants (POPs) (UNEP, 2022a). For further information on incineration on land (D10) of plastic waste other than plastic wastes containing or contaminated with POPs, refer to the technical guidelines on the environmentally sound incineration of hazardous wastes and other wastes as covered by disposal operations D10 and R1 (UNEP, 2022d). For information on the reduction of mercury releases from incineration on land (D10) of plastic wastes containing or contaminated with mercury, refer to the technical guidelines on the environmentally sound management of wastes consisting of, containing, or contaminated with mercury or mercury compounds (UNEP, 2022c).

7. Specific aspects related to recycling of certain types of plastic wastes

(a) Specific aspects related to recycling of common types of plastic wastes

~~281.~~282. Specific aspects of recycling of common types of plastic waste (PE, PP, PS, ABS, PET, PC, PVC) are provided below.

(i) Recycling of waste PE

~~282.~~283. LDPE can be mechanically recycled and this involves initial removal of contaminants followed by washing, drying and melt re-processing. Post-extrusion, the LDPE melted paste can be re-formed into thin plastic sheets which can be used for manufacturing plastic products. Good quality LDPE is used for household items like plastic wrap, grocery bags, and non-food containers. Recycled LDPE can be made into garbage cans, garbage bags, construction panelling, furniture, flooring and bubble wrap.

~~283.~~284. Bales of LDPE film can provide a high yield depending on the waste source, with clean distribution film performing best. The recyclate can be reintroduced into many primarily film related applications (e.g., non-food contact packaging, grocery bags, refuse bags, drip irrigation systems).

~~284.~~285. HDPE is normally treated through mechanical recycling. At first, the plastic waste is sorted and cleaned in order for any unwanted non-plastic debris to be removed. Then it needs to be segregated and purified, so that only HDPE items will be re-processed together. If other, non-compatible plastic polymers were to remain in the batch, the recycled end-product will be poor quality. HDPE can be separated by NIR sensor sorting techniques. However, if the plastic is too dark in colour, which means it absorbs the infrared waves, it is difficult to use this technique. Sorted HDPE is then shredded, washed melted and filtered to further purify the polymer. Finally, the plastic is cooled into pellets which can be used in product manufacturing. Recycled HDPE is used, for example, in pens, plastic lumber, plastic fencing, picnic tables and non-food bottles.

~~285.~~286. HDPE obtained from MSW (e.g., milk containers), distribution (e.g., crates and pallets), and construction (e.g., pipes) can be sorted at the article level into relatively pure HDPE streams.

~~286.~~287. HDPE obtained from waste vehicles and WEEE is often sorted by density separation. Preferably, this stream should be further separated (e.g., through electrostatic sorting). Alternatively, HDPE from waste vehicles and WEEE can be co-processed into a compounded blend, although the properties of the final plastic may be of a lower quality than individual 100% pure polymers.

~~287.~~288. Plastic wastes consisting of PE are usually mixed with PP and, occasionally, PVC. HDPE and LDPE may also be mixed together. PE has a degree of compatibility with PP, but has poor compatibility with PVC, so even if the amount of PVC is small, it must be removed before melt processing.

~~288.~~289. The PE/PP compatibility can be enhanced through the use of compatibilization additives. The presence of a small amount of PP in PE will not greatly reduce the performance of the recycled material, but if the amount of PP is large, then, for example, EPDM (ethylene propylene diene monomer rubber) can be considered as a possible compatibilizer for improved melt-blending.

~~289.~~290. [In case recycled HDPE is used in food contact materials, strict national legislation for using recycled plastics in food contact materials should be in place to minimize migration of chemicals into food.]

(ii) Recycling of waste PP

~~290.~~291. PP obtained from MSW (e.g., margarine tubs), bulky waste (e.g., garden furniture), distribution (e.g., crates and pallets), ELV and WEEE mixed-plastics and construction wastes can be sorted into relatively homogeneous single-polymer waste streams. Good segregation of these different waste streams helps to deliver well-characterised mixed plastic waste items into recycling sorting facilities and aids higher recycling yields and recyclate quality.

~~291.~~292. Regarding the mechanical recycling of PP, like other plastics, good sorting, washing, purification and melt re-processing are all critical steps to delivering high yield and quality of recyclate output. In the melt reprocessing phase, high purity PP flake is fed into an extruder where it is melted at 180 to 220 °C then homogenized, de-gassed, melt-filtered and die-formed into strands before cooling to be chipped into pellet granules. This is the common format for secondary PP raw-material polymer product.

~~292.~~293. Recycled PP can be mixed with virgin PP in any ratio for the production of new products such as clothes hangers, playground equipment, compost bins and kerbside recycling crates. However, there are many recent examples of high-quality PP recyclates being used at 100% levels for the production of car-parts, pipes, drainage goods and electrical product casings, as well as for non-food contact packaging items.

(iii) Recycling of waste PS

~~293.~~294. PS can be recycled physically and/or mechanically. HIPS is easier to recycle since its properties are not greatly affected even after multiple re-processing. The recycling rate of PS packaging waste is low due to the difficulty in removing food residues and odours from used packages.

~~294.~~295. PS foams can be troublesome for most rigid plastic recycling facilities. If oily molecules, water, and other contaminants make it into recycled materials, the substances can disrupt and weaken the polymers. PS clamshell containers and coffee cups are especially likely to be dirty, adding to the effort of processing them for recycling (Lemonick. S, 2019).

~~295.~~296. Solvent-based dissolution of foamed PS and rigid-PS waste materials can be used to remove unwanted contaminants, odours, and additives (e.g., BFR) to create high-purity PS recyclates[70].

(iv) Recycling of waste ABS

~~296.~~297. ABS can be successfully recycled mechanically from mixed waste streams. Similar to the recycling of PS from these waste fractions, NIR sorting is difficult due to the extensive use of black plastics. However, density separation can be employed to create a mixed-styrenics fraction (PS+ABS) that is almost free from BFR additives. The presence of mineral filled-PP in the plastic waste infeed mixture will result in some PP contamination in the PS+ABS density sorted fraction, which is incompatible for melt-blending even at low levels. Further separation may not always be necessary,

[70] See https://www.ivv.fraunhofer.de/en/recycling-environment/recycling-plastics.html#creasolv.

because ABS and PS polymers display a level of compatibility in extrusion, although further purification is possible using electrostatic sorting, to remove filled-PP and PS, to make near-pure ABS for higher-end applications. The ABS recyclates can be reintroduced into their original applications (e.g., vacuum cleaners) or other used for other applications (e.g., non-food containers; automotive parts; furniture feet).

~~297.~~298. ABS regenerated material can sometimes be blended with other similar types of compatible plastic waste (e.g., HIPS), and, by adding various functional additives, modified ABS blended materials with good toughness, corrosion resistance, oil resistance, cold resistance, weatherability and anti-aging properties can be produced. When recycled, ABS from plastic wastes can be used either in a mixture with virgin material, or as 100% recyclate, to produce products.

(v) Recycling of waste PET

~~298.~~299. PET makes up a large percentage of rigid, household packaging items in the form of blow-moulded bottles and thermoformed trays, often in clear, natural colour. The collection of rigid packaging from municipal sources means that PET recycling rates are some of the highest for any plastic, especially in countries where DRS are well-established (e.g., Norway has over 90% bottle collection rates)[71]. Polyester fibre recycling from clothing, household fabrics and bedding (e.g., duvet fillings) remains at very much lower rates, due to less prevalence of collection systems for these products.

~~299.~~300. Blow-moulded PET from bottles is one of the plastic wastes that are easiest to recycle and have the highest recycling rate of any common plastic. Closed loop recycling (e.g., bottle to bottle) is possible. This is because it is relatively easy to wash, separate out coloured flakes and then upgrade the intrinsic viscosity (polymer chain length) during the recycling process to near-virgin quality using polycondensation reactions. Food-contact approval certification has been given to advanced recycling processes that can demonstrate very high purity and tight quality control of the closed-loop recycled PET (r-PET), with usage levels of up to 100% r-PET to make new consumer drinks bottles.

~~300.~~301. The process of recycling PET bottles (or other rigid PET packaging wastes) for use in fibres is generally to sort, granulate, float sink, wash and dry. The fibres are made by adding colouring (as required), extrusion melting, filtering, and spinning into fibres. The output quality of the fibres depends upon the input quality of the PET flakes and the capability of the recycling process. The most demanding woven applications with very fine denier yarns can be successfully made from 100% recycled PET.

~~301.~~302. PET textiles and fibres can be recycled by thorough washing and re-melting. Recycled PET can be used for carpets, garments and non-woven applications.

~~302.~~303. [In common with recycled HDPE, recycled PET is also used in food contact materials. Noting paragraph 290, there should be national legislation in place to minimize migration of chemicals into food.]

(vi) Recycling of waste PC

~~303.~~304. Waste PC can be recycled by mechanical recycling. PC is difficult to separate from mixed WEEE and ELV waste plastic streams due to the difficulty in reaching a high enough purity of the individual PC sorted flakes. Most PC recycling happens where source segregated PC-rich waste streams exist, such as used CD and DVD discs. After repeated recycling and reprocessing PC is prone to degradation and its mechanical properties, especially notched impact strength, will be significantly reduced. Therefore, PC recycled material can be reinforced by adding a toughening agent.

(vii) Recycling of waste PVC

~~304.~~305. PVC can be recycled by mechanical recycling, which involves mechanically treating the waste (e.g., grinding) to reduce it into much smaller particles (i.e., powder or 'pulver'). The resulting granules can be melted and re-moulded into different products, usually the same product from which it came, such as window frame profiles.

~~305.~~306. Certain PVC wastes may contain high concentrations of lead compounds, phthalates, or other additives to an extent to render the waste hazardous or problematic. In such cases, the future use of the recycled PVC should be carefully assessed in order to ensure its adequacy with the permitted uses in case of restrictions due to the presence of such additives in products.

[71] See https://www.bpf.co.uk/suppliers/packaging/deposit-return-schemes.aspx.

(b) Specific aspects related to recycling of other types of plastic wastes

~~306.~~307. Specific aspects related to recycling of other types of plastic wastes (cured resins, fluorinated polymers, biodegradable plastic wastes, textile plastic wastes) are provided below.

(i) Recycling of waste cured resins

~~307.~~308. Cured resins are thermoset polymers which cannot be remelted or dissolved in a solvent. This makes such polymers difficult to recycle.

(ii) Recycling of waste fluorinated polymers

~~308.~~309. The recycling of waste fluorinated polymers is not well established inter alia as they may contain additives (e.g., glass fibres, glass beads, graphite, and soot) to an extent to render the waste hazardous or problematic (Schlipf et al., 2014). In addition, fluorinated polymers applied to metal articles (e.g., non-stick frying pans) may not be recycled as it is difficult to separate them from metal wastes during metal recycling.

~~309.~~310. ~~-~~In addition to the fluorinated polymers referred to in table 3, polytetrafluoroethylene (PTFE) is of practical relevance and the main material used. Currently, recycling of fluorinated polymers is mainly applied to certain PTFE wastes. Some of the fluorinated polymers are thermosets, such as PTFE, which cannot undergo thermal melt-extrusion or compounding, but can be recycled after size reduction. The recyclates obtained in this process can be used as additives e.g., in plastics other than PTFE. It is not possible to use such recyclates in their original applications. Some other fluorinated polymers, such as FEP and PFA, are thermoplastics and can undergo thermal melt-extrusion or compounding. It is noted that the fluoride content of fluorinated polymers may lead to corrosion during recycling.

(iii) Recycling of biodegradable plastic wastes

~~310.~~311. ~~[~~ ~~[~~Biodegradable plastic ~~[~~wastes~~]~~, including compostable wastes, are not suitable for mechanical recycling ~~[~~together~~]~~ with non-biodegradable plastic wastes~~]~~. To avoid contaminating or otherwise reducing the quality of plastic recyclate, biodegradable plastics ~~[~~should not be mixed~~]~~ with non-biodegradable plastics in the recycling stream.~~]~~ If collected in a separate stream, ~~a few~~ some types of biodegradable plastic wastes may be ~~treated~~ recycled e.g., with mechanical recycling ~~[and composting]~~. Research and development in this area is still ongoing. While ~~M~~mechanical recycling of some types of biodegradable plastic wastes is possible, ~~but~~ it may be difficult to convert them into useful products, especially due to thermomechanical degradation during extrusion. Therefore, after each cycle the product quality is lower compared with the starting material.~~]~~

~~311.~~312. ~~[~~As an example of biodegradable plastic wastes, PLA may be effectively sorted out during a mechanical recycling process using ~~available detection technologies. PLA can be sorted out using~~ spectroscopy.~~,~~ H~~h~~owever it is not possible to separate it using mechanical sorting techniques such as density separation. ~~There is~~ ~~however~~ ~~T~~therefore ~~a risk that mechanical sorting techniques are not able to sufficiently sort out~~ biodegradable plastics ~~from conventional polymers, which~~ can ~~then~~ contaminate the recycled fraction and degrade the quality of recyclate. ~~Also,~~ PLA is denser than water so in the flotation tank any PLA fragments ~~will~~ may eventually follow the PET stream towards mechanical recycling. This mixing of PLA with PET materials may cause problems in the reprocessing stage ~~to the reprocessing unit~~ since PLA and PET have different melting points (Luc et al., 2018).~~]~~

313. [~~-~~There is a need to recognize the environmental impacts related to the use of biodegradable plastics, its durability, affordability, and ESM of biodegradable plastic when its turns to waste especially there is a need to have a proper environmental conditions and capacity] ~~[Not every plastic that is biodegradable is compostable. Whereas biodegradable plastic may be engineered to biodegrade in soil or water, compostable plastic refers to biodegradation into soil conditioning material (i.e., compost) under a certain set of conditions. In order for a plastic to be labeled as commercially "compostable" it must be able to be broken down by biological treatment at a commercial or industrial composting facility. Composting utilizes microorganisms, heat and humidity to yield carbon dioxide, water, inorganic compounds, and biomass that is similar in characteristic to the rest of the finished compost product. Decomposition of the plastic must occur at a rate similar to the other elements of the material being composted (within 6 months) and leave no toxic residue that would adversely impact the ability of the finished compost to support plant growth. The American Society for Testing and Materials (ASTM International) has established ASTM Standards D6400 and D6868 which identify specifications that must be met to label a plastic as commercially "compostable". There are currently no ASTM standard test methods in place for evaluating the ability of a plastic to compost in a home~~

~~environment (EPA webpage: https://www.epa.gov/trash-free-waters/frequently-asked-questions-about-plastic-recycling-and-composting).]~~

~~312.~~

(iv) Recycling of textile plastic wastes

~~313.~~314. Textiles with fabrics that contain more than one fibre are inherently difficult to recycle mechanically because the fibres cannot be easily separated. (e.g., cotton and polyester blends).

~~314.~~315. Recycling of Nylon-6 (polyamides type) has been widely used in the carpet industry, through combining mechanical and chemical (depolymerization) processes (Hann et al., 2020). Nylon 6.6 (polyamides type) is commonly recycled mechanically from pre-consumer fibres (Le, 2018).

~~315.~~316. PP carpet fibres can be recycled, but the process is simplified when the complete carpet structure (i.e., pile fibres; adhesives; foam underlay) has been designed and constructed for ease-of-recycling by using fully compatible polymer types in the product composition. This approach works well for short-life carpets used, e.g., for large area exhibition halls and sports arenas.

[8. Specific aspects related to the disposal of compostable plastic wastes]

~~316.~~317. ~~[~~~~[Composting in industrial composting facilities currently can be applied for compostable plastic wastes e.g., PLA used for waste collection bags (Spierlinga, 2017) and starch-based plastics used for food-waste caddy sacks etc.]~~Composting of compostable plastic wastes together with organic waste can be applied in certain controlled industrial composting facilities e.g., PLA- and starch-based plastics used for waste collection bags (Spierlinga, 2017). However, not all industrial composting facilities can treat compostable plastic waste within the operating timeframe, as each facility operates with varying conditions of time, temperature, moisture, oxygen, and microbial activity. [It should however be noted that compostable plastic, including PLA, may contain hazardous substances and therefore not be suitable for composting (Zimmerman et al., 2020).]~~]~~

~~317.~~318. [When collecting ~~and accepting~~ compostable plastic for treatment in [a] [controlled] [an] [industrial] composting facility, clear guidance should be provided to residents and other waste generators about which type of plastics are to be collected together with the waste streams destined for composting in ~~professionally /~~ [controlled] industrial composting ~~ly managed~~ facilities. Otherwise, there is a risk of attracting other non-compostable plastics and creating subsequent technical problems in the composting activity.]

[318bis. Sorting should be undertaken to ensure that non-compostable plastic wastes are removed from the waste stream destined for composting to the industrial composting facility, in accordance with the relevant acceptance criteria [at the facility].]

~~318.~~319. [In cases where compostable plastic waste are disposed of in controlled industrial composting facilities that are not able to fully treat them, this may result ~~[In addition, compostable~~ in compostable plastics ~~may~~ not breaking down sufficiently in the composting facility~~, especially in colder climates~~. Residual plastic may therefore remain visible, hindering marketing efforts, depending on the acceptance of anticipated customers for the final product.]

[319bis. The time it takes for a material to go through a controlled industrial composting facility can vary significantly depending on the chosen composting process, ~~local~~ the [composting] [environmental] conditions and the properties of the biodegradable plastic wastes (such as the material thickness). This should be done in accordance with the relevant standard the compostable plastic waste was certified with (e.g., decomposition occurs at a rate similar to the other elements of the material being composted). The outputs of composting compostable plastics are CO2, water, biomass, and inorganic compounds.]

[319ter. As compostable plastics are designed to break down in specific conditions of an industrial compost facility, it should be noted that compostable plastic waste [would] [will] not completely break down in a landfill in accordance with its certification criteria, and may result in increased methane releases. Therefore, compostable plastics should be composted in a controlled industrial composting facility rather than landfilled, where such facilities exist.]

H. Health and safety

~~319.~~320. Both the supplier and/or operator of the facility ~~managing [plastic waste]~~ should ensure that the following information is available and safety measures are in place, when required:

(a) The identity, quality and form of the plastic waste, especially the content of chemicals of concern such as POPs;

(b) The safe handling instructions appropriate to the plastic wastes;

(c) The protective clothing that should be worn by employees, including eye and ear protection, gloves, protective footwear, filter masks and hard hats, depending on the processing to which the plastic waste is subjected;

(d) The safe storage of the compacted plastic wastes, including mechanical handling equipment, stack heights/stability and stack spacing;

(e) Fire prevention, firefighting, fire extinguishers, emissions from burning plastic wastes, advice to fire fighters, means of dealing with fire residues.

~~320.~~321. To improve knowledge regarding possible risk due to contamination, the origin of the waste and information on how the waste is generated will help improve recycling and reduce risk to employees. Waste operators should have access to sufficient information on relevant hazardous substances (additives etc.) used at the production step of the plastic.

~~321.~~322. Contaminated plastic wastes, such as packaging of pesticides or other hazardous chemicals, should be handled with specific care, in particular if it constitutes a hazardous waste dependant on the type and amount of contamination.

~~322.~~323. When plastic waste is contaminated with larger quantities of food residues problems with micro-organisms, odour and attraction of pests may occur. Measures should be taken to reduce odour and pests around the workplace.

~~323.~~324. Plastic containers used to supply hospitals with sterile water and other aqueous solutions may safely be recycled [for other applications,] provided they have been kept separated from medical/clinical wastes (e.g., RECOMED UK[72]). Plastic wastes may become contaminated with water, insect pests and dirt during transport and storage if not properly protected.

~~324.~~325. ~~With respect to health and safety in relation to plastic wastes from healthcare facilities, the Technical guidelines on environmentally sound management of biomedical and healthcare wastes (Y1, Y3) (UNEP, 2002) should also be considered.~~ [Kept for consistency of para numbers]

~~325.~~326. The following rules should apply in the workplace:

(a) Smoking should be forbidden in the plastic waste storage and disposal areas and such areas should be protected by secure fencing;

(b) Ready access to all parts of storage areas should be maintained by well-organised and supervised stacking patterns in order to ensure efficient working conditions, easy emergency escape routes for workers and ready access for emergency services vehicles;

(c) Suitable extinguishers should be readily available in storage areas and staff should attempt to extinguish fires in their very earliest stages.

~~326.~~327. Working conditions for employee health and safety should include, as applicable (Illinois Recycling Association, 2010):

(a) An environmentally comfortable and safe working environment. This includes:

(i) Space that is heated in the winter, cooled in the summer, and has good air exchange (ventilation);

(ii) Anti-fatigue mats to reduce the physical discomfort of standing in one place for long periods of time;

(iii) Sufficient lighting to reduce eye strain;

(iv) Gloves, safety glasses, hearing protection, steel-toed boots, and, if applicable, hardhats, facemasks and respirators;

[72] See https://recomed.co.uk/about-recomed.

(b) All stations and conveyors should be ergonomically designed. For instance, sorting conveyors should be of a comfortable reach across width, if sorting from one side of the conveyor.

1. Fire and safety

~~327.~~328. In the event of a fire (at any industrial operation):

(a) All staff should evacuate the premises immediately and assemble at recognised points and be counted;

(b) The emergency services should be summoned immediately and should be reminded:

(i) Of the speed at which fire can spread in burning plastics;

(ii) That burning plastics may form a mobile stream of burning material which can rapidly transfer the fire to other areas and can also block drains;

(iii) Of the need for self-contained breathing apparatus when entering a building in which any material is burning.

~~328.~~329. Good practice guidance for managing fire safety during the reception, treatment and storage of solid combustible wastes is provided by the Waste Industry Safety and Health (WISH) forum on reducing fire risks at waste management sites (WISH, 2020).

2. Smoke and toxic gases

~~329.~~330. The major cause of deaths in accidental fires is through the inhalation of carbon monoxide and smoke which should be prevented (Fardell, 1993). Fire brigades usually regard the smoke and fumes from any accidental fire as toxic and employ self-contained breathing apparatus when entering a burning building regardless of the materials present.

~~330.~~331. It should be taken into account that combusting PVC and fluoropolymers may emit acidic gases. The high chlorine content of PVC reduces its ignitability and also generates less heat compared with other types of plastics[73]. It should also be noted that combusting fluorinated polymers can produce hydrogen fluoride which is acutely toxic and ecotoxic.

~~331.~~332. Toxic gases emitted during thermal degradation are harmful on their own, but those harms can be multiplied when they are emitted in combination. For example, when carbon monoxide and hydrogen cyanide are emitted together from polyurethane insulation foam (a thermoset plastic) this can significantly increase the risk of cardiac arrest and cancer, hazards well-known to firefighters (Drager Safety AG & Co).

~~332.~~333. Soot from combusting materials, natural and man-made, contain small concentrations of more toxic materials and so should be handled with care using appropriate protective clothing.

I. Emergency response

~~333.~~334. Emergency response plans should be in place for plastic wastes in production, use, storage and transport or at disposal sites. The principal elements of an emergency response include:

(a) Identifying all potential hazards, risks and accidents;

(b) Identifying relevant local and national legislation governing emergency response plans;

(c) Planning for anticipated emergency situations and possible responses to them;

(d) Maintaining a complete up-to-date inventory of the plastic wastes on site;

(e) Training personnel in response activities, including simulated response exercises, and first aid;

(f) Maintaining mobile spill response capabilities or retaining the services of a specialized firm for spill response;

(g) Installing mitigation measures such as fire suppression systems, spill containment equipment, fire-fighting water containment, spill and fire alarms, and firewalls;

(h) Installing emergency communication systems, including signs indicating emergency exits, telephone numbers, alarm locations and response instructions;

[73] See https://envorinex.com/web_assets/docs/products/PVC%20and%20Fire.pdf

(i) Installing and maintaining emergency response kits containing sorbents, personal protective equipment, portable fire extinguishers and first aid supplies;

(j) Integrating facility plans with local, regional, national and global emergency plans, if appropriate;

(k) Regularly testing emergency response equipment and reviewing emergency response plans.

~~334.~~335. Emergency response plans should be prepared jointly by interdisciplinary teams that include emergency response, medical, chemical and technical personnel and labour and management representatives. When applicable, representatives of potentially impacted communities should also be included.

J. Awareness and participation

~~335.~~336. Public participation is a core principle of the 1999 Basel Declaration on Environmentally Sound Management and many other international agreements. It is essential that the public and all stakeholder groups have a chance to participate in the development of policy related to plastic wastes, the planning of programmes, the development of legislation, the review of documents and data and decision making on local issues related to plastic wastes. Paragraphs 6 (g) and (h) of the Basel Declaration reflect an agreement to enhance and strengthen efforts and cooperation to achieve ESM with regard to the enhancement of information exchange, education, and awareness-raising in all sectors of society, along with cooperation and partnership at all levels between countries, public authorities, international organizations, industry, non-governmental organizations and academic institutions.

~~336.~~337. Articles 6, 7, 8, and 9 of the UNECE 1998 Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention), along with the Escazú Convention, require the parties to conduct fairly specific types of activities regarding public participation in specific government activities, the development of plans, policies and programmes and the development of legislation and call for access to justice for the public with regard to the environment.

~~337.~~338. Public awareness and attitudes to plastic wastes can affect the population's willingness to cooperate and participate in adequate plastic waste management practices. General environmental awareness and information on health risks due to deficient plastic waste management are important factors which need to be continuously communicated to all sectors of the population.

~~338.~~339. Raising public awareness and promoting public participation is especially critical for separation and collection as important steps for environmentally sound management of plastic wastes.

~~339.~~340. Local authorities should organize awareness raising campaigns/events addressed to business (commercial, beach users, fishermen, etc.) and the public (tourists, households, etc.) to make people aware of the importance of ESM of waste plastics in tackling environmental problems such as marine litter and in improving people's lives. There exists a variety of communication techniques that can be used, such as door to door information, leaflets, community meetings, media etc. Communication objectives could (Climate and Clean Coalition, 2013):

(a) Address cultural practices and beliefs;

(b) Emphasize health benefits;

(c) Use simple messages and multiple media types;

(d) Build on existing neighbourhood networks;

(e) Emphasize the economic benefits of proper plastic waste management;

(f) Frame plastic waste management activities as a topic of great interest for voters, particularly on important issues (e.g., marine plastic litter);

(g) Increase visibility and credibility of plastic waste management activities (e.g., by issuing uniforms to workers);

(h) Identify instances where city activities support national goals;

(i) Communicate about the national benefits of proper local plastic waste management (e.g., to attract investments);

(j) Tailor communication to the intended audience;

(k) Emphasize the economic benefits to businesses (e.g., better conditions for attracting investment);

(l) Target groups with broad influence (e.g., tourism boards).

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Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
Sixteenth meeting
Geneva, 1–12 May 2023
Item 4 (b) (i) of the provisional agenda*
Matters related to the implementation of the Convention: scientific and technical matters: technical guidelines

Technical guidelines on the environmentally sound management of plastic wastes

Note by the Secretariat

1. As is mentioned in the note by the Secretariat on technical guidelines (UNEP/CHW.16/6), the annex to the document UNEP/CHW.16/INF/11 sets out the revised version of the updated technical guidelines on the environmentally sound management of plastic wastes, reflecting the outcomes of the thirteenth meeting the Open-ended Working Group.

2. As is mentioned in the note by the Secretariat on the outcomes of and follow up to the thirteenth meeting of the Open-ended Working Group (UNEP/CHW.16/20/Add.1), the small intersessional working group on plastic wastes has been requested to prepare a further revised version of the technical guidelines, taking into account the discussions during the thirteenth meeting of the Working Group, and to make them available to the Conference of the Parties for its consideration at its sixteenth meeting.

3. Pursuant to that mandate, the small intersessional working group on plastic wastes met online[1] on 21, 22, 23 and 28 March 2023. The annex to the present note sets out the further revised version of the technical guidelines that was prepared by the group, for the consideration of the Conference of the Parties. The small intersessional working group on plastic wastes used as a basis for its discussions the technical guidelines reflecting the outcomes at the Open-ended Working Group (document UNEP/CHW/16/INF/11). The changes made to the version of the technical guidelines of 16 December 2022 (document UNEP/CHW.16/6/Add.3) have been tracked so that the revisions can be easily identified.

4. The present note, including its annex, has not been formally edited.

* UNEP/CHW.16/1.

1 http://www.basel.int/Implementation/Plasticwaste/Technicalguidelines/Meetings/SIWGPlastic2023/tabid/9517/Default.aspx.

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Annex

Technical guidelines on the environmentally sound management of plastic wastes

(Draft updated version of 5 April 2023)

Contents

Abbreviations

ABS	acrylonitrile butadiene styrene
AHEG	ad hoc expert group
ASTM	American Society for Testing and Materials
BAT	best available techniques
BEP	best environmental practices
BFRs	brominated flame retardants
CEN	European Committee for Standardization
CiP	Chemicals in Products Programme
c-octaBDE	commercial octabromodiphenyl ether
c-pentaBDE	commercial pentabromodiphenyl ether
decaBDE	decabromodiphenyl ether
DRS	deposit-and-return system
ELV	end of life vehicles
EN	European norm
EPR	extended producer responsibility
EPS	expandable polystyrene
ESM	environmentally sound management
EU	European Union
FEP	perfluoroethylene /propylene
GHG	greenhouse gas
HBCD	hexabromocyclododecane
HDPE	high-density polyethylene
HFCs	hydrofluorocarbons
HIPS	high impact polystyrene
IATA	International Air Transport Association
ICCM	International Conference on Chemical Management
IMO	International Maritime Organization
INC	intergovernmental negotiating committee
ISO	International Organization for Standardization
LDPE	low-density polyethylene
MF	melamine formaldehyde
MFA	tetrafluoroethylene/perfluoromethyl vinyl ether
MSW	municipal solid waste
NA	neutralisation agent
NIR	near-infrared
ODS	ozone depleting substances
OECD	Organisation for Economic Co-operation and Development
PA	polyamide
PBS	polybutylene succinate
PBT	polybutylene terephthalate
PC	polycarbonate
PCB	polychlorinated biphenyls
PCL	polycaprolactone
PE	polyethylene
PET	polyethylene terephthalate
PF	phenol formaldehyde
PFA	perfluoroalkanes
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonic acid
PLA	polylactic acid
POP	persistent organic pollutants
POP-BDE	brominated diphenyl-ethers listed in the Stockholm Convention: tetra-BDE, penta-BDE, hexa-BDE, hepta-BDE, deca-BDE
PP	polypropylene
PS	polystyrene
PTFE	polytetrafluoroethylene
PUR	polyurethane
PVC	polyvinyl chloride
PVDF	polyvinylidene fluoride
PVOH	polyvinyl alcohol
PVF	polyvinyl fluoride

QA	quality assurance
QC	quality control
RDF	refuse derived fuel
SAICM	Strategic Approach to International Chemical Management
UNEA	United Nations Environmental Assembly
UNEP	United Nations Environment Programme
UNECE	United Nations Economic Commission for Europe
UF	urea-formaldehyde
UV	ultraviolet
VIS	visual spectrometry
WEEE	waste electrical and electronic equipment
XPS	extruded polystyrene
XRF	X-ray fluorescence
XRT	X-ray transmission

Units of measurement

kg	kilogram
mg/kg	milligram(s) per kilogram.
mg	milligram
ppm	parts per million
tonne	1000 kg

I. Introduction

A. Scope

1. The present technical guidelines provide guidance on the environmentally sound management (ESM) of plastic wastes, pursuant to decisions BC-14/13 and BC-15/10 and BC-16 [to be completed post COP16] of the Conference of the Parties to the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal. This document supersedes the technical guidelines for the identification and environmentally sound management of plastic wastes and for their disposal of December 2002.

2. Plastic wastes, in the context of these guidelines, covers plastic wastes classified by entries Y48 in Annex II, A3210 in Annex VIII and B3011 in Annex IX to the Basel Convention. Furthermore, the guidelines cover plastic wastes extracted and/or separated from other waste streams that have plastic components or consist partially or fully of plastic (e.g., wastes collected from households (Y46), waste electrical and electronic equipment (WEEE), waste vehicles, waste cables, waste lead-acid batteries and waste textiles for which there are separate related entries in Annexes VIII and IX).

3. It should be noted that several other technical guidelines also provide guidance on plastic wastes, as follows:

(a) For specific guidance on plastic wastes containing or contaminated with persistent organic pollutants (POPs), see the Basel Convention general technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with Persistent Organic Pollutants (UNEP, 2022a) and the Basel Convention specific technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with hexabromodiphenyl ether and heptabromodiphenyl ether, or tetrabromodiphenyl ether and pentabromodiphenyl ether or decabromodiphenyl ether (UNEP, 2019d), technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with hexachlorobutadiene (UNEP, 2015a), technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with short chain chlorinated paraffins (UNEP, 2019b), technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF) and perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds (UNEP, 2022b) and technical guidelines on the environmentally sound management of wastes containing or contaminated with unintentionally produced polychlorinated dibenzo-p-dioxins, polychlorinated dibenzofurans, hexachlorobenzene, polychlorinated biphenyls, pentachlorobenzene, polychlorinated naphthalenes or hexachlorobutadiene (UNEP, 2019e);

(b) For specific guidance on plastic wastes containing, or contaminated with mercury or mercury compounds, see the technical guidelines on the ESM of wastes consisting of, containing, or contaminated with mercury or mercury compounds (UNEP, 2022c);

(c) For specific guidance on the co-processing of plastic wastes in cement kilns, see the Basel Convention technical guidelines on the environmentally sound co-processing of hazardous wastes in cement kilns (UNEP, 2011);

(d) For specific guidance on the incineration of plastic wastes, see the technical guidelines on the environmentally sound incineration of hazardous wastes and other wastes as covered by disposal operations D10 and R1 (UNEP, 2022d);

(e) For specific guidance on the landfilling of plastic wastes, see the technical guidelines on the environmentally sound disposal of hazardous wastes and other wastes in specially engineered landfill (D5) (UNEP, 2022e).

(f) For specific guidance on plastic wastes from healthcare facilities, see the technical guidelines on environmentally sound management of biomedical and healthcare wastes (Y1, Y3) (UNEP, 2002).

B. About plastics and plastic wastes

4. Plastics started being made over 100 years ago from cellulose [(Bellis, 2021)]. They started to come into wider use in the 1950s and within a few years production had risen to a high rate. They are currently almost exclusively made from fossil fuels such as crude oil or gas. [In 2021, 90.2% of the world's plastics production was fossil-based. Post-consumer recycled plastics and bio-based/bio

attributed plastics respectively accounted for 8.3% and 1.5% of world plastic production (Plastics Europe, 2022)]. Global production of plastic increased from 1.5 million tonnes in 1950 (Plastics Europe, 2008) to [390 million tonnes in 2021 (Plastics Europe, 2022)] .

5. Plastics are lightweight with varying degrees of strength and durability. They can be both thermal and electrical insulators, can be moulded in various ways, and can offer a large range of characteristics and colours achieved through additives. Plastics are most commonly used for packaging, food containers, building and construction, textiles, vehicles, electrical and electronic equipment, [agricultural] film and piping, healthcare equipment, sporting equipment and energy generation infrastructure.

6. [ALT However, [hazardous additives from plastic wastes] [plastic wastes] can have adverse effects on human health and the environment. [Such effects are for example caused by the properties of polymers, and from hazardous substances in plastic, including the use of hazardous additives and processing aids, that may render the plastic waste hazardous, difficult to recycle or otherwise problematic.] [Such effects are for example caused by hazardous substances [that might exist] [contained] in plastic [wastes], including [some polymers and] certain additives and processing aids, that may render the waste hazardous or difficult to recycle [or otherwise problematic] [or other disposal operation]. [These additives have to be restricted from use in plastic to minimize any risk that can make their impact on plastic waste.] Attention to such effects has increased recently particularly, amongst other issues, due to the ubiquity of plastics and microplastics in marine, freshwater and terrestrial environments (UNEP, 2021a)[(Bank, 2022)]. This is a consequence of the leakage of plastic into the environment at every stage of its lifecycle, particularly if plastic wastes are not managed in an environmentally sound manner. The plastics lifecycle includes a full range of activities from extracting raw materials, production, distribution, use and disposal as waste. Environmental problems may be caused at any stage in the lifecycle of plastics, inter alia from point source emissions to air, water and soil from production processes, as well as from plastic wastes not managed in an environmentally sound manner. [Such impacts are for example caused by certain additives and processing aids that may render the waste hazardous or problematic.] The majority of plastics degrade very slowly in the environment.

7. The environmentally sound management of plastic wastes has been a constant challenge. [Of the 353 million tonnes of plastic waste generated globally in 2019, 9% was recycled, 19% was incinerated, almost 50% was disposed in landfills and 22% was disposed of in dumpsites, subjected to open burning or leaked into the environment (OECD, 2022)]

8. Landfilling of plastic wastes can have adverse effects on human health and the environment, in particular in non-engineered landfills or open dumpsites, such as the leaching of plastics additives, as well as leakage of microplastics and macroplastics into the wider environment. Gasification, pyrolysis and combustion, in particular open burning, of plastic wastes can also adversely affect human health and the environment due to emissions and releases of greenhouse gases and pollutants, such as unintentionally produced POPs and mercury.

9. The leakage of plastic and plastic wastes into the environment can occur from a variety of land-based and ocean-based sources in the form of macroplastics, microplastics and nano-size plastic particles. The sources include, but are not limited to, the uncontrolled dumping of waste, litter, wastewater, storm water run-off and sewers, microplastics intentionally added to products, loss of fishing gear and spillage of plastic pellets, as well as wear from the use of a variety of products containing plastics such as artificial turf, paints and synthetic textiles, unintentional releases from plastic materials in production processes and equipment[, potential microplastic releases from incinerator bottom ash,] and the fragmentation of oxo-degradable plastics [and failed dissolution of water-soluble plastics]. Leakages may notably be caused by insufficient and inefficient waste collection, transport and disposal systems, private consumer behaviour as well as business practices. Microplastic pollution is further compounded by the spreading on land of wastewater and sewage sludges that contain microplastic.

C. Types of plastics

1. What is plastic?

10. Plastic is a synthetic material or modified natural material, either a polymer or combination of polymers of high molecular mass modified or compounded with additives such as fillers, plasticizers, stabilizers, flame retardants and colourants. There are different definitions of plastic in current international or national documents. For example, according to the International Organization for Standardization (ISO) “plastic is a material which contains as an essential ingredient a high polymer

and which, at some stage in its processing into finished products, can be shaped by flow" (ISO, 2013). Other definitions are available, including from MARPOL[2].

11. Polymers are natural or synthetic substances composed of very large molecules, called macromolecules, that are multiples of simpler chemical units called monomers. There are a number of detailed definitions of the term "polymer", such as by the OECD[3].

2. Classification of polymers

12. Since polymer types are so diversified it is difficult to classify them in a comprehensive manner. One of the most common ways of classifying polymers is to separate them into thermoplastics and thermosets:

(a) Thermoplastics are polymers which soften when heated and solidify upon cooling, allowing them to be remoulded and recycled. Examples are polyethylene (PE), polypropylene (PP), and polystyrene (PS). Most common consumer plastics are thermoplastics;

(b) Thermosets are polymers that are set into a mould once, normally with a chemical reaction taking place, and cannot be re-softened or moulded again. Examples of thermosets include urea formaldehyde (UF) resins, phenol formaldehyde (PF) resins, and melamine formaldehyde (MF) resins. Thermosets are often used for high-heat applications such as electronic equipment, appliances, construction, and insulation.

13. Polymers can be produced either from materials produced from fossil fuels (fossil-based) or from biomass (bio-based). Both can be chemically identical and also have identical physical properties. Polymers can include additives to improve the base-polymer's physical properties~~.~~.

14. ~~[Plastics can be biodegradable or non-biodegradable.~~ Both fossil-based plastics and bio-based plastics can be biodegradable or non-biodegradable. Examples are shown in Figure 1.

~~14.~~15. Biodegradable plastics are broadly understood to refer to plastics that can be degraded under ~~certain~~ specific conditions, such as temperature, ~~[~~UV radiation,~~]~~ humidity, oxygen content and pH, by microorganisms in nature, such as bacteria, mould, and algae, and turn into carbon dioxide and other small molecules ~~[~~(SAPEA, 2020)~~]~~. ~~[[~~When a plastic is claimed~~]~~ ~~[For a claim]~~ to be biodegradable, ~~[the producers of biodegradable plastics] [should] [must] [it is important to] include [on their products]~~ information ~~[~~by the producer is needed~~]~~ about the timeframe, the stages and level of biodegradation, and the environmental conditions required for biodegradation~~. to be discussed with para 275] [The timeframe, the level of biodegradation, and the environment condition required for biodegradation need to be provided by the producer of the plastics, along with claim of biodegradability of plastics~~ (European Bioplastics, 2018). Some ~~[For this purpose, standard] [S][s]tandard[s] [specifications or protocols] are required [to prove the biodegradability of plastics] [for biodegradability of plastics].~~standards exist to determine biodegradability of plastics [4], however these standards are designed for specific conditions ~~[Some of the available standard protocols] [Standards] for assessment of biodegradation of plastics include ISO/17556 for aerobic biodegradability of plastic materials in soil, and ISO/15985 for anaerobic biodegradation under high-solids anaerobic-digestion conditions~~. Further ~~considerations~~ information on biodegradable plastics can be found in European Commission, 2022~~].]~~.

~~[There is a need to recognize the environmental impacts related to the use of biodegradable plastics, its durability, affordability, and ESM of biodegradable plastic when its turns to waste especially there is a need to have a proper environmental conditions and capacity. "Producing plastics from primary biomass can lead to direct or indirect land-use change, which in turn can result in biodiversity loss, ecosystem degradation, deforestation and water scarcity, as well as competition with crops intended for human consumption" (European Commission 2022).]~~

~~15.~~16. ~~[Both fossil-based plastic and bio-based plastic can be biodegradable or non-biodegradable under certain conditions. Examples of bio-based and fossil-based plastics as well as of biodegradable~~

[[2] See MARPOL Annex V. Available from: https://www.imo.org/en/OurWork/Environment/Pages/Garbage-Default.aspx]

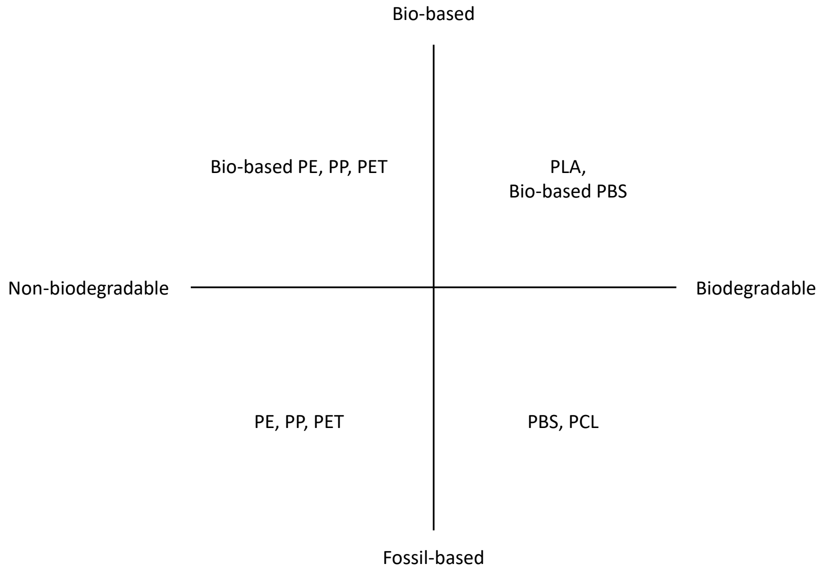
[3] https://www.oecd.org/env/ehs/oecddefinitionofpolymer.htm

[4] I ~~[ISO/17556 is a standard for [determining the] aerobic biodegradability of plastic materials in soil][ISO22403:2020 on the intrinsic biodegradability of plastics in the marine environment]~~[ISO 17556:2019 - Plastics- Determination of the ultimate aerobic biodegradability of plastic materials in soil by measuring the oxygen demand in a respirometer or the amount of carbon dioxide evolved]. [ISO22403:2020 – Plastics — Assessment of the intrinsic biodegradability of materials exposed to marine inocula under mesophilic aerobic laboratory conditions — Test methods and requirements]

~~and non-biodegradable plastics are shown in Figure 1. [An example of] The [distinction] [classification] of plastics based on material and biodegradability is shown in Figure 1, where examples of some types of plastics are indicated.]~~

~~16.~~17. Compostable plastics are a subset of biodegradable plastics designed to biodegrade under controlled conditions (European Commission, 2022). Compostable plastics are considered those plastics which have been tested and adhere to international standards for biodegradation in an industrial composting facility[5]. In addition, compostability may be certified by a third party. While compostable plastic waste does not contribute to the soil quality of the compost, it can be composted together with organic waste[6]. For compostable plastic waste to be fully composted together with organic waste, the composting must happen under specific conditions of temperature, moisture, oxygen level and microbial activity, normally found in controlled industrial composting facilities.

Figure 1: ~~[Examples of bio-based and fossil-based plastics as well as of biodegradable and non-biodegradable plastics] [Example of] [the distinction] [Classification] of plastics based on material and biodegradability under certain conditions.~~ Examples of bio-based plastics, fossil-based plastics, biodegradable plastics and non-biodegradable plastics



Source: Adapted from European Bioplastics (2018)

~~[ALT 17A Compostable plastics are a type of biodegradable plastic that are designed to biodegrade in soil conditioning material (i.e., compost) under a certain set of conditions. Composting utilizes microorganisms, heat and humidity to yield carbon dioxide, water, inorganic compounds, and biomass that is similar in characteristic to the rest of the finished compost product. For compostable plastics to be fully composted, disposal must happen under specific conditions of temperature, moisture, oxygen level and microbial activity, normally found in a controlled composting environment such as that found in industrial or commercial composting. Decomposition of the plastic must occur at a rate similar to the other elements of the material being composted (e.g., within 6 months) and leave no toxic residue that would adversely impact the ability of the finished compost to support plant growth. In order for a plastic to be labelled as commercially "compostable" it must have been tested and adhere to international standards for biodegradation in an industrial composting facility. Examples of such standards include the American Society for Testing and Materials ASTM D6400-21 and D6868 (ASTM, 2021) (in the U.S.) or European Standard EN 13432:2001 (European Standard, 2001) and EN 14995:2006 (European Standard, 2006) in Europe). In addition, compostability may be certified by a third party.]~~

~~[ALT 17B Compostable plastics are a subset of biodegradable plastics designed to biodegrade under controlled conditions (European Commission, 2022).] Compostable plastics are considered those plastics which have been tested and adhere to international standards [for biodegradation in an~~

[5] Examples of such standards include ISO 5413, ISO 17088, ISO 18606, American Society for Testing and Materials ASTM D6400-21 (ASTM, 2021) (in the U.S.), European Standard EN 13432:2000 (European Standard, 2000) and EN 14995:2006 (European Standard, 2006).

[6] It is noted that the term "bio-waste" is used as a synonym in some countries.

~~industrial composting facility[7].] [,such as] [Examples of such standards include] American Society for Testing and Materials ASTM D6400-21 (ASTM, 2021) (in the U.S.), [or] European Standard EN 13432:2000 (European Standard, 2000) and EN 14995:2006 (European Standard, 2006) in Europe), [for biodegradation in an industrial composting facility]. In addition, compostability may be certified by a third party. While compostable plastic waste does not contribute to the soil quality of the compost, it can be composted together with organic waste[8]][For compostable plastics [waste]to be fully composted, [together with organic waste] [disposal][the composting] must happen under specific conditions of temperature, moisture, oxygen level and microbial activity, normally found in controlled composting.~~

~~17.~~18. ~~[~~Oxo-degradable plastic are non-biodegradable plastics ~~that simulate biodegradable and compostable plastics~~. They are made by blending a pro-degradant additive into a~~the~~ non-biodegradable plastic ~~into a conventional non-biodegradable plastic~~ during the extrusion process, which accelerates the fragmentation of plastics ~~into plastic fragments~~ under ~~certain~~ specific conditions. However, unlike biodegradable and compostable plastics, once ~~the product~~ oxo-degradable plastics and ~~its~~ their fragments ~~is~~are buried in the soil, out of sunlight, the degradation process stops ~~[~~or~~]~~ ~~[~~slows significantly~~]~~ and ~~residual~~persistent small plastic particles remain intact, causing the release of microplastics. The resulting microplastics are made of oxidised ~~conventional~~ non-biodegradable polymers.~~]~~ ~~and are not biodegradable.~~

~~18.~~19. [Water-soluble plastics such as polyvinyl alcohol and its blends are used as protective films for laundry and dish[washing] [washer] detergents; sizing and finishing agents in the textile industry, and as thickening or coating agents for paints, glues, meat packaging, and pharmaceuticals in paper and food industries. While water-soluble plastics may dissolve in water under specific circumstances, these are not met in waste-water treatment plants, leading to significant water pollution with PVA microplastics, which concentrate environmental pollutants and amplify their uptake in the food chain. The discharge of PVA into water also triggers foaming and disrupts the oxygen exchange, harming aquatic life. Even when water-soluble plastics like PVA dissolve, their constituents (such as ethylene in the case of PVA) can remain intact in water, and harm aquatic fauna and flora.]

3. Common types of polymers

~~19.~~20. There are a wide range of polymers used in common plastics and they each have different properties which make them appropriate for different applications. Properties and typical applications of common polymer types, including those listed in entries Y48 and B3011 in Annex II and IX to the Basel Convention respectively, are shown in Table 1.

Table 1: Properties and typical applications of common polymer types including those listed in entries Y48 and B3011

Polymer Type	Labels (ASTM D7611)	Properties	Typical Applications
Polyethylene terephthalate (PET)	1 PETE	clear and resistant to heat, cold, and chemicals	plastic bottles (water, soft drinks etc.) food packaging film, strapping, carpets, vehicle tyre cords and fibres
High-density Polyethylene (HDPE)	2 HDPE	durable and resistant to shock and cold	packaging film, industrial film, bottles, tubs, cups, closures, toys, tanks, drums, cable insulation, pipes, gasoline tanks, shipping containers, seating and household goods

~~[[7] Examples of such standards include ISO 5413, ISO 17088, ISO 18606, American Society for Testing and Materials ASTM D6400-21 (ASTM, 2021) (in the U.S.), European Standard EN 13432:2000 (European Standard, 2000) and EN 14995:2006 (European Standard, 2006).]~~

~~[[8] It is noted that the term "bio-waste" is used as a synonym in some countries.]~~

Polymer Type	Labels (ASTM D7611)	Properties	Typical Applications
Polyvinyl chloride (PVC)	3 V	rigid or soft via plasticizers, resistant to water and solvents and flame retardant	piping, vinyl flooring, cabling insulation, window frames and roof sheeting
Low-density Polyethylene (LDPE)	4 LDPE	lightweight, flexible, and resistant to shock and cold	packaging film, cling-film, bags/sacks, lids, toys, coatings, flexible containers, tubing, irrigation pipes and vehicle dashboards
Polypropylene (PP)	5 PP	lightweight and resistant to heat, water and chemicals	yoghurt pots, snack wrappers, packaging films, bottles/caps, automotive battery cases, parts and body components, electrical components, carpet pile and backing, drainage goods
Polystyrene (PS)	6 PS	lightweight, structurally weak, and easily thermoformed or expanded	packaging applications, dairy product containers, cups, coat hangers and electrical appliances
Acrylonitrile butadiene styrene (ABS)	7 OTHER	durable, stiff, hard and resistant to shock	computers, televisions, kitchen appliances, toys, musical instruments, electrical products and automobile component parts
Polycarbonates (PC)	7 OTHER	clear, resistant to shock and heat and flame retardant	electronic applications, products in construction industry (e.g., for dome lights, flat or curved glazing, and sound walls), CDs, Blu-ray discs, automotive, aircraft and railway parts
Polyethers	7 OTHER	resistant to heat, chemicals,flame retardants, oils, grease and abrasion	electrical components, medical equipment, and automobile components

Source: ASTM (2022)

4. Other types of polymers

(a) Cured resins, condensation products and fluorinated polymers

~~20.~~21. Entries Y48 and B3011 listed in Annexes II and IX to the Basel Convention, respectively, make special mention of plastic wastes consisting of cured resins, condensation products or fluorinated polymers. Cured resins are plastics formed by cross-linking polymer chains and include (but are not limited to) UF resins, PF resins, MF resins, epoxy resins and alkyd resins. Condensation products are plastics formed by the removal of water or alcohol during polymerization and the final molecular weight of the polymer is controlled by the equilibrium concentration of water or alcohols in the molten polymer at the end of the polymerization. Examples of such polymers are polyamides and polyester. Fluorinated polymers (fluoropolymers) are fluorocarbon-based polymers with multiple carbon–fluorine bonds and can come in many different forms (powders, granules etc.). Properties and typical applications of cured resins and fluorinated polymers listed in entries Y48 and B3011 are shown in Table 2 and 3 respectively.

Table 2: Properties and typical applications of cured resins listed in entries Y48 and B3011

Polymer type	Properties	Typical Application
Urea formaldehyde (UF) resin	stiff, hard, and resistant to heat and solvent	glue resins in particle board, medium density fibreboard, plywood used in building material and furniture and kitchen worktops
Phenol formaldehyde (PF) resin	resistant to heat, oils and chemicals and flame retardant	
Melamine formaldehyde (MF) resins	high tensile strength and resistant to water and shock	
Epoxy resins	resistant to heat, chemically stable, high mechanical strength and anti-corrosive	coating and glue resin, glass fibre resins
Alkyd resins	compatible to materials and resistant to corrosion	coating

Source: Copps Industries (2020)

Table 3: Properties and typical applications of fluorinated polymers listed in entries Y48 and B3011

Polymer type	Properties	Typical Application
Perfluoroethylene/propylene (FEP)	resistant to corrosion, chemicals and wear	wiring, coaxial cable, wiring for computer wires and technical gear
Tetrafluoroethylene/perfluoro alkyl vinyl ether (PFA)		extruded wire insulation, tubing, protective film, sheet linings, pump housings and non-stick materials
Tetrafluoroethylene/perfluoro methyl vinyl ether (MFA)		non-stick coatings and anticorrosion coatings
Polyvinylfluoride (PVF)	flame retardant and resistant to weather	encapsulant in PV applications, vacuum bagging, coating and lamination
Polyvinylidenefluoride (PVDF)	high tensile strength and resistant to chemicals	piping products, sheet, tubing, films, plate and an insulator for premium wire

Source: Fang Liu et al. (2013), Rodney et al. (2014)

(b) Polymers that are biodegradable under certain conditions

~~21.~~22. Typical applications of polymers that are biodegradable under certain conditions are listed in Table 4.

Table 4: Typical applications of polymers that are biodegradable under certain conditions

Polymer Type	Typical Application
Polyglycolic acid (PGA)	controlled drug releases, implantable composites, bone fixation parts [subcutaneous sutures, and intracutaneous closures in surgeries]
Polylactic acid (PLA)	packaging and paper coatings, sustained release systems for pesticides and fertilizers, mulch films, and compost bags
Polybutylene succinate (PBS)	food packaging (e.g., cups and plates) and agricultural mulch films
Polycaprolactone (PCL)	mulch and other agricultural films, fibres containing herbicides to control aquatic weeds, seedling containers and slow-release systems for drugs
Polyhydroxybutyrate (PHB)	products like bottles, bags, wrapping film and nappies, as a material for tissue engineering scaffolds and for controlled drug release carriers
Polyhydroxyvalerate (PHBV)	films and paper coatings, biomedical applications, therapeutic delivery of worm medicine for cattle, and sustained release systems for pharmaceutical drugs and insecticides

Polymer Type	Typical Application
Polyvinyl alcohol (PVOH)	packaging applications which dissolve in water to release products such as laundry detergent, pesticides, and hospital washables
Polyvinyl acetate (PVAC)	adhesives, the packaging applications include boxboard manufacture, paper bags, paper lamination, tube winding and re-moistenable labels

Source: Shah et al. (2008)

5. Plastics in composites, plastic multilayers, and polymer blends

~~22.~~23. Composites may be made of plastics and non-plastics materials. The plastics may be bound to other materials to create multi-material packaging such as metal (e.g., metallized wrappers and sachets) or paper-based materials (e.g., in beverage cartons). Composite materials typically have properties superior to the individual materials themselves. Alternatively, the plastics and non-plastics materials may be integrated to produce a new material such as glass-fibre filled plastics which have superior physical mechanical properties or wood-plastics composites that look like wood but do not require the maintenance associated with wood. [Composites are used to improve durability and efficiency in a wide variety of applications in the aerospace, automotive, marine, energy, infrastructure, and defense industries. For example, wind turbine blades are typically constructed of fibreglass-reinforced plastics. High performance carbon-fiber reinforced thermoset and thermoplastic composite materials are used in the aerospace industry.] Such composite materials tend to be significantly more difficult to deconstruct and recycle.

~~23.~~24. Plastic multi-layered materials consist of bonded layers of different polymers that together provide superior properties to the individual polymer types used on their own. Multi-layer polymers provide certain characteristic specific functions in the use-phase (e.g., oxygen and ultraviolet (UV)-light barrier layers, sealing layers and surface finish layers). For example, food packaging films may contain 7 layers of material (e.g., metallized crisp packet). Multilayer structures are also more difficult to recycle.

~~24.~~25. Polymer blends, sometimes referred to as polymer alloys, combine different polymer types that each contribute desired properties in specific applications. Miscibility and compatibility increase between polymers of the same family (e.g., PE and PP belong to the polyolefin family and PS and ABS belong to the styrenics family). Furthermore, compatibility can be enhanced by the use of an additive to bring polymers together in a physical blend (compatibilizer additive technology). Tolerances will be highly dependent on the specific polymers being used.

6. Typical additives and processing aids

~~25.~~26. Most plastics are a blend of polymers and additives. Additives are substances that are added to plastics to bring about certain changes to the characteristics of the plastics as desired and are usually included in the polymer matrix by blending in the melt phase but are not necessarily chemically bonded. [This leads to the potential for them to be released into the environment during their production, use and waste phase.]

~~26.~~27. Processing aids refers to several different classes of materials and are used to improve the processability and handling of high-molecular-weight polymers. [Two main groups of processing aids are lubricants and fluoropolymer-based additives. Fluoropolymers are a unique group of processing aids that] can make plastics virtually chemically inert, non-wetting, non-stick, and highly resistant to temperature, fire, and weather.

~~27.~~28. Functions and concentration ranges of typical additives in plastic are listed in Table 5.

Table 5: Functions and concentration ranges of typical additives.

Additives	Functions	Concentration range (%w/w)
Plasticizers (e.g., adipates, azelates, citrates, benzoates, ortho-phthalates, terephthalates, sebacates and trimellitates)	To impart plasticity (softness and flexibility) to the material into which they are incorporated. Typical polymers without plasticizers are too rigid for certain applications.	10-70[9]
Flame retardants (e.g., brominated flame retardants and organophosphate flame retardants)	To prevent ignition of the plastic material and to reduce flammability risks in products.	3–25 (for brominated flame retardants)
Stabilizers, antioxidants and UV stabilizers (e.g., Hindered Amine Light Stabilizers	To prolong the lifetime of the polymer by suppressing degradation that results from UV-light, oxidation, and other	0.05–[10]

[9] 70% applies to a small range of applications.

Additives	Functions	Concentration range (%w/w)
(HALS), benzotrialozes, benzophenones and organic nickel compounds)	phenomena. Typical stabilizers absorb UV light or function as antioxidants.	
Biocides (e.g., compounds based on tin, mercury, arsenic, copper and antimony)	Protecting plastics in certain applications from attack and degradation by microorganisms	0.001-1
Fillers (e.g., mica, talc, kaolin, clay, calcium carbonate, limestone and barium sulphate)	To improve performance or reduce production costs.	up to 70
Colourants (e.g., pigments, soluble azocolourants and processing oils)	To produce plastics products in various colours.	0.25–5

Sources: Hansen et al, (2013), Hahladakis et al. (2018), Xanthopoulos,P (2014)

~~28.~~29. The addition of additives or processing aids has the potential to render plastic waste hazardous or [problematic] [difficult to recycle]. A study found that over 2,400 substances [used in the production of plastics] (as monomers, additives or processing aids) have been identified as substances of potential concern as they meet one or more of the persistence, bioaccumulation, and toxicity criteria in the European Union (EU) (Wiesinger et. al (2021). Table 6 [provides information on] [shows] POPs listed by the Stockholm Convention that have been or are used as plastic additives or processing aids and Table 7 provides information on some substances that have been or are used as plastic additives and have been identified as substances of very high concern (SVHC) [under EU REACH legislation[10]].

Table 6: [Information on] POPs listed in the Stockholm Convention that have been or are used as plastic additives or processing aids

Additives	Purpose	Plastics	Typical content
Hexabromobiphenyl (HBB) (UNEP, 2006a)	Flame retardant	ABS for construction machine housings, and electrical products, polyurethane foam for auto upholstery, coatings and lacquers	N/A
Hexabromocyclododecane (HBCD)	Flame retardant	Expandable polystyrene, XPS in insulation HIPS in electrical and electronic equipment	0.7–2.5% (EPS, XPS) 1–7% (HIPS) (UNEP, 2017a)
Decabromodiphenyl ether (decaBDE)	Flame retardant	HIPS, PA, PE, PP	5–16% (Buekens and Yang 2014)
Heptabromodiphenyl ether (heptaBDE)	Flame retardant		N/A
Hexabromodiphenyl ether (hexaBDE)	Flame retardant	as c-octaBDE in: ABS, HIPS, PBT, PA	12–18% (UNEP, 2017b)
Pentabromodiphenyl ether (pentaBDE)	Flame retardant		N/A
Tetrabromodiphenyl ether (tetraBDE)	Flame retardant	as c-pentaBDE in polyurethane (PUR), plastics in former printed circuit boards	0.5–5% (UNEP, 2017b)
Short chain chlorinated paraffins (SCCPs)	Plasticizer, flame retardant	PVC	
Perfluorooctanoic acid (PFOA), its salts and PFOA related compounds (UNEP, 2016a)	Processing aids, surfactants	Fluorinated polymers, such as polytetrafluoroethylene (PTFE), sidechain	N/A

[[10] See: https://echa.europa.eu/support/authorisation/substances-of-very-high-concern-identification]

Additives	Purpose	Plastics	Typical content
		fluorinated polymers such as fluoroacrylate;	
Perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (UNEP, 2006b)	Processing aids, plastic coatings	Fluorinated polymers	N/A

Source: Wagner et al. (2020)

Table 7: Information on some SVHCs listed on the ECHA website[11] that have been or are used as plastic additives.

Additives	Purpose	Plastics	Typical content
Bisphenol A (Food and Drug Administration, 2014)	Antioxidant	PS, PVC, PC	
Tris phosphite (TNPP)	Antioxidant	PS, PVC	
Diethylhexylphthalate (DEHP)	Plasticizer	PVC	30% (European Chemicals Agency 2007)
Benzylbutylphthalate (BBP)	Plasticizer	PVC	5–30% (European Chemicals Agency 2007)
Dibutyl phthalate (DBP)	Plasticizer	PVC	1,5% (Danish Environmental Protection Agency, 2009)
Diisobutyl phthalate (DIBP)	Plasticizer	PVC	Comparable to DBP (Gächter and Müller 1990)
The following lead compounds • Trilead bis(carbonate) dihydroxide (Basic lead carbonate) • Tetralead trioxide sulphate (Tribasic lead sulphate) • Pentalead tetraoxide sulphate (Tetrabasic lead sulphate) • Phthalato(2-)] dioxotrilead (Dibasic lead phthalate) • Lead oxide sulfate (Basic lead sulphate) • Dioxobis(stearato)trilead • Trilead dioxide phosphonate (Dibasic lead phosphite) • Sulfurous acid, lead salt, dibasic Fatty acids, C16-18, lead salts	Stabilizer	PVC	0.6-2.5%[12]
Short chain chlorinated paraffins (SCCPs)	Plasticizer, flame retardant	PVC	
Medium chain chlorinated paraffins (MCCPs) (UNEP, 2022f)	Plasticizer, flame retardant	PVC	
UV 328 2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol	UV stabilizer	ABS resin, epoxy resin, fibre resin, PVC, unsaturated polyesters, polyacrylates and polycarbonates, polyolefins, polyurethanes, PVC, polyacrylate, epoxy and elastomers	1[- 10]% (UNEP, 2021b, UNEP, 2022g)

[11] https://echa.europa.eu/candidate-list-table.

[12] Lead stabilizers are used as a proprietary blend of different stabilizers. The concentration range shown above reflects the total concentration contained in the blend.

Additives	Purpose	Plastics	Typical content
UV 327 2,4-di-tert-butyl-6-(5-chlorobenzotriazol-2-yl) phenol	UV stabilizer	Outdoor applications	Max 0.5% (De Kort, 2017)
UV 350 2-(2H-benzotriazol-2-yl)-4-(tert-butyl)-6-(sec-butyl) phenol	UV stabilizer	Outdoor applications	Max 0.5% (De Kort, 2017)
UV 320 2-benzotriazol-2-yl-4,6-di-tert-butylphenol	UV stabilizer	Outdoor applications	Max 0.5% (De Kort, 2017)

Source : Wagner et al. (2020)

II. Relevant provisions of the Basel Convention and international linkages

A. Basel Convention

1. General provisions

~~29.~~30. The Basel Convention, which entered into force on 5 May 1992, aims to protect human health and the environment against the adverse effects resulting from the generation, management, transboundary movements, and disposal of hazardous and other wastes. It does this via a set of provisions on the transboundary movement of wastes and their ESM. In particular, the Basel Convention stipulates that any transboundary movement (export, import or transit) of wastes is permissible only when the movement itself and the planned disposal of the hazardous or other wastes are environmentally sound. A set of provisions of the Basel Convention lays out Parties obligations to ensure the ESM of wastes. These are listed in paragraphs 31 to 34 below.

~~30.~~31. Article 2 ("Definitions"), paragraph 1, of the Convention defines wastes as "substances or objects which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law". Paragraph 4 of that article defines disposal as "any operation specified in Annex IV" to the Convention. Annex IV contains two categories of operations: those leading to the possibility of resource recovery, recycling, reclamation, direct reuse or alternative uses (R operations) and those not leading to this possibility (D operations). Paragraph 8 defines the ESM of hazardous wastes or other wastes as "taking all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner which will protect human health and the environment against the adverse effects which may result from such wastes."

~~31.~~32. Article 4 ("General obligations"), paragraph 1, establishes the procedure by which Parties exercising their right to prohibit the import of hazardous wastes or other wastes for disposal shall inform the other Parties of their decision. Paragraph 1 (a) states: "Parties exercising their right to prohibit the import of hazardous or other wastes for disposal shall inform the other Parties of their decision pursuant to Article 13." Paragraph 1 (b) states: "Parties shall prohibit or shall not permit the export of hazardous or other wastes to the Parties which have prohibited the import of such wastes when notified pursuant to subparagraph (a) above."

~~32.~~33. Article 4, paragraphs 2 (a)-(e) and 2 (g), and paragraph 8, contain key provisions of the Basel Convention pertaining to environmentally sound management, transboundary movement, waste minimization and waste disposal practices aimed at mitigating adverse effects on human health and the environment:

Paragraphs 2 (a) – (e) and 2 (g): "Each Party shall take the appropriate measures to:

(a) Ensure that the generation of hazardous wastes and other wastes within it is reduced to a minimum, taking into account social, technological and economic aspects;

(b) Ensure the availability of adequate disposal facilities, for the environmentally sound management of hazardous wastes and other wastes, that shall be located, to the extent possible, within it, whatever the place of their disposal;

(c) Ensure that persons involved in the management of hazardous wastes or other wastes within it take such steps as are necessary to prevent pollution due to hazardous wastes and other wastes arising from such management and, if such pollution occurs, to minimize the consequences thereof for human health and the environment;

(d) Ensure that the transboundary movement of hazardous wastes and other wastes is reduced to the minimum consistent with the environmentally sound and efficient management of such wastes, and is conducted in a manner which will protect human health and the environment against the adverse effects which may result from such movement;

(e) Not allow the export of hazardous wastes or other wastes to a State or group of States belonging to an economic and/or political integration organization that are Parties, particularly developing countries, which have prohibited by their legislation all imports, or if it has reason to believe that the wastes in question will not be managed in an environmentally sound manner, according to criteria to be decided on by the Parties at their first meeting;

(g) Prevent the import of hazardous wastes and other wastes if it has reason to believe that the wastes in question will not be managed in an environmentally sound manner.

Paragraph 8: "Each Party shall require that hazardous wastes or other wastes, to be exported, are managed in an environmentally sound manner in the State of import or elsewhere."

~~33.~~34. The Ban Amendment entered into force 5 December 2019, and it provides that Parties listed in Annex VII to the Convention (members of the European Union (EU), Organisation for Economic Cooperation and Development (OECD) and Liechtenstein) shall prohibit transboundary movements of hazardous wastes to States not listed in Annex VII of hazardous wastes which are destined for operations according to Annex IV-A and hazardous wastes under Article 1.1(a) which are destined to operations according to Annex IV-B[13].

2. Provisions relating to plastic wastes

~~34.~~35. According to article 1 ("Scope of the Convention"), the Basel Convention covers two types of waste subject to transboundary movement: "hazardous wastes" and "other wastes".

~~35.~~36. Paragraph 1 (a) of Article 1 sets out a two-step process for determining whether a "waste" is a "hazardous waste" covered by the Convention: first, the waste must belong to one of the categories listed in Annex I to the Convention ("Categories of wastes to be controlled"), and second, it must possess at least one of the characteristics listed in Annex III to the Convention ("List of hazardous characteristics").

~~36.~~37. Annex I wastes are presumed to exhibit one or more Annex III hazardous characteristics, which may include H4.1"flammable solids"; H6.1 "Poisonous (Acute)"; H6.2 "Infectious substances"; H11 "Toxic (delayed or chronic)"; H12 "Ecotoxic"; or H13 (capable after disposal of yielding a material which possess a hazardous characteristic), unless, through "national tests," they can be shown not to exhibit such characteristics. National tests may be useful for identifying a particular hazardous characteristic in Annex III of the Convention until such time as the hazardous characteristic is fully defined. Guidance documents for Annex III hazardous characteristics H4.1, H11, H12 and H13 were adopted on an interim basis by the Conference of the Parties to the Basel Convention at its sixth and seventh meetings.

~~37.~~38. [At its fourth meeting in February 1998, the Conference of the Parties added the two lists of wastes as two new annexes to the Convention, namely Annex VIII (list A) and Annex IX (list B). These were intended to provide greater certainty and clarity to the entries. List A and List B are kept under review by the Conference of the Parties; in addition, a process was established under Decision BC VIII/15 of the Conference of the Parties to the Basel Convention to facilitate the identification and agreement on new entries. However, please note that Annex I and Annex III remain the factors to characterize wastes as hazardous for the purpose of this Convention, and that List A and List B are not intended to be exhaustive.]

~~38.~~39. List A of Annex VIII describes wastes that are "characterized as hazardous under Article 1, paragraph 1 (a) of this Convention" although "their designation on this Annex does not preclude the use of Annex III [hazard characteristics] to demonstrate that a waste is not hazardous" (Annex I, paragraph (b)). List B of Annex IX lists wastes that "will not be wastes covered by Article 1, paragraph 1 (a), of this Convention unless they contain Annex I material to an extent causing them to exhibit an Annex III characteristic".

~~39.~~40. As stated in Article 1, paragraph 2, "Wastes that belong to any category contained in Annex II that are subject to transboundary movement shall be "other wastes" for the purposes of this Convention".

[13] For information on the status of individual Parties in relation to the amendment/s, please see the Status of Ratifications page on the Basel Convention website.

~~40.~~41. The Basel Convention contains three main entries on plastic wastes in Annexes II, VIII and IX of the Convention[14] as follows:

(a) Annex II (categories of wastes requiring special consideration, i.e., they are subject to the control procedure): entry Y48 covering all plastic waste, including mixtures of plastic waste, except for the plastic waste covered by entries A3210 (in Annex VIII) and B3011 (in Annex IX);

<table>
<tr>
<td>Y48[15,16]</td>
<td>Plastic waste, including mixtures of such waste, with the exception of the following:
• Plastic waste that is hazardous waste pursuant to paragraph 1 (a) of Article 1[17]
• Plastic waste listed below, provided it is destined for recycling[18] in an environmentally sound manner and almost free from contamination and other types of wastes:[19]
- Plastic waste almost exclusively[20] consisting of one non-halogenated polymer, including but not limited to the following polymers:
o Polyethylene (PE)
o Polypropylene (PP)
o Polystyrene (PS)
o Acrylonitrile butadiene styrene (ABS)
o Polyethylene terephthalate (PET)
o Polycarbonates (PC)
o Polyethers
- Plastic waste almost exclusively consisting of one cured resin or condensation product, including but not limited to the following resins:
o Urea formaldehyde resins
o Phenol formaldehyde resins
o Melamine formaldehyde resins
o Epoxy resins
o Alkyd resins
- Plastic waste almost exclusively consisting of one of the following fluorinated polymers[21]:
o Perfluoroethylene/propylene (FEP)
o Perfluoroalkoxy alkanes:
▪ Tetrafluoroethylene/perfluoroalkyl vinyl ether (PFA)
▪ Tetrafluoroethylene/perfluoromethyl vinyl ether (MFA)
o Polyvinylfluoride (PVF)
o Polyvinylidenefluoride (PVDF)
• Mixtures of plastic waste, consisting of polyethylene (PE), polypropylene (PP) and/or polyethylene terephthalate (PET), provided they are destined for separate recycling[22] of each material and in an environmentally sound manner and almost free from contamination and other types of wastes[14].</td>
</tr>
</table>

(b) Annex VIII (wastes presumed to be hazardous, subject to the control procedure): entry A3210 covering hazardous plastic waste;

[14] See decision BC-14/12.

[15] This entry becomes effective as of 1 January 2021.

[16] Parties can impose stricter requirements in relation to this entry.

[17] Note the related entry on list A A3210 in Annex VIII.

[18] Recycling/reclamation of organic substances that are not used as solvents (R3 in Annex IV, sect. B) or, if needed, temporary storage limited to one instance, provided that it is followed by operation R3 and evidenced by contractual or relevant official documentation.

[19] In relation to “almost free from contamination and other types of wastes”, international and national specifications may offer a point of reference.

[20] In relation to “almost exclusively”, international and national specifications may offer a point of reference.

[21] Post-consumer wastes are excluded.

[22] Recycling/reclamation of organic substances that are not used as solvents (R3 in Annex IV, sect. B), with prior sorting and, if needed, temporary storage limited to one instance, provided that it is followed by operation R3 and evidenced by contractual or relevant official documentation.

A3210[23]	Plastic waste, including mixtures of such waste, containing or contaminated with Annex I constituents, to an extent that it exhibits an Annex III characteristic (note the related entries Y48 in Annex II and on list B B3011).

(c) Annex IX (wastes presumed to be non-hazardous, not subject to the control procedure): entry B3011, which replaced the entry B3010 from 1 January 2021.

B3011[24]	Plastic waste (note the related entries Y48 in Annex II and on list A A3210): • Plastic waste listed below, provided it is destined for recycling[25] in an environmentally sound manner and almost free from contamination and other types of wastes[26]: - Plastic waste almost exclusively[27][20] consisting of one non-halogenated polymer, including but not limited to the following polymers: o Polyethylene (PE) o Polypropylene (PP) o Polystyrene (PS) o Acrylonitrile butadiene styrene (ABS) o Polyethylene terephthalate (PET) o Polycarbonates (PC) o Polyethers - Plastic waste almost exclusively[14] consisting of one cured resin or condensation product, including but not limited to the following resins: o Urea formaldehyde resins o Phenol formaldehyde resins o Melamine formaldehyde resins o Epoxy resins o Alkyd resins - Plastic waste almost exclusively[28] consisting of one of the following fluorinated polymers[29]: o Perfluoroethylene/propylene (FEP) o Perfluoroalkoxy alkanes: ▪ Tetrafluoroethylene/perfluoroalkyl vinyl ether (PFA) ▪ Tetrafluoroethylene/perfluoromethyl vinyl ether (MFA) o Polyvinylfluoride (PVF) o Polyvinylidenefluoride (PVDF) • Mixtures of plastic waste, consisting of polyethylene (PE), polypropylene (PP) and/or polyethylene terephthalate (PET), provided they are destined for separate recycling[30] of each material and in an environmentally sound manner, and almost free from contamination and other types of wastes21.

~~41.~~42. The entries Y48, A3210 and B3011 became effective on 1 January 2021, except for one Party for which these entries became effective on 10 February 2022[31].

~~42.~~43. In addition to the plastic waste entries referred to in paragraph 41~~2~~, Table 8 contains an indicative list of other entries relevant to plastic waste listed in Annexes I, II, VIII, and IX to the Convention.

[23] This entry becomes effective as of 1 January 2021.

[24] This entry becomes effective as of 1 January 2021. Entry B3010 is effective until 31 December 2020

[25] Recycling/reclamation of organic substances that are not used as solvents (R3 in Annex IV, sect. B) or, if needed, temporary storage limited to one instance, provided that it is followed by operation R3 and evidenced by contractual or relevant official documentation.

[26] In relation to “almost free from contamination and other types of wastes”, international and national specifications may offer a point of reference.

[27] In relation to “almost exclusively”, international and national specifications may offer a point of reference.

[28] In relation to “almost exclusively”, international and national specifications may offer a point of reference.

[29] Post-consumer wastes are excluded

[30] Recycling/reclamation of organic substances that are not used as solvents (R3 in Annex IV, sect. B), with prior sorting and, if needed, temporary storage limited to one instance, provided that it is followed by operation R3 and evidenced by contractual or relevant official documentation.

[31] http://www.basel.int/Countries/StatusofRatifications/PlasticWasteamendments/tabid/8377/Default.aspx.

Table 8: Indicative list of other entries [with direct reference to plastics wastes and other entries that are] relevant to plastic wastes listed in Annexes I, II, VIII and IX of the Convention[32]

Entries with direct reference to plastic wastes	
Y13	Wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives
A1181[33]	**Electrical and electronic waste (note the related entry Y49 in Annex II)[34]** • Waste electrical and electronic equipment (a) containing or contaminated with cadmium, lead, mercury, organohalogen compounds or other Annex I constituents to an extent that the waste exhibits an Annex III characteristic, or (b) with a component containing or contaminated with Annex I constituents to an extent that the component exhibits an Annex III characteristic, including but not limited to any of the following components: – glass from cathode-ray tubes included on list A – a battery included on list A – a switch, lamp, fluorescent tube or a display device backlight which contains mercury – a capacitor containing PCBs – a component containing asbestos – certain circuit boards – certain display devices – certain plastic components containing a brominated flame retardant • Waste components of electrical and electronic equipment containing or contaminated with Annex I constituents to an extent that the waste components exhibit an Annex III characteristic, unless covered by another entry on list A Wastes arising from the processing of waste electrical and electronic equipment or waste components of electrical and electronic equipment, and containing or contaminated with Annex I constituents to an extent that the waste exhibits an Annex III characteristic (e.g. fractions arising from shredding or dismantling), unless covered by another entry on list A
A1190	Waste metal cables coated or insulated with plastics containing or contaminated with coal tar, polychlorinated biphenyls (PCB)[35], lead, cadmium, other organohalogen compounds or other Annex I constituents to an extent that they exhibit Annex III characteristics
A3050	Wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives excluding such wastes specified on list B (note the related entry on list B B4020
B1115	Waste metal cables coated or insulated with plastics, not included in list A A1190, excluding those destined for Annex IVA operations or any other disposal operations involving, at any stage, uncontrolled thermal processes, such as open burning.
B3026	The following waste from the pre-treatment of composite packaging for liquids, not containing Annex I materials in concentrations sufficient to exhibit Annex III characteristics:

[32] Refer to Annexes I, II, VIII and IX to the Basel Convention to see the full entries.

[[33] This entry becomes effective as of 1 January 2025.]

[34] PCBs or PBBs are at a concentration level of 50 mg/kg or more in equipment, in a component, or in wastes arising from the processing of waste electrical and electronic equipment or waste components of electrical and electronic equipment.]

[35] PCBs are at a concentration level of 50mg/kg or more.

	• Non-separable plastic fraction • Non-separable plastic-aluminium fraction
B4020	Wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives, not listed on list A, free of solvents and other contaminants to an extent that they do not exhibit Annex III characteristics, e.g., water-based, or glues based on casein starch, dextrin, cellulose ethers, polyvinyl alcohols (note the related entry on list A A3050)
Other entries relevant to plastic waste	
Y1	Clinical wastes from medical care in hospitals, medical centres and clinics
Y3	Waste pharmaceuticals, drugs and medicines
Y4	Wastes from the production, formulation and use of biocides and phytopharmaceuticals
Y10	Waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs and/or polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBs)
Y12	Wastes from production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish
Y18	Residues arising from industrial waste disposal operations
Y24	Arsenic; arsenic compounds
Y26	Cadmium; cadmium compounds
Y27	Antimony, antimony compounds
Y29	Mercury; mercury compounds
Y31	Lead; lead compounds
Y41	Halogenated organic solvents
Y42	Organic solvents excluding halogenated solvents
Y45	Organohalogen compounds other than substances referred to in this Annex (e.g., Y39, Y41, Y42, Y43, Y44)
Y46	Wastes collected from households
Y49[36,37]	**Electrical and electronic waste** • Waste electrical and electronic equipment (a) not containing and not contaminated with Annex I constituents to an extent that the waste exhibits an Annex III characteristic, and (b) in which none of the components (e.g., certain circuit boards, certain display devices) contain or are contaminated with Annex I constituents to an extent that the component exhibits an Annex III characteristic • Waste components of electrical and electronic equipment (e.g., certain circuit boards, certain display devices) not containing and not contaminated with Annex I constituents to an extent that the waste components exhibit an Annex III characteristic, unless covered by another entry in Annex II or by an entry in Annex IX Wastes arising from the processing of waste electrical and electronic equipment or waste components of electrical and electronic equipment (e.g. fractions arising from shredding or dismantling), and not containing and not contaminated with Annex I constituents to an extent that the waste exhibits an Annex III characteristic, unless covered by another entry in Annex II or by an entry in Annex IX

[36] This entry becomes effective as of 1 January 2025.
[37] Note the related entry on list A A1181 in Annex VIII.

A1160	Waste lead-acid batteries, whole or crushed
A1170	Unsorted waste batteries excluding mixtures of only list B batteries. Waste batteries not specified on list B containing Annex I constituents to an extent to render them hazardous
A1180[38]	Waste electrical and electronic assemblies or scrap[39] containing components such as accumulators and other batteries included on list A, mercury-switches, glass from cathode-ray tubes and other activated glass and PCB-capacitors, or contaminated with Annex I constituents (e.g., cadmium, mercury, lead, polychlorinated biphenyl) to an extent that they possess any of the characteristics contained in Annex III (note the related entry on list B B1110)[40].
A3120	Fluff - light fraction from shredding
A3140	Waste non-halogenated organic solvents but excluding such wastes specified on list B
A3150	Waste halogenated organic solvents
A3180	Wastes, substances and articles containing, consisting of or contaminated with polychlorinated biphenyl (PCB) polychlorinated terphenyl (PCT), polychlorinated naphthalene (PCN) or polybrominated biphenyl (PBB), or any other polybrominated analogues of these compounds, at a concentration level of 50 mg/kg or more[41]
A4020	Clinical and related wastes; that is wastes arising from medical, nursing, dental, veterinary, or similar practices, and wastes generated in hospitals or other facilities during the investigation or treatment of patients, or research projects
A4070	Wastes from the production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish excluding any such waste specified on list B (note the related entry on list B B4010)
A4110	Wastes that contain, consist of or are contaminated with any of the following: • Any congenor of polychlorinated dibenzo-furan • Any congenor of polychlorinated dibenzo-p-dioxin
A4130	Waste packages and containers containing Annex I substances in concentrations sufficient to exhibit Annex III hazard characteristics
B1090	Waste batteries conforming to a specification, excluding those made with lead, cadmium or mercury
B1110[42]	Electrical and electronic assemblies: • Electronic assemblies consisting only of metals or alloys • Waste electrical and electronic assemblies or scrap[43] (including printed circuit boards) not containing components such as accumulators and other batteries included on list A, mercury switches, glass from cathode-ray tubes and other activated glass and PCB-capacitors, or not contaminated with Annex I constituents (e.g., cadmium, mercury, lead, polychlorinated biphenyl) or from which these have been removed, to an extent that they do

[38] Entry A1180 is effective until 31 December 2024.

[36] This entry does not include scrap assemblies from electric power generation.

[37] PCBs are at concentration level of 50 mg/kg or more.

[41] The 50 mg/kg level is considered to be an internationally practical level for all wastes. However, many individual countries have established lower regulatory levels (e.g., 20 mg/kg) for specific wastes.

[42] Entry B1110 is effective until 31 December 2024.

[43] This entry does not include scrap from electrical power generation.

	not possess any of the characteristics contained in Annex III (note the related entry on list A A1180) • Electrical and electronic assemblies (including printed circuit boards, electronic components and wires) destined for direct reuse[44], and not for recycling or final disposal[45]
B1250	Waste end-of-life motor vehicles, containing neither liquids nor other hazardous components
B3030	Textile wastes[46]
B3035	Waste textile floor coverings, carpets
B4010	Wastes consisting mainly of water-based/latex paints, inks and hardened varnishes not containing organic solvents, heavy metals or biocides to an extent to render them hazardous (note the related entry on list A A4070)
B4030[47]	Used single-use cameras, with batteries not included on list A

B. International linkages

1. Stockholm Convention

~~43.~~44. The Stockholm Convention on Persistent Organic Pollutants (POPs) is a global treaty aimed at protecting human health and the environment from POPs.

~~44.~~45. The objective of the Stockholm Convention, which entered into force on 17 May 2004, is set forth in Article 1 (“Objective”): “Mindful of the precautionary approach as set forth in Principle 15 of the Rio Declaration on Environment and Development, the objective of this Convention is to protect human health and the environment from persistent organic pollutants.”

~~45.~~46. The POPs listed in Annexes A, B, or C of the Stockholm Convention that are relevant in relation to plastic waste, inter alia as additives or processing aids, are:

(a) Hexabromobiphenyl (HBB);

(b) Hexabromocyclododecane (HBCD);

(c) The following polybromodiphenyl ethers: decabromodiphenyl ether (decaBDE), heptabromodiphenyl ether (heptaBDE), hexabromodiphenyl ether (hexaBDE), pentabromodiphenyl ether (pentaBDE) and tetrabromodiphenyl ether (tetraBDE);

(d) Short-chain chlorinated paraffins (SCCPs);

(e) Perfluorooctanoic acid (PFOA), its salts and PFOA related compounds;

(f) Perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride;

(g) Unintentionally produced POPs.

~~46.~~47. For further information on the general provisions and the waste-related provisions of the Stockholm Convention, refer to section II.B of the General technical guidelines on POPs.

~~47.~~48. For further information on the specific provisions related to these POPs, it is referred to the specific technical guidelines on POP-BDEs (UNEP, 2019d), HBCD (UNEP, 2015a), SCCPs (UNEP, 2019c), PFOS and PFOA (UNEP, 2022a) and unintentionally produced POPs (UNEP, 2019e).

2. Minamata Convention

~~48.~~49. The Minamata Convention on Mercury, which entered into force on 16 August 2017, is a global treaty with the objective according to Article 1, “to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. For further information on the general provisions and the waste-related provisions of the Minamata Convention,

[44] Reuse can include repair, refurbishment or upgrading, but not major reassembly

[45] In some countries these materials destined for direct re-use are not considered wastes.

[46] Refer to Annex IX to the Basel Convention to see the full entry

[47] Entry B4030 is effective until 31 December 2024.

refer to section II.B of the technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds (UNEP, 2022c).

~~49.~~50. Some plastics contain mercury, including residual mercury from the manufacturing process of PVC, and pigments containing mercury sulphide. Mercury and methylmercury also adsorb onto marine plastics.

3. Montreal Protocol

~~50.~~51. The Montreal Protocol on Substances that Deplete the Ozone Layer is a global treaty aimed at protecting the Earth's ozone layer by phasing out the chemicals that deplete it. The agreement entered into force in 1989. Under the Montreal Protocol), Parties are obligated to phase out the production and consumption of ozone-depleting substances (ODS) according to specified controls schedules, as well as to phase down the production and consumption of hydrofluorocarbons (HFCs). HFCs do not deplete the ozone layer but are greenhouse gases that were introduced to replace some uses of ODS.

~~51.~~52. Several of the substances controlled by the Montreal Protocol are used or have been used as blowing agents in the manufacture of rigid plastic foams. In foams used mainly for insulation purposes, in particular rigid polyurethane foam, trichlorofluoromethane (CFC-11), 1,1-dichloro-1-fluoroethane (HCFC-141b) and 1,1,1,3,3-pentafluoropropane (HFC-245fa) have been used, among other substances controlled by the Protocol. While there are no obligations pertaining to the destruction of these substances under the Protocol, the Parties agreed through Decision IV/24 to urge "all parties to take all practicable measures to prevent releases of controlled substances into the atmosphere", including "to destroy unneeded ozone-depleting substances where economically feasible and environmentally appropriate to do so". Furthermore, Parties to the Montreal Protocol have approved a list of destruction technologies and related minimum destruction removal efficiencies applicable to controlled substances[48], and a Code of Good Housekeeping Procedures[49], which outlines measures that should be considered to ensure that releases to the environment of controlled substances are minimized during the disposal of plastic wastes containing substances controlled by the Protocol.

4. Work under the United Nations Environment Assembly (UNEA) on marine plastic litter and microplastics

~~52.~~53. Concerns about global marine litter including plastic pollution and microplastics and the related risks to the environment and potentially human health are increasing. The negative effects on ecosystems, biota, societies and economies have been globally recognised and governments are committing to reducing plastic pollution. Four resolutions on marine plastic litter and microplastics have been adopted by UNEA at its sessions in 2014, 2016, 2017 and 2019 to address this global challenge. The issue has also been addressed in separate resolutions, detailed below, on sustainable consumption and production, waste management and single-use plastics in 2019.

~~53.~~54. UNEA-1 resolution 6 on "Marine plastic debris and microplastics" (UNEP/UNEA, 2014) formally brought the issue within the scope of UNEA's agenda and emphasized the challenges of marine debris, particularly plastic and microplastic pollution, the need for urgent action, further information and research and encouraged multi-stakeholder engagement.

~~54.~~55. UNEA-2 resolution 11 on "Marine plastic litter and microplastics" (UNEP/UNEA 2016) addressed the challenges related to marine litter, the issues of microplastic and nano-size particles, transport of plastic through freshwater systems, slow degradation processes and the release and adsorption of chemicals such as POPs.

~~55.~~56. In 2017, UNEA-3 resolution 7 on "Marine litter and microplastics" (UNEP/UNEA, 2017) addressed the importance of preventive actions through waste minimization, environmentally sound waste management, actions in areas with large sources of marine plastic litter and recognized that measures exist to provide cost-effective solutions. UNEA members also recognized the importance of long-term elimination of discharges of litter and microplastics to the oceans and avoiding detriment to marine ecosystems, and the human activities dependent on them, from marine litter and microplastics.

~~56.~~57. The resolution also established an open-ended ad hoc expert group (AHEG) to further examine barriers to and options for combating marine plastic litter and microplastics. The AHEG discussed the adequacy of existing global governance frameworks (UNEP/AHEG, 2018a), and addressed issues

[48] https://ozone.unep.org/treaties/montreal-protocol/meetings/thirtieth-meeting-parties/decisions/annex-ii-destruction-technologies-and-status-their-approval.

[49] https://ozone.unep.org/meetings/fifteenth-meeting-parties-montreal-protocol/decisions/annex-iii-code-good-housekeeping.

related to information, monitoring and governance and possibilities for enhancing existing efforts or identifying new governance structures for marine plastic litter (UNEP/AHEG, 2018b).

~~57.~~58. UNEA-4 resolution 6 on "Marine plastic litter and microplastics" (UNEP/UNEA 2019) extended the mandate of the AHEG to address development of indicators to harmonize monitoring, the need for effective monitoring of sources, the quantities and impacts of marine litter, and invited member states to promote environmentally sound waste management and marine plastic litter recovery; a multi-stakeholder platform was also established to strengthen coordination and cooperation. UNEA-4 resolution 9 on "Addressing single-use plastic products pollution" encourages member states to develop and implement actions to address the environmental impacts of single-use plastic products, identify environmentally friendly alternatives to single-use plastics, promote improved waste management and more resource-efficient design, production, use and sound management of plastics across their life cycle. At its third and fourth AHEG meetings in November 2019 and November 2020, AHEG discussed stocktaking of existing activities and the effectiveness of existing and potential responses to address marine litter issues (UNEP/AHEG 2019 and UNEP/AHEG 2020). In 2020, AHEG completed its mandate, however, potential options for continued work on the global level will be considered at UNEA-5.

~~58.~~59. At UNEA 5.2, a~~a~~ resolution 5/14 titled, ~~[~~'End plastic pollution: Towards an international legally binding instrument' was adopted. By this resolution, the Assembly agreed to convene~~]~~ an Intergovernmental Negotiating Committee (INC) to ~~[~~develop an international legally binding instrument on plastic pollution, including in the marine environment, with the ambition to complete its work by the end of 2024. According to the resolution, this instrument could [start with voluntary approaches and end up by gradually binding approaches] include both binding and voluntary approaches, based on a comprehensive approach that addresses the full life cycle of plastic, taking into account, among other things, the principles of the Rio Declaration on Environment and Development, as well as national circumstances and capabilities, and other provisions. ~~The instrument will be based on a comprehensive approach that addresses the full lifecycle of plastics.~~ The resolution indicates that the instrument could include provisions to promote sustainable production and consumption of plastics~~, including,~~ through among others, product design and environmentally sound management of plastic waste including through resource efficiency and circular economy approaches. ~~[should be included in the instrument~~.~~]~~ ~~[~~It was also decided that the instrument could include provisions to promote cooperation and coordination with relevant regional and international conventions, instruments and organizations, while recognizing their respective mandates, avoiding duplication and promoting complementarity of action.~~]~~

~~[~~59bis. Microplastics and chemicals in plastic products are issues with emerging evidence of environment and human health risks identified in the Global Chemicals Outlook II (UNEP, 2019f).~~]~~

5. Strategic Approach to International Chemicals Management (SAICM)

~~59.~~60. SAICM was developed to support the achievement of the global goal of sound chemicals and waste management by 2020, agreed at the 2002 Johannesburg World Summit on Sustainable Development. It is a multi-stakeholder, multi-sector voluntary international policy instrument focussed on the achievement of the Sustainable Development Goals relating to sound chemical and waste management. Its work is governed by the following documents: Dubai Declaration; Overarching Policy Strategy; Global Plan of Action and Overall Orientation and Guidance.

~~60.~~61. The International Conference on Chemical Management (ICCM) under SAICM assesses and calls for appropriate action on emerging policy issues and issues of concern. Chemicals in Products (CiP) was identified as an issue of concern at the ICCM2 in 2009 "with a view of taking appropriate cooperation actions, to consider the need to improve the availability of and access to information on chemicals in products in the supply chain and throughout their life cycle." The CiP Programme, a voluntary framework activity, was welcomed by the fourth session of the ICCM4. The Programme's activities are focussed on greater access to the information on chemicals in products that actors need for the sound management of chemicals, and the products that contain them, throughout their life cycle. One of the potential outcomes of the Programme is "enhancing the safe recycling and reuse of materials and products". The CiP Programme focuses specifically on four sectors: textiles, toys, electronics, and building materials.

~~61.~~62. Other emerging issues under SAICM relevant to plastics include hazardous substances within the life cycle of electrical and electronic products, perfluorinated chemicals and the transition to safer alternatives, and endocrine disrupting chemicals. In addition, it is recognized that actions have been taken to address microplastic use in cosmetics and personal care products, but actions addressing other major sources of microplastics are limited (UNEP, 2020a).

~~62.~~63. SAICM shares common goals with multilateral environmental agreements such as the Basel, Rotterdam and Stockholm Conventions. In 2019 the Conference of the Parties to the Basel, Rotterdam and Stockholm Conventions requested the Secretariat (decisions BC-14/21; SC-9/19; RC-9/9) to continue to enhance cooperation and coordination with relevant initiatives including SAICM.

III. Guidance on environmentally sound management (ESM) of plastic wastes

A. General considerations

~~63.~~64. Environmentally sound management (ESM)[50] is a broad policy concept that is understood and implemented in various ways by different countries, organizations and stakeholders. The provisions and guidance documents pertaining to the ESM of hazardous wastes and other wastes under the Basel Convention provide for a common understanding and international guidance to support and implement the ESM of hazardous wastes and other wastes. OECD has also produced core performance elements related to ESM.

~~64.~~65. The 2013 Framework for the environmentally sound management of hazardous wastes and other wastes, adopted by decision BC-11/1 (“ESM framework”) (UNEP, 2013) establishes a common understanding of what ESM encompasses and identifies tools and strategies to support and promote the implementation of ESM. In addition, a set of practical manuals for the promotion of the environmentally sound management of wastes (UNEP, 2017c and UNEP,2019h) has been developed. The ESM framework and the practical manuals are intended as practical guides for governments and other stakeholders participating in the management of hazardous wastes and other wastes and complement the Basel Technical guidelines. Moreover, guidance on how to address the environmentally sound management of wastes in the informal sector (UNEP, 2019a) and a practical manual for stakeholders to ensure that notifications of transboundary movements meet environmentally sound management requirements (UNEP, 2022f) have been developed.

~~65.~~66. As presented in paragraph 33 of this document, Article 4 of the Basel Convention contains provisions related to the ESM of hazardous wastes and other wastes. ESM is also the subject of the following declarations:

(a) The 1999 Basel Declaration on Environmentally Sound Management, which was adopted at the fifth meeting of the Conference of the Parties to the Basel Convention, calls on the Parties to enhance and strengthen their efforts and cooperation to achieve ESM, including through prevention, minimization, recycling, recovery and disposal of hazardous and other wastes subject to the Basel Convention. This takes into account social, technological and economic concerns, and through further reduction of transboundary movements of hazardous and other wastes subject to the Basel Convention;

(b) The 2011 Cartagena Declaration on the Prevention, Minimization and Recovery of Hazardous Wastes and Other Wastes was adopted at the tenth meeting of the Conference of the Parties to the Basel Convention. The Declaration reaffirms that the Basel Convention is the primary global legal instrument for guiding the ESM of hazardous wastes and other wastes and their [disposal, including efforts to prevent and minimize their generation, and efficiently and safely manage that which cannot be avoided.

~~66.~~67. The waste management hierarchy is a guiding principle for the ESM of waste and covers prevention, minimization, reuse, recycling, other recovery including energy recovery, and final disposal. The hierarchy encourages treatment options that deliver the best overall environmental outcome, taking into account lifecycle thinking[51].The waste management hierarchy has also been recognised by the Strategic Framework (adopted by decision BC-10/2), the ESM framework (see its paras. 11, 14, 18, 26 and 43) and in the Guidance to assist Parties in developing efficient strategies for achieving the prevention and minimization of the generation of hazardous and other wastes and their disposal (UNEP, 2017d). UNEA-2 resolution 11 on marine plastic litter and microplastics also called on countries to establish and implement necessary policies, regulatory frameworks and measures consistent with the waste hierarchy.[52] The waste hierarchy was also defined and described in UNEP’s Global Waste Management Outlook (UNEP, 2015b).

[50] See paragraph 31 for the definition of ESM in the Basel Convention.

[51] Decision BC-10/2: Strategic framework for the implementation of the Basel Convention for 2012-2021.

[52] http://web.unep.org/unea/list-resolutions-adopted-unea-2.

~~67.~~68. Parties should consider a systemic approach to harmonizing and developing policy frameworks related to plastic wastes. Such an approach may address the root causes of the problem and take a long-term perspective that considers the long-lasting consequences of plastic in the environment, including the marine environment.

~~68.~~69. In addition, Parties should develop a range of measures (strategies, legislation, regulations and programmes) and monitor their implementation to support the meeting of ESM objectives. The implementation of national strategies, policies and programmes are effective methods to ensure a structured approach to the implementation of legislation and regulations; monitoring and enforcement; incentives and penalties; technologies; and other tools in which all key stakeholders participate and cooperate (UNEP, 2013). The following sections should be taken into account when establishing, implementing or evaluating ESM.

B. Legislative and regulatory framework

~~69.~~70. Parties to the Basel Convention should examine their national and subnational strategies, policies, controls, standards and procedures to ensure that they are in agreement with the Convention and with their obligations under it, including those that pertain to the transboundary movement and ESM of plastic wastes.

~~70.~~71. Most countries already have in place some form of legislation that outlines broad environmental protection principles, powers and rights. Such legislation should make ESM operational and include requirements for protection of both human health and the environment. Such enabling legislation can give governments the power to enact and enforce specific rules and regulations on the ESM of plastic wastes, including provisions for inspections and for establishing penalties for violations (e.g., on illegal traffic).

~~71.~~72. Such legislation should enable relevant authorities to monitor whether facilities where plastic wastes are disposed of, for example plastic waste recycling facilities, have obtained all the necessary approvals and can demonstrate due diligence in compliance to ensure such facilities are fully protective of human health and the environment. In addition, any legislation should establish whether actors involved in plastic waste management (e.g., collectors, transporters, and recyclers) ensure that the collection, transportation, storage and disposal of wastes are environmentally sound.

~~72.~~73. The legislation should require adherence to ESM principles, ensuring that countries provide ESM of plastic wastes, including environmentally sound disposal as described in the present guidelines. Specific components or features of a regulatory framework that would meet the requirements of the Basel and Stockholm Conventions and other international agreements are addressed in relevant guidance documents developed under these conventions.[53]

~~73.~~74. The legislation should cover plastic product policies to increase the recycling rates of plastic wastes or stimulate sustainable use of plastic products.

1. Extended producer responsibility

~~74.~~75.

~~75.~~ [Extended Producer Responsibility (EPR) systems for plastic and plastic packaging have been introduced in many industrialized countries. EPR is an approach that promotes reduction in the environmental impact of products, throughout their lifespan, from production to the waste stage. EPR assigns the responsibility of the whole lifecycle of a product to the producer of the goods, including environmentally sound waste disposal.]

[75 ALT Extended Producer Responsibility (EPR) systems [for all] plastic [applications] [and] [, including] plastic packaging have been introduced in many industrialized countries. EPR is an approach that promotes [awareness and] reduction in the environmental impact of products, throughout their lifespan, production, [and use] to the waste [management] stage. EPR assigns the responsibility of the whole lifecycle of a product to the producer [of the goods] [that is defined by the whole value chain (additive producer, catalyst producer, technology provider, resin producer, downstream equipment manufacturer, importer, distributers, brand owners, converters, retailers, recyclers and end users)], including environmentally sound waste disposal. [For most countries, EPR policies will be determined at a national level, aligned with national strategies, and fall within the

[53] Further guidance on Basel Convention regulatory frameworks can be found in the following documents: *Manual for the Implementation of the Basel Convention* (UNEP, 2015d) and *Basel Convention: Guide to the Control* (UNEP, 2015e). Parties to the Stockholm Convention should also consult the *Guidance for Developing a National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants* (UNEP, 2017e).

capability and resources "bottom-up approach" to ensure maximum plastic waste minimization measures adopted by local authorities. The given examples, which are expanded upon in paragraph 77 and 78 may not be suitable for adoption in all countries. Consequently parties, and where appropriate local authorities should consider which approach are most appropriate for their needs, resources and capability. Based on that parties have the right to include other waste that widely mixed and contaminated with plastics waste under EPR system, such as wood, paper, glass, cotton, etc].

76. In addition to plastic packaging, products partly consisting of plastic such as electrical and electronic equipment and vehicles are, in some developed and emerging economies, under relevant EPR schemes. For example, in Canada, EPR schemes are in place in many provinces and territories and cover a range of plastic products including plastic film, bags, containers, and products partially consisting of plastic, such as electronics (Environmental and Climate Change Canada, 2021 and Electronic Products Recycling Association, 2020). In the European Union (EU) for example, Member States must establish EPR schemes for certain single use plastic products to ensure that producers contribute to the cost of waste collection, transportation and treatment of the waste, of awareness raising measures and of cleaning up litter (European Union, 2019). In a few countries, such as China, France, Italy, Spain and Sweden, EPR has, for example, been introduced for agricultural plastic film, and Argentina has introduced EPR for agrochemical plastic containers. Other products such as toys, housewares, furniture, mattresses, fishing gear and textiles (such as carpets) [can] [may] also be covered by EPR schemes. [Kingdom of Saudi Arabia (KSA) local authorities assign local producers and converters to have a collaborative investment of cleaning of shores with collaboration with an external non-profit environment organization. This assignment has extended to make end user awareness, sortation and conversions of waste to useful plastics applications].

~~76.~~

77. Components of effective EPR programs related to plastic products [can] [may] include:

(a) [Mandatory] [Chosen] Clear definitions of products covered;

(b) Mandatory compliance with legally binding requirements;

(c) Responsibility with [producers furthest up the chain] [value chain] that is under the jurisdiction of the government (this may be the [downstream equipment producer,] manufacturer, importer, distributor, brand owner, etc.), as the entity that can have the most influence on product design;

(d) Financial [and awareness] responsibility borne by [producers] [all value chain];

(e) Measurable targets for plastic waste prevention and reduction, for reusability, durability and reparability of plastic products, for exclusion of hazardous additives, and for mechanical recycling [and chemical recycling];

(f) Effective enforcement provisions, including dissuasive fines or financial remediation plans for non-compliance and the ability for public oversight;

(g) Protection for existing informal waste collection workers;

(h) Public education programmes [and awareness];

(i) Publicly accessible reporting [, controlled by local authorities].

78. [Further guidance on EPR is available in the practical manual on extended producer responsibility adopted by decision BC-14/3, in "Extended Producer Responsibility - Guidance for efficient waste management" (OECD, 2016) and in "Development of Guidance on Extended Producer Responsibility (EPR)" (European Commission, 2014).]

2. End-of-waste status

79. The text of the Basel Convention does not clarify when a waste ceases to be a waste. The Glossary of Terms of the Basel Convention provides explanatory notes in this regard (UNEP, 2017f). Possibilities for waste to cease to be waste referenced in the Glossary of terms include when:

(a) It has been prepared for reuse;

(b) It has undergone a recycling operation and that operation is completed;

(c) It has otherwise gained end-of-waste status as a result of a recovery operation.

80. Some Parties have adopted conditions in their national legislation that can determine the point at which a material need no longer be classified as waste, such as the European Union (European Union, 2008) and the UK (English Environment Agency, 2016).

3. Transboundary movement requirements

81. Transboundary movements of hazardous wastes and other wastes must be kept to a minimum consistent with their environmentally sound and efficient management and conducted in a manner that protects human health and the environment from any adverse effects that may result from such movements. Y48 in Annex II and A3210 in Annex VIII are categorized as other wastes and hazardous wastes respectively and should, as far as is compatible with their ESM, be disposed of in the country where they were generated. Transboundary movements of such wastes are permitted only under the following conditions:

(a) If the country of export does not have the technical capacity and the necessary facilities, capacity or suitable disposal sites in order to dispose of the wastes in question in an environmentally sound and efficient manner;

(b) If the wastes in question are required as a raw material for recycling or recovery industries in the country of import;

(c) If the transboundary movements in question are in accordance with other criteria decided by the Parties.

82. Any transboundary movements of hazardous wastes and other wastes considered under the Basel Convention are subject to prior written notification from the exporting country and prior written consent from the importing and, if appropriate, transit countries. Parties shall not permit the export of hazardous wastes and other wastes if the country of import prohibits the import of such wastes in accordance with the Basel Convention.

83. Parties listed in Annex VII to the Convention (members of the EU, OECD and Liechtenstein), that are bound by the Ban Amendment, shall prohibit transboundary movements to states not listed in Annex VII of hazardous wastes which are destined for operations according to Annex IVA and hazardous wastes under Article 1.1(a) which are destined to operations according to Annex IVB[54].

84. The Basel Convention also requires that information regarding any proposed transboundary movement of hazardous wastes and other wastes be provided using the accepted notification form and that the approved consignment be accompanied by a movement document from the point where the transboundary movement commences to the point of disposal. Furthermore, hazardous wastes and other wastes subject to transboundary movements should be packaged, labelled and transported in conformity with international rules and standards[55].

85. When a transboundary movement of hazardous wastes and other wastes to which consent of the countries concerned has been given cannot be completed, the country of export shall ensure that the waste in question is taken back into the country of export for their disposal if alternative arrangements cannot be made. In the case of illegal traffic (as defined in Article 9, paragraph 1), as the result of conduct on the part of the exporter or the generator, the country of export shall ensure that the wastes in question are taken back into the country of export for their disposal or otherwise disposed of in accordance with the provisions of the Basel Convention (as per Article 9, paragraph 2). For further information, see the Guidance on the implementation of the Basel Convention provisions dealing with illegal traffic, adopted by COP13 in 2017 (UNEP, 2017g).

86. No transboundary movements of hazardous wastes and other wastes are permitted between a Party and a non-Party to the Basel Convention unless a bilateral, multilateral or regional agreement or arrangement exists as required under Article 11 of the Convention.

4. [Considerations on][Interpretation of]terms contained in the entries Y48 and B3011

87. In the entries Y48 and B3011 the terms “almost free from contamination and other types of wastes” and “almost exclusively consisting of” appear. The purpose of these terms is to distinguish between entries Y48 and B3011.

[54] For information on the status of individual Parties in relation to the amendment, please see the Status of Ratifications page on the Basel Convention website http://www.basel.int/Countries/StatusofRatifications/BanAmendment/tabid/1344/Default.aspx.

[55] In this connection, the United Nations Recommendations on the Transport of Dangerous Goods (Model Regulations) of 2019 (UNECE, 2019) or later versions should be used.

88. When implementing the entries B3011 and Y48 at the domestic level, Parties may interpret the terms "almost free from contamination and other types of wastes" and "almost exclusively consisting of" used in these entries in different ways. Examples of approaches to interpreting these terms are the following:

(a) A quantitative approach using quantitative criteria. Guidance following this approach has for example been issued in the European Union (European Commission, 2021). Such guidance, inter alia, contains that, for the first indent of entry B3011, the content of contamination, other types of wastes or non-halogenated polymers, cured resins or condensation products, or fluorinated polymers other than the one non-halogenated polymer, cured resin or condensation product, or fluorinated polymer that makes up the bulk of the plastic waste should not exceed a total maximum percentage of the weight of the consignment of 2%;

(b) An approach drawing on an assessment of quantitative elements and qualitative criteria. Guidance following this approach has for example been issued by the Scottish Environment Protection Agency (Scottish EPA, 2020). This guidance says that to be classified under entry B3011, a consignment of a certain type of plastic waste must contain only minimal amounts of other plastic wastes and only minimal amounts of contamination or other wastes. The assessment of the minimal amounts is based on the quantity, type and quality of contaminants in the waste and on the specific type of waste.

89. Parties and their competent authorities should share information on the national legislation and relevant guidance they have issued in a transparent and efficient manner.

90. It is the responsibility of persons involved in shipments of plastic wastes, such as exporters, importers, and carriers, to ensure they comply with the national legislation and apply the relevant guidance issued by the States of export, import and transit. [However, national procedures for the import of plastic waste should not be considered a replacement for prior-informed consent procedure for all Parties concerned by a transboundary movement.]

5. Specifications for containers and storage sites

91. To meet the requirements of ESM and specific clauses in the Basel and Stockholm Conventions (for example, Basel Convention Article 4, paragraph 7, and Stockholm Convention Article 6, paragraph 1), Parties may need to enact specific legislation that describes the types of containers and storage areas that are acceptable for particular plastic waste streams.

92. Parties should ensure that containers that may be subject to transboundary movement meet international standards such as those established by the International Air Transport Association (IATA), the International Maritime Organization (IMO) and the ISO.

6. Requirements for plastic waste treatment and disposal facilities

93. Most countries have legislation in place that requires the operators of waste treatment and disposal facilities to obtain approval to operate. Approvals may contain specific conditions that must be adhered to for these approvals to remain valid. A permitting or approval process based on established and transparent criteria on, inter alia, how to operate facilities, emission levels, monitoring, as well as an inspection regime may be an appropriate approach. It may prove necessary to add requirements specific to plastic wastes to meet the requirements of ESM, and to comply with the specific requirements of the Basel and Stockholm Conventions.

7. Other legislative controls

94. Examples of other aspects of the life-cycle management of plastic wastes that could be regulated through legislation and or a permitting/approval process may include:

(a) Environmental impact assessment of facilities disposing of plastic wastes, if appropriate;

(b) Citing provisions and requirements relative to the storage, handling, collection and transportation of plastic wastes;

(c) Public participation in the permitting or approval process for plastic waste disposal facilities as referred to in section III, J;

(d) Requirements for health and safety of workers;

(e) Decommissioning requirements for plastic recycling facilities, including:

(i) Inspection prior to and during decommissioning;

(ii) Procedures to be followed to protect worker and community health and the environment during decommissioning;

(iii) Post-decommissioning site requirements;

(f) Emergency contingency planning, spill and accident response, including:

(i) Clean-up procedures and post-clean-up concentrations to be achieved;

(ii) Worker training and safety requirements;

(iii) Waste prevention, minimization and management plans;

(iv) Obligations to ensure best-practice management systems, including requirements for annual reporting and regular third-party auditing and verification after the accident;

(g) Restrictions on greenhouse gas (GHG) emissions across the life cycle of plastics including their management as wastes, including such restrictions as are required to meet nationally determined contributions for parties to the Paris Agreement.

C. Waste prevention and minimization

1. General considerations

95. ~~Prevention and minimization of wastes are the most important steps in the waste management hierarchy. The third preambular paragraph to the Basel Convention, affirms that the most effective way of protecting human health and the environment from the dangers posed by hazardous wastes and other wastes is the reduction of their generation to a minimum in terms of quantity and/or hazard potential.~~ ~~[~~The Basel Convention affirms that reducing the generation of hazardous wastes and other wastes to a minimum in terms of quantity and/or hazard potential is the most effective way of protecting human health and the environment from the dangers posed by such wastes.~~]~~

96. In Article 4, paragraph 2, the Basel Convention calls on Parties to “ensure that the generation of hazardous wastes and other wastes is reduced to a minimum”. Waste prevention should be the preferred option in any waste management policy, so that the need for waste management is reduced, enabling resources to be used more efficiently.

97. At the tenth meeting of the Conference of the Parties to the Basel Convention, the Parties, in adopting the Cartagena Declaration committed “to enhancing the active promotion and implementation of more efficient strategies to achieve prevention and minimization of the generation of hazardous waste and other wastes and their disposal”.

98. One of the multiple benefits of plastic waste prevention and minimization is the reduction in the release of plastic waste into the terrestrial and marine environments. The Conference of the Parties to the Convention addressed the prevention and minimization of the generation of plastic waste in its decision BC-14/13: Further actions to address plastic waste under the Basel Convention, in particular in part II of the decision.

99. According to the ESM framework, the need to manage wastes and/or the risks and costs associated with waste management can be reduced by not generating wastes and by ensuring that generated wastes are less hazardous (UNEP, 2013).

100. The ESM framework states that “companies that generate wastes (waste generators) are responsible for ensuring the implementation of best available techniques (BAT) and best environmental practices (BEP) when undertaking activities that generate wastes”. In doing so, they act to minimize the wastes generated by ensuring research, investment in design, innovation and development of new products and processes that use less resources and energy and that reduce, substitute or eliminate the use of hazardous materials (UNEP, 2013).

101. Waste management efforts require multi-stakeholder involvement in the development of waste management plans with a strong emphasis on prevention and minimization, in partnership with waste generators, industrial users and civil society.

102. A practical manual on waste prevention, as part of the set of practical manuals for the promotion of the environmentally sound management of wastes (UNEP, 2017c), provides stakeholders with general guidance on waste prevention principles, strategies and possible measures and tools. The Guidance to assist Parties in developing efficient strategies for achieving the prevention and minimization of the generation of hazardous wastes and other wastes and their disposal (UNEP

2017d) identifies elements of a waste prevention and minimization programme that apply also to plastic wastes.

2. Policy instruments and measures on waste prevention and minimization

103. ~~Countries [are encouraged to] [should] adopt policies and measures to prevent and minimize plastic waste generation throughout the [entire] life cycle of plastics [from bottom to top approach] [, taking into account national circumstances, [and] [capabilities] needs and priorities]. Examples of policy instruments and measures on waste prevention and minimization [that may be applied] are provided in Table 9[56]~~.

[103 ~~ALT~~ .Waste prevention and minimization~~, including recycling,~~ are essential elements in the transition from a linear to a circular economy. [Examples of policy instruments and measures on waste prevention and minimization can be found in (OECD, 2019)]Table 9 provides a non-exhaustive list of examples of measures that have been adopted in some countries to support plastic waste prevention and minimization. The examples, which are expanded upon in paragraphs 104 to 120, may not be suitable for adoption in all countries. Consequently Parties, ~~[and to some extent]~~and where appropriate local authorities, businesses, and community groups, should consider which measures are most appropriate for their needs [. The adoption of this "bottom-up approach" should ensure] [so] that the selection of waste prevention and minimization measures takes full account of national resources, capability, circumstances, needs and priorities]

[103.ALT Waste prevention and minimization are essential elements in the transition from a linear to a circular economy. Examples of policy instruments and measures on waste prevention and minimization can be found in (OECD, 2019). Table 9 provides a non-exhaustive list of examples of measures that have been adopted in some countries to support plastic waste prevention and minimization. The examples, which are expanded upon in paragraphs 104 to 120 and in table 9, may not be suitable for adoption in all countries. Consequently parties, where appropriate local authorities and community groups may consider which measures are most appropriate for their needs and capability. For most countries policies and legislation will be gradually determined at a national level, aligned with their capabilities and national strategies, using a bottom up approach will gradually produce appropriate polices and measures. A "bottom-up" approach allows a country to have the discretion to choose their approach in the light of different national capabilities and circumstances. This approach allows a country to adopt a tailor-made solution that matches to the situation of each country and recognizes social and economic constraints in society. The bottom-up approach should be gradually adopted to ensure maximum plastic waste minimization measures adopted by a country takes full account of national resources, capability, circumstances, needs and priorities.]

Table 9: Examples of policy instruments and measures on waste prevention and minimization[57,][58]

Policy instruments	Waste prevention and minimization measures
Regulatory	- Design requirements [- Ban on certain single-use plastic products [, such as single-use plastic bags or cutlery][59]] [- Ban on oxo-degradable plastics] - Restrictions on [toxic or] hazardous substances in plastics and of microplastics in products - Consumption reduction measures[60] - Targets on recovery/recycling - Targets on recycled content - Deposit return schemes to increase reuse and recycling - Labelling and identification of products - Extended Producer Responsibility (EPR), e.g., including fee modulation with respect to recycled content or other design aspects

~~[56] More information on the examples can be found in OECD, 2019.~~

[57] More information on the examples can be found in OECD, 2019.

[58] Some measures are relevant to more than one policy instrument.

[59] For example, see European Union, 2019.

[60] For example, see European Union, 1994, and European Union, 2019.

	- Green procurement criteria [- Landfill ban/incineration ban] [- Measures to [Reduce][ban/restriction][Restrictions on] the use of hard-to-recycle plastics]
Market-based	- Taxes on products (e.g. packaging, plastic bags[, virgin plastic]) - Tax exemptions [and other positive economic incentives] (e.g. for reuse and repair) - Pay-as-you-throw schemes (PAYT) - Deposit return schemes - Extended producer responsibility (EPR) - Landfill tax/incineration tax [- Tax on virgin plastic] [- Economic incentives for reusable and repairable products and packaging, packaging-free businesses]
Information-based	- Awareness campaigns/school education - Labelling and identification of products - Procurement guidelines - Providing practical information, e.g., via information exchange platforms, to businesses and consumers - Environmental certification schemes
Voluntary	- Product standards (e.g., eco design) and specifications [- Stakeholder recognition and incentive programs] - Labelling and identification of products - Extended producer responsibility (EPR) [- Green procurement criteria] [- Sustainable procurement]

(a) Regulatory instruments and measures

104. [Design requirements for products are a central feature in successful waste prevention and minimization policy. It has been shown that eco-design, for all products, determines almost 80 percent of a product's environmental impact (European Commission, 2012).

105. Design requirements can reduce the amount of plastic waste generated by limiting the use of plastics in new products. This can be achieved either by using alternative materials with less environmental impact or by reducing the size of the products. In addition, the volume of plastic packaging could be reduced, e.g., in order to prevent excessive use of packaging that is not necessary.

106. For some plastic products, the most relevant design feature would be to focus on an extended lifespan, thereby postponing and reducing waste generation. This can be achieved through integrating aspects of durability, reusability, repairability and upgradability in the design process.

~~[~~106 bis Design requirements could be tailored to ensure the use of certain hazardous substances in plastics are avoided or minimized. Restrictions on the use of intentionally added microplastics in products, such as in certain cosmetics and paints, could also be considered at the design stage.~~]~~

107. ~~The choices made at the design stage will also influence the options available for recycling, once the product has become waste. [Measures to reduce the use of hard-to-recycle plastics could be taken]. Using materials that lead to hard-to-recycle plastic waste could be avoided [, such as carbon black in black plastics, which are found in products such as packaging, as these plastics are difficult to detect by automatic sensor sorting.] Composite products where the individual parts or layers are difficult to separate should [also] be avoided, as they typically consisting of a combination of plastics and other material types or of different plastic polymers. [The use of carbon black in black plastics, found in certain products, e.g. in packaging, could also be avoided since these plastics are difficult to detect by automatic sensor sorting.]~~ ~~[~~Choices made at the design stage can have impacts on how products are managed in an environmentally sound manner when they become waste. For example, the use of carbon black in consumer packaging could be avoided as these black plastics ~~are~~ may be difficult to detect by automatic sensor sorting ~~[~~thereby impeding recycling~~]~~. Any selection of materials or additives that contribute to difficult-to-recycle plastic waste should also be carefully considered to determine whether their use is necessary for the specific application. Typical examples include composite products, plastic multilayers or other products where the individual parts or layers are difficult to separate as they consist of a combination of plastics and other material types or of different plastic polymers (see paragraphs 23-25).~~]~~

108. ~~Specific waste prevention and minimization measures can be applied to single-use products and other products that are known be frequently littered, such as plastic bags, [disposable] [single-use] cutlery and products made of EPS. A ban on certain single-use plastics could be formulated. Oxo-~~

~~degradable plastics could also be banned since this plastic type leads to [significant] release of microplastics. Consumption reduction measures could also be a relevant initiative for these articles, leading to a substantial reversal of increasing consumption trends [(see paragraph 18)].~~ ~~[~~Selective waste prevention and minimization measures, such as bans or consumption reduction measures, have been applied in some countries to specific single-use plastic products and/or other plastic products that are frequently found in litter, such as cutlery, plastic bags and other packaging products. For example, in certain countries measures have been adopted to address food packaging ~~[~~made from EPS~~]~~ as this has been identified as a particular problem in litter because it can be easily dispersed by wind and is easily broken up. In addition, measures to reduce the consumption of these products could also be relevant and may lead to a reversal of increasing consumption.~~]~~

109. ~~[In addition, measures to restrict the use of certain plastic polymer types that are known to cause problems in the waste management chain, such as PVC, could be considered]~~ ~~[~~Other selective waste prevention and minimization, measures may focus on the use of certain plastics that are known to cause problems. For example, oxo-degradable plastics, which are designed to degrade quickly into smaller pieces, contributing to litter problems and the release of microplastics (see paragraph 18) could be considered.~~]~~

110. [Left for consistency of paragraph number.]

111. ~~Setting targets for recycled content in plastic products and/or targets on recovery/recycling could increase the demand for secondary raw materials and strengthen their market position, thereby stimulating recycling activities. [This is also expected to increase general public awareness on the importance of sound disposal and separate collection.] In addition, the implementation of deposit return schemes for plastic products, such as PET beverage bottles, typically leads to high levels of collection and provides a clean stream of plastics for reuse [or of plastic waste for recycling].~~ ~~[~~Setting targets for the use of recycled content in plastic products and/or targets for recovery/recycling could increase the demand for secondary raw materials and strengthen their market position, thereby stimulating plastic waste collection and recycling activities. This may also increase general public awareness of the importance of separate waste collection and environmentally sound waste management. In addition, the implementation of deposit return schemes for plastic products, such as PET beverage bottles, typically leads to improved levels of plastic waste segregation, collection and recycling.~~]~~

112. ~~[~~Businesses, including manufactures, suppliers and retailers should disseminate product design information through the use of standards, claims, labels and identification schemes regarding plastic products, e.g., for clear and well-designed recyclability labels. This will enable consumers to make informed choices when buying products, thereby contributing to the ~~leading to~~ ~~waste~~ prevention and minimization of waste. Such claims and labels could also enable plastic waste disposal facilities to access information about ~~waste containing~~ additives or processing aids present in the plastic waste which may ~~to an extent to~~ render it ~~the waste~~ hazardous or problematic, for example ~~notably~~ POPs or SVHC (see tables 6 and 7 and paragraph 218). ~~,~~ Information contained in claims and labels may therefore assist measures to ~~in order to~~ avoid contamination of subsequent recycling and manufacturing processes.~~]~~

113. ~~[~~Principles such as reliability, relevance, clarity, transparency and accessibility should serve as the main guiding principles of standards, claims, labels and identification schemes related to plastic packaging (UNEP, 2020b).~~]~~

114. [EPR systems aim to shift a large part of the costs of waste management back to producers, thereby stimulating investment in eco-design, leading to waste prevention and increased recycling. ~~In order to~~ To be effective, the EPR systems should include ~~implement~~ incentives for waste prevention and recycling for each ~~individual~~ producer, for instance through modulating the fees that producers pay according to certain criteria, such as recycled content or other design aspects. For further information on EPR, see section B.1 above.]

115. ~~[~~Green public procurement criteria may be developed to facilitate the inclusion of green requirements in ~~public~~ tender documents, including specific requirements on ~~[~~the use of products that meet certain design requirements (e.g., setting requirement for~~the use of~~ minimum recycled content)~~]~~ ~~[waste prevention and recycling]~~. Since the public sector's purchasing accounts for a large proportion of the economic activity in society, such criteria could have an important influence on ~~services and works within~~ the marketplace.~~]~~

116. ~~Introducing a [total or partial] ban on landfilling of plastic waste could be considered. It could also be relevant to ban [energy recovery] [incineration] of recyclable plastics, except in cases where certain plastic types or additives represent a particular health risk or environmental hazard and require~~

~~destruction. [This could increase recycling and stimulates waste prevention and increase recycling, if alternative waste management infrastructure is in place] [after careful analysis to determine that such a measure would be unlikely to result in improper disposal to avoid compliance with such measures (e.g., open dumping). For example, in jurisdictions with low rates of collection and developing recycling markets, enacting a ban on landfilling could unintentionally create an incentive to improperly dispose of waste unless alternative management options are available]~~. ~~[~~Other measures may be employed to divert the management of plastic waste higher up the waste hierarchy. For example, a ban on sending recyclable plastic waste to energy recovery activities, except in cases where the plastic waste contains hazardous substances which represent a particular health risk or environmental hazard and require destruction could be considered. Countries could also implement a ban on the landfilling or incineration (without energy recovery) of plastic waste. These measures could increase recycling and stimulate waste prevention; but may require careful consideration to ensure any risk of improper disposal of plastic waste, (e.g., open dumping or open burning) is minimised.~~]~~

(b) Market-based instruments and measures

117. ~~[Marked-based measures may be used to incentivize actions towards waste prevention and minimization. Taxes couldcan be levied on certain plastic products, such as [virgin single-use plastics,] plastic bags, or on plastic products that do not comply to a certain environmental standard, such as a minimum content of recycled material. Tax [exemptions and other positive economic incentives] [, such as subsidies,] can also be applied [to stimulate] [, for instance] for reuse and repair [activities] [of plastic products and packaging-free businesses [or awarded to businesses that sell products without plastic packaging or in reusable containers]. Another option is to introduce pay-as-you-throw (PAYT) schemes with variable pricing for waste collection by weight or volume. Such schemes which may encourage consumers to generate less waste as higher fees would be reserved for mixed residual waste., which works as an incentive for consumers to generate less waste. The highest fee would typically be imposed on mixed residual waste. In addition, taxes can be levied on [energy recovery] [incineration] or landfilling of plastics. [Taxes on virgin single-use plastic products can be levied to disincentivize the production of such items. Tax reductions can also be awarded to businesses that sell products without packaging or in reusable containers.]]~~

~~[~~117 ~~ALT~~Market-based measures may be used to incentivize the prevention and minimization of plastic waste. For example, tax exemptions, subsidies, or grants/loans could be used to support businesses that sell products without plastic packaging or to support enterprises that engage in the re-use or repair of plastic products or the recycling of plastic waste. Pay-as-you throw (PAYT) schemes with variable pricing for waste collection by weight or volume, could be used to encourage businesses and/or residents to ~~[~~generate less plastic waste~~]~~ and to incentivize separation of plastic waste at source~~[put less plastic waste in the residual waste]~~. Conversely, market-based measures may be used to discourage activities that either increase the generation of plastic waste or impact negatively on the reuse or recycling of plastic waste. These may take the form of increased taxation of the use of virgin raw materials in plastic products or selective taxes or surcharges on single-use plastic products or plastic products that do not comply with specified criteria, such as recycled content. Increased taxation could also be applied to non-hazardous recyclable plastic waste sent to energy recovery activities or to incineration without energy recovery or any plastic waste sent to landfill with the intention of encouraging the diversion of plastic waste to reuse or recycling activities. These types of instruments could, since they are linked to the economy, be more sensitive to national circumstances, needs and priorities than regulatory instruments.~~]~~

(c) Information-based instruments and measures

118. ~~Actions for the prevention and minimization of plastic waste would benefit from a change of public awareness relating to production and consumption. Creating awareness amongst the general public as well as the business community can e.g. be achieved through targeted campaigns and education. Sharing practical information and guiding tools about how individuals and companies can prevent and reduce plastic waste in their daily lives, is also a useful step.~~ ~~[~~Raising awareness of plastic waste prevention and minimization measures amongst the public and businesses may support the increased adoption of these activities. Furthermore, this can lead to a change of public awareness relating to production and consumption. Examples of awareness raising include targeted public campaigns and education initiatives which may involve sharing practical information and tools on how individuals and businesses can reduce the amount of plastic waste they generate. Raising awareness amongst school pupils may also help to change the behaviour of parents.~~]~~

~~[ALT 118. Raising awareness among the general public and business community about ways to prevent and minimize the generation of plastic waste can also be an effective way to spur action. [Furthermore, this can lead to a change of public awareness relating to production and consumption] Examples of [such] [relevant] measures include targeted campaigns education, and the sharing of practical information and guiding tools about how individuals and companies can prevent and reduce plastic waste in their daily lives.]~~

119. ~~[~~Additionally, local authorities should consider the promotion~~e~~ of community-based waste prevention initiatives by working ~~-based community building through communication~~ with local businesses and residents.~~commerce and industries, as well as consumers.~~ For further information, see section III.J.~~]~~

(d) Voluntary instruments and measures

120. ~~Some of the instruments and measures on waste prevention and minimization described above are applicable to more than one policy instrument. This is for instance the case for some regulatory measures that can also be applied voluntarily by various actors, such as product standards and specifications, labelling and identification of products, EPR and green procurement criteria.~~ ~~[~~Local authorities, businesses, schools and communities could also voluntarily adopt a range of the waste prevention and minimization measures outlined above. Measures can also be adapted to fit specific national and local circumstances. For example, some regulatory measures could be applied voluntarily by various actors, such as product standards and specifications, labelling and identification of products, ~~[~~EPR~~]~~ and green procurement criteria.~~]~~

[~~ALT 120. Voluntary measures encompass a range of activities undertaken by stakeholders and other actors and can include many of the instruments and measures identified as regulatory in Table 9, such as product standards and specifications, labelling and identification of products, EPR and green procurement criteria. Voluntary measures can include also programs established by governments or other organizations that incentivize stakeholders to prevent and reduce waste without regulatory action, e.g., stakeholder recognition programs, that highlight actions taken by stakeholders that go beyond mandated requirements.]~~

120.bis ~~[~~Governments can also foster voluntary waste prevention and minimisation initiatives as an alternative or an addition to regulatory measures. For example, through government recognition or certification programs that publicise positive actions taken by local authorities, businesses, schools or communities that go beyond mandated requirements.~~]~~]

3. Reduction of plastic leakage through waste prevention and minimization

121. ~~[~~Waste prevention and minimization measures described above should ~~will in general~~ reduce the leakage~~s~~ of plastics from the waste phase. In addition, special care should be taken to reduce the release of plastics to the environment ~~leakages~~ from the unintended loss of plastic products, such as fishing gear, plastic pellets and artificial turf. Most of these losses occur in the use phase of products, ~~whereas~~ the loss~~es~~ of pellets may also occur in the production, transport, ~~or use~~and~~-~~ storage phases (Karlsson et al, 2018)[61] ~~as well~~.~~]~~

122. ~~[~~The leakage~~s~~ of plastics from the production, transport and use phase can be addressed through various ~~policy instruments, such as~~ regulatory, voluntary and information-based measures. In general, procedures and best practices for handling of the products should be applied to minimize ~~, in order to reduce~~ the risk of their ~~[~~loss~~][losing] [them]~~ to the environment. For some product types, notably plastic pellets, this should be done for several handling steps along the value chain, since losses can occur from any of the steps. Leakages of plastics and the relevant sources may ~~could typically~~ differ from country to country, so ~~regulations and other~~ measures to prevent leakages should be tailored to ~~each country's~~ national circumstances.~~]~~

123. [Text may be added based on activities undertaken by the Working Group 1 on Prevention and Minimization of Waste established under the Plastic Waste Partnership (PWP).]

[61] See also the Operation Clean Sweep® voluntary program: https://www.opcleansweep.eu/

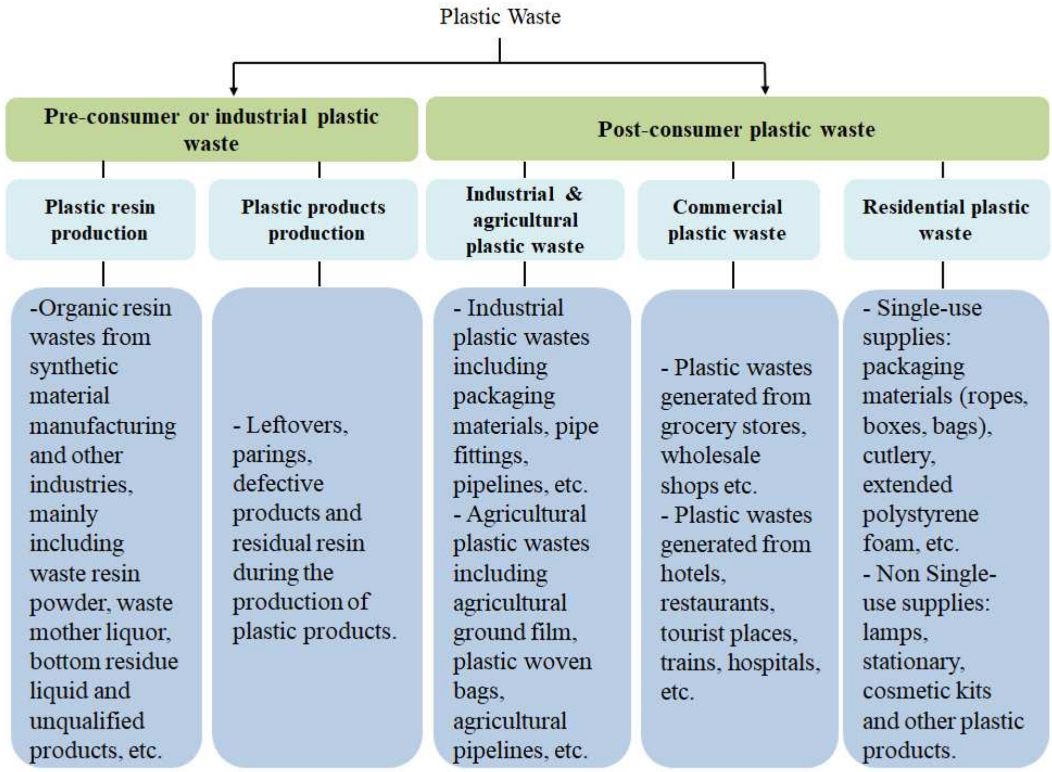
D. Identification and inventories

1. Identification of plastic wastes sources

124. The identification of plastic waste is the starting point for their effective ESM. To enable effective action to prevent, minimize and manage plastic wastes, it is important that Parties identify the sources of plastic waste generation and quantify the amount of plastic wastes generated.

125. Plastic wastes can be categorised into two main categories: pre-consumer and post-consumer wastes (see Figure 2). Post-consumer plastic wastes are found mainly in municipal solid waste (MSW) and in the following economic sectors: industry, agriculture, [building and] construction [and demolition], commercial, institutional, automotive, electrical and electronic equipment, and textiles (see Table 10 for main sources and examples of plastic wastes.)

Figure 2: Classification of plastic wastes



Source: Based on Yang et al., 2018.

Table 10: Main sources and examples of plastic wastes:

Source	Examples of waste types generated	Detailed examples
Pre-consumer plastic wastes		
Polymer production and compounding	Wastes from: · Industrial packaging · Pre-production offcuts · Sweepings · Off-specification plastic	Off-specification colour pellets, compounder purge, clean-down waste, pellet conveying systems line-purge waste, handling and bulk loading spillages.
Plastic conversion	Wastes from moulding and extrusion	Sheet edge trimmings and mould flow sprues.
Plastic assembly or installation	Wastes from plastic assembly and installation processes	Damaged assemblies, intentional 'press-out' blanks, component handling tabs, screw thread covers, body panel covers, failed trial polymer applications
Post-consumer plastic wastes		
Municipal solid waste	Consumer plastic packaging	Plastic bottles, pots, tubs, trays, films and wrappers.
	Garden plastics	Outdoor seats and tables, toys, buckets, flowerpots, paddling pools.
	Household products	Crates, filing boxes, washing baskets, kitchenware.
	Furnishings	Seating foams, upholstery textiles, legs, feet, mouldings, and mattresses.
	Sports and leisure equipment	Rackets, balls, cushion mats, protective headwear and footwear.

Commercial and large industrial plastic wastes	Packaging and containers	Waste of bags, drums and containers from the food and chemical industries, packaging films, industrial equipment, crates.
Agriculture plastic wastes	Flexible films, fibres, string and nets Tanks, drums, containers and pipes	Greenhouses covers, fertilizer sacks, mulch and fumigation films, silage bale-wraps, bird protection nets and baling twine. Water tanks, chemical drums, fertilizer bottles, irrigation pipes and valves.
Plastic wastes from hospitals, health and safety, and laboratories	Single-use plastic packaging, medical and laboratory supplies and personal protective equipment	Infusion bottle (bag), dialysis bucket, plastic packaging, packing box, packing barrel, masks, protective clothing.
Plastic wastes from WEEE	Refrigerators, computers, vacuum cleaners, small domestic appliances, mobile phones and office equipment.	Printed circuit board, fans, shells, PUR foams, pipes, inner tank, coil, plastic capacitor, and resistance
Plastic wastes from end-of-life vehicles waste (ELV)	-	Car bumpers, body mouldings, interior trim panels, seat foams, flexible cooling pipes, battery shell.
Plastic wastes from Fishing/aquaculture	Nets and other fishing gear	Fishing nets, trawls, ropes, strapping bands, floats, buoys
Wastes from construction and demolition		Plastic from window frames and doors, construction off-cuts, roofing sheets, insulation panels, textiles, drainage pipes.
Plastic wastes from textiles	Textile wastes	Clothing and textiles such as towels, curtains, bedding, and carpets.
Plastic wastes from cables		Cable jackets

2. Identification of plastic products/wastes according to the resin type

126. The ASTM D7611—Standard Practice for Coding Plastic Manufactured Articles for Resin Identification provides a set of symbols appearing on plastic products that identify the plastic resin out of which the product is made (See Table 1).

3. Identification of hazardous ~~[~~and non-hazardous~~]~~ plastic wastes

127. According to Article 1 paragraph 1(a) of the Convention, plastic waste that belongs to any category contained in Annex I is to be considered hazardous waste, unless it does not possess any of the hazardous characteristics contained in Annex III. For example, the following plastic wastes should therefore be presumed to be hazardous waste[62]:

(a) ~~[~~Plastic wastes covered under the category Y13 (wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives) and entry A3050. For example, wastes of formaldehyde resins, epoxy resins and alkyd resins, in particular when uncured, may ~~exhibit~~ possess the hazardous characteristics H6.1, H8, H11 and H12 ~~;~~ and H13~~]~~:

(b) ~~[~~Plastic wastes containing or contaminated with heavy metals covered under the categories Y24 (arsenic; arsenic compounds), Y26 (cadmium; cadmium compounds), Y29 (Mercury; mercury compounds) and Y31 (lead; lead compounds). For example, ~~[~~waste of~~]~~ rigid PVC ~~[that contains]~~ [may contain] [containing] cadmium and lead stabilizers and plastic components separated from waste lead-acid batteries (A1160), such as battery casings, may ~~[~~possess~~]~~ ~~[exhibit]~~ the hazardous ~~Annex III~~ characteristics~~]~~ H6.1, H11, H12 and H13, in which case they would fall under entry A3210~~]~~:

(c) ~~[~~Plastic wastes containing or contaminated with brominated flame retardants (BFRs), in particular BFRs that are POPs according to the Stockholm Convention, covered ~~[~~under category Y45 (organohalogen compounds other than substances referred to elsewhere in Annex I) and ~~]~~ ~~[under]~~ entry A3210. In ~~general~~addition, ~~[~~plastic waste containing BFRs may, ~~fall under Annex I category Y45 (organohalogen compounds other than substances referred to elsewhere in Annex I) and,]~~ if antimony compounds are used as synergists of the BFRs, fall under category Y27 (Antimony, antimony compounds). Depending on the concentration and the chemical properties of the BFRs and

[62] It should be noted that some of the entries in Annex VIII have references to entries in Annex IX. See also Table 8.

their synergists, plastic wastes containing or contaminated with BFRs, for example plastic components separated from waste electrical and electronic equipment (A1180[63], A1181[64]), may possess ~~Annex III~~ the hazardous characteristics H6.1, H11, H12 and H13.]

(d) [Textile wastes made of plastic containing or contaminated with PFAS compounds after treatment for waterproofing covered under ~~Annex I~~ category Y45 (organohalogen compounds other than substances referred to elsewhere in Annex I). PFAS compounds such as PFOS and PFOA that are listed as POPs under the Stockholm Convention, may possess the hazardous characteristics H6.1, H11, H12 and H13~~–~~, in which case they would fall under entry A3210];

(e) Plastic wastes contaminated with hazardous materials such as solvents covered under the categories Y41 (halogenated organic solvents) and Y42 (organic solvents excluding halogenated solvents), and entry A3140 ~~[and material covered under categories Y39 such as Bisphenol A]~~ and A3150. For example, a waste solvent plastic tank may possess the hazardous characteristics H11 and H12;

(f) [Plastic wastes from medical care in hospitals, medical centres and clinics covered under the category Y1(clinical wastes from medical care in hospitals, medical centers and clinics) and entry A4020, plastic wastes contaminated with waste pharmaceuticals, drugs and medicines under the category Y3 (Waste pharmaceuticals, drugs and medicines). For example, waste plastic articles from medical care such as waste syringes may possess the hazardous characteristics H6.1, H6.2, H11 and H12.]

(g) Plastic wastes containing certain additives such as MCCPs covered under Annex I category Y45 (organohalogen compounds other than substances referred to elsewhere in Annex I) and entry A 3210 may possess the hazardous characteristics H11 and H12.

(h) [Plastic wastes from metal cables containing or contaminated with organohalogen compounds covered under category Y45 (organohalogen compounds other than substances referred to elsewhere in Annex I) and entry A1190. Such plastic waste ~~[include Fluoropolymers (ETFE, FEP, MFA, PFA and PTFE) used as cable insulation] [and]~~may ~~exhibit~~ possess the hazardous characteristics H6.1, H11, H12 and H13];

(i) [Plastic wastes from waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs) and/or polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBs) covered under category Y10 (waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs) and/or polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBs)) and entry A3180, and possibly under entries A1160, A1170, A1180[65], A1181,[66]A3120 and A4130. PCBs and HBB, a PBB, are listed as POPs under the Stockholm Convention. Waste containing PCBs, PCTs and PBBs may possess the hazardous characteristics H6.1, H11, H12 and H13, depending on their concentration levels in a waste];

(j) [Plastic wastes from production, formulation and use of inks, dyes, pigments, paints, lacquers and varnish covered under the category Y12 (wastes from production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish) and entry A4070. For example, wastes of azo dyes may ~~exhibit~~ possess the hazardous characteristics H11, H12 and H13];

(k) [Plastic wastes that contain or are contaminated with any congenor of polychlorinated dibenzo-furan and/or any congenor of polychlorinated dibenzo-p-dioxin covered under the category Y43 (any congenor of polychlorinated dibenzo-furan) and Y44 (any congenor of polychlorinated dibenzo-p-dioxin) and entry A4110~~, [for example incomplete burned plastic wastes A1090, A1150]~~. These plastic wastes may ~~exhibit~~ possess the hazardous characteristics H6.1, H11 and H12];

(l) [Plastic wastes covered under category Y4 (Wastes from the production, formulation and use of biocides and phytopharmaceuticals) and entry A4030, and possibly under entries A3210 and A4130. For example, an empty plastic container for biocides may possess ~~exhibit~~ the hazardous characteristics H6.1, H11, H12 and/or H13];

(m) [Plastic wastes covered under category Y18 (Residues arising from industrial waste disposal operations. For example, residues from the processing of hazardous plastic wastes, such as from sorting or shredding, may ~~exhibit~~ possess the hazardous characteristics H6.1, H11, H12 and H13, in which case they would fall under entry A3210];

[63] This entry is effective until 31 December 2024
[64] This entry becomes effectives as of 1 January 2025
[65] This entry is effective until 31 December 2024
[66] This entry becomes effectives as of 1 January 2025

(n) ~~[~~Plastic waste packages and empty containers from waste streams (Y1 – Y18) or contaminated with constituents (Y19-Y45), and entry A4130 may ~~exhibit~~possess hazardous characteristic H13 and the specific hazard of the substance contained~~]~~;

(o) (o) Plastic wastes having as constituent organohalogenated compounds covered under Annex I category Y45 (organohalogen compounds other than substances referred to elsewhere in Annex I) and entry A3210, may exhibit hazardous characteristics H11, H12 and H13.

127bis All non-hazardous fluorinated polymers fall under Y48, unless they are pre-consumer plastic waste consisting almost exclusively of one of FEP, PFA, MFA, PVF, PVDF, destined for recycling in an environmentally sound manner and almost free from contamination and other types of waste. In such a case, they would fall under B3011.

128. Annex II to the Basel Convention lists category Y46 (Wastes collected from households) which may contain or be contaminated with certain plastic wastes referred to in paragraph 127 [and 127bis].

4. Identification of non-hazardous contaminants

129. Contaminants are unwanted materials present in plastic wastes., including non-hazardous contaminants. The composition of plastic wastes depend not only on the intrinsic composition of the different plastics but may also contain certain non-hazardous contaminants which derive from the production, use or waste phases of the plastic lifecycle.

130. Plastic wastes from industrial processes often arise in large volumes of clean material consisting of a single polymer type with low levels of contamination. However, it can have a higher contamination than virgin plastics (Huysveld et al. 2019) and be non-homogenous when it is generated in the manufacture of composite materials. The majority of residential post-consumer plastic wastes is a much wider range of mixed items and material types, where the contamination levels may be significant.

131. Mixed polymer waste streams may be more difficult to recycle. For instance, small amounts of PVC mixed with other polymers (PE, PP or PET) can prevent effective recycling. Clear PET and PVC (i.e., from packaging) have a particular problem with cross-contamination as their visual appearance is very similar. The density ranges of PET and PVC also overlap making it more challenging to separate the polymers using float-sink technology. Film types such as PP, PET and multi-layer laminates are considered contaminants in a mixed LDPE stream (Mepex Consult AS, 2017).

132. Paper labels can contaminate recyclable plastic wastes (e.g., stock identification labels on pallet wraps). Inks, that are used to print information directly on the surface of the packaging material, can bleed during the recycling washing process and discolour the recyclate and waste liquid effluent.

133. Plastic wastes can be contaminated with either non-ferrous or ferrous metals. Plastic wastes from cables may contain residual metals. Post-consumer plastic packaging wastes may contain aluminium which may be difficult to remove.

134. Contamination can also appear at the use phase of plastic. Plastic waste can also be contaminated with food or beverage residues. Many packaging items contain a residual level of the original contents and require washing during recycling, leaving a clean plastic material for onward processing.

135. Plastic film wastes from agriculture may contain high percentages of soil and traces of pesticides, and emptied plastic containers may still contain and be impregnated with agrochemicals, that could render the waste hazardous under Art. 1, paragraph. 1 (a) and (b) of Basel Convention.

5. Specifications

136. Specifications (see the footnotes related to "almost free from contamination and other types of waste" and "plastic waste almost exclusively consisting of" in entries B3011 and Y48 that refer to international and national specifications that may offer a point of reference) can be sourced from industry-wide standards, regional and national quality standards linked to the plastic waste trade. Under the Plastic Waste Partnership, a compilation of national and international specifications is under development.

137. [Text may be added based on activities undertaken under the Plastic Waste Partnership (PWP).]

6. Inventories

138. Inventories can be an important tool for identifying, quantifying and characterizing wastes. When developing an inventory for plastic wastes, priority should be given to the identification of important waste streams (e.g., hazardous plastic wastes).

139. National inventories may be used to:

(a) Establish a baseline quantity of plastic products, articles and plastic wastes and products with a relevant content of plastic and related wastes;

(b) Establish an information registry to assist with safety and regulatory inspections;

(c) Assist with the preparation of emergency response plans;

(d) Track progress towards minimizing and phasing out specific plastic waste streams (e.g., single-use plastics).

140. For further information on the development of national inventories Parties may consult the methodological guide for the development of inventories of hazardous wastes and other wastes under the Basel Convention. (UNEP, 2015c). The guide focuses on the actions recommended to develop the national information systems that produce the information needed to assist countries in fulfilling their reporting obligations under the Basel Convention. In addition, Practical guidance on the development of an inventory of plastic wastes has been developed (UNEP, 2022f).

141. [Kept for consistency of paragraphs numbers]

E. Sampling, analysis and monitoring

142. Sampling, analysis and monitoring are important activities in the management of plastic wastes enabling the manager of the wastes and those who regulate its management to identify the composition of plastic types in some waste streams, the degree of contamination of the plastic wastes, as well as the presence and concentration of hazardous substances within plastic wastes.

143. Monitoring and surveillance serve as elements for identifying and tracking environmental concerns and human health risks.

144. The information obtained from the monitoring should be used:

(a) To detect any releases which cause any change to the quality of the surrounding environment;

(b) To ensure that different types of plastic wastes are managed in an environmentally sound manner;

(c) To identify potential issues relating to possible exposure to humans and determine whether adjustments to the management approach might be appropriate.

145. Sampling, analysis and monitoring should be conducted by trained professionals in accordance with a well-designed programme and using internationally accepted or nationally approved methods, carried out using the same method each time over the duration of the programme. They should also be subjected to rigorous quality assurance [(QA)] and quality control [(QC)] measures. Mistakes in sampling or analysis, or deviation from standard operational procedures, can result in meaningless data or even programme-damaging data.

146. Each Party should identify its sampling, analysis and monitoring needs and ensure it has laboratory and equipment capacity that will meet the required operating standards. Training and protocols should be in place to ensure that standards can be met, and that quality data and meaningful results can be obtained.

147. As there are different reasons for sampling, analysis, and monitoring, and because wastes come in so many different physical forms, many different sampling, analysis, and monitoring methods are available. For information on good laboratory practices the OECD series (OECD, various years) and the Handbook on Good Laboratory Practices (WHO, 2009) may be consulted. The next three sections consider key elements that should be included in sampling, analysis, and monitoring.

1. Sampling

(a) General considerations

148. The overall objective of any sampling activity is to obtain a sample that can be used for the targeted purpose, e.g., waste characterization, compliance with regulatory standards or specifications

or suitability of proposed treatment or disposal methods, and environmental monitoring. This objective should be identified before sampling is started. It is essential that quality requirements for equipment, transportation and traceability are met.

149. Standardised sampling procedures should be established and agreed before the start of a sampling campaign. Elements of these procedures include the following:

(a) The number of samples to be taken, the sampling frequency, the duration of the sampling project and a description of the sampling method (including [QA] procedures put in place, e.g., field blanks and chain-of-custody);

(b) Selection of location or sites and time or stage of sample-taking (including description and geographic localization);

(c) Identity of the person who took the sample and conditions during sampling.

(d) Full description of sample characteristics – labelling;

(e) Preservation of the integrity of samples during transportation and storage (before analysis);

(f) Close cooperation between the sampler and the analytical laboratory;

(g) Appropriately trained sampling personnel.

150. Sampling should comply with specific national legislation, where it exists, or with international regulations and standards. Sampling procedures include the following:

(a) Development of a standard operational procedure for sampling plastic wastes;

(b) Application of well-established sampling procedures;[67]

(c) Establishment of [QA] and [QC] procedures.

151. All these steps should be followed for sampling programmes to be successful. Similarly, documentation should be thorough and rigorous.

(b) Sampling of plastic wastes

152. Sampling of plastic wastes may be carried out to identify the composition of plastic types in some waste streams and the degree of non-hazardous contamination of the plastic wastes, as well as the presence and concentration of hazardous substances within plastic wastes. This information may be used to determine the suitability of disposal methods.

153. Microplastics samples can be sorted according to characteristics such as location, shape, polymer type, amount, size, colour or surface condition. The sampling methods for microplastics will differ depending on the compartment being sampled (sea surface or water column) and the size range of litter being monitored. A common challenge in any sampling effort is for the information collected to be as representative as possible. The abundance and distribution of plastic in the water surface and water column compartments are highly variable due to seasonal changes in river outputs, ocean currents or mechanisms of degradation and fragmentation. Some of the methods used for sampling microplastics include using ship intake water for sampling, bulk water sampling, pump sampling, Continuous Plankton Recorder (CPR), etc. Although standardized methods for sampling microplastics have not been established, some countries have developed specific methods for sampling microplastics in seabed and biota. (UNEP/GESAMP, 2019)

154. When carrying out sampling of plastic wastes, locations should be determined based on the objective of the sampling being undertaken. These could include:

(a) Points of collection of plastic wastes, including collection of marine litter;

[67] Such as procedures developed by ISO, ASTM, the EU, the United States Environmental Protection Agency (EPA), the Global Environment Monitoring System (GEMS), and the European Committee for Electrotechnical Standardization (CENELEC) (See Standard on Collection, logistics and treatment requirements for WEEE (Waste Electrical and Electronic Equipment) – Part 1: General Treatment Requirements, in particular specifications for de-pollution), and the European Committee for Standardization (CEN) (see EN 14899:2005 Characterization of waste - Sampling of waste materials - Framework for the preparation and application of a sampling plan and the series of CEN/TR 15310 1-5: 2006 Characterization of waste - Sampling of waste materials).

(b) Input and output of disposal facilities (e.g., material recovery and re-processing facilities);

(c) Points of reception of imported plastic wastes, e.g., ports.

(c) Sampling for environmental monitoring and biomonitoring

155. Pollutant emissions related to disposal and treatment of plastic wastes at respective facilities can include liquids, solids, gases, and others, which can be determined following the specific national legislation or international regulations and standards. Waste matrices typically sampled for monitoring emissions include:

(a) Liquids:

(i) Wastewater from plastic waste treatment/disposal facilities as well from the sewage treatment facilities (inlet and outlet);

(ii) Leachate from dumpsites and landfills;

(iii) Water (surface water, drinking water and industrial and municipal effluents);

(b) Solids:

(i) Consumer products;

(ii) Solids from industrial sources and treatment or disposal processes (e.g., fly ash, bottom ash, filter and scrubber residues, sludge and wastewater treatment sludge still bottoms, other residues, clothing, ash from dumpsite and landfill fires;

(iii) Soil, sediment (including in drains and water bodies near plastic waste disposal facilities), rubble and compost;

(c) Gases:

(i) Air (indoor);

(ii) Air (emissions);

(d) Biota and human biological samples (for the purpose of biomonitoring):

(i) Trout and other fatty fish in water bodies as well as soil living organisms, chicken and other biota feeding from the ground in the vicinity of plastic waste disposal facilities;

(ii) Bodily fluid and hair samples from workers in plastic waste-management and communities located near facilities.

156. Sampling for the purpose of monitoring should prioritize the investigation of pollutants specifically associated with the disposal of plastic wastes including, but not limited to, the following:

(a) Bisphenols and phthalates;

(b) Short chain chlorinated paraffins;

(c) Medium chain chlorinates paraffins;

(d) Per- and polyfluoroalkayl substances;

(e) Brominated flame-retardants;

(f) Relevant UV stabilizers such as UV 320, UV 327, UV 328 and UV 350;

(g) Relevant aldehydes such as formaldehyde;

(h) Heavy metals, in particular antimony, cadmium, lead and mercury;

(i) Polychlorinated dibenzodioxins (PCDDs)/ polychlorinated dibenzofurans (PCDFs);

(j) Polybrominated dibenzo-p-dioxins and dibenzofurans (PBDD/PBDFs).

2. Analysis

157. Normally, plastic waste analysis is performed in a dedicated laboratory. However, rapid developments in process instrumentation and real-time online detection equipment have enabled very sophisticated high-speed sensors to be used in-situ on sorting equipment and in the field (e.g., hand-

held X-ray fluorescence (XRF) detection of metals in plastics; online X-ray transmission sorting systems).

158. For analysis in laboratories, there are several analytical methods available. Therefore, Parties should verify the availability and costs of methods of chemicals, including POPs, relevant to plastics before developing a monitoring and sampling programme.

159. The main steps in the analysis are:

(a) To scope the sample group(s) e.g., source separated plastic, plastic from residual household waste, reprocessed plastic;

(b) To proceed with pre-treatment of samples;

(c) To select target analytes;

(d) To prepare samples (e.g., microwave assisted digestion with magnetic stirring);

(e) To select chemical analysis method (e.g., Inductively coupled plasma mass spectrometry);

(f) To proceed with statistical analysis of samples.

160. The analysis of microplastics is related to their particle size, shape, concentration, and chemical composition. For microplastics, it is often difficult to describe the sizes, shapes and polymer types fully and reliably, from complex environmental matrices, using a single analytical method. In general, microplastic analysis consists of two steps: physical characterization of potential plastics (e.g., microscopy) followed by chemical characterization (e.g., vibration spectroscopy) for confirmation of plastics. In special cases, co-contaminant chemical analysis is performed on extracted chemicals. Through physical characterization (done by visual observation with the naked eye, or by using microscopy), size (maximum dimension or particle image), shape and colour can be observed and recorded. Chemical characterization is a final step to identify microplastics from the other natural materials, when visual and microscopic observation is not enough to confirm the particle nature. The most common method used in chemical characterization of microplastic particles is spectroscopy (e.g., Fourier-Transform Infra-Red and Raman) (UNEP/GESAMP, 2019).

3. Monitoring

161. Article 10 ("International Cooperation") paragraph 2 (b) of the Basel Convention requires Parties to "cooperate in monitoring the effects of the management of hazardous wastes on human health and the environment".

162. Monitoring programmes should be implemented for facilities managing plastic wastes if appropriate, as they provide an indication of whether a plastic waste management operation is functioning in accordance with its design and complying with environmental regulations and serve as elements for identifying and tracking environmental concerns and human health risks.

163. Information collected from monitoring programmes can feed into science-based decision-making processes and can be used for the evaluation of the effectiveness of risk management measures, including regulations. Monitoring of plastic litter, both in the marine environment and on land, can provide information on the nature, extent and impact of plastic pollution, notably on which products are prone to be discarded outside the waste management system. Monitoring can also give information on the effectiveness of policy measures related to plastic waste management.

164. To measure the effectiveness of ESM practices at a facility, accurate and up-to date data are required on the precise effects of the activities of the facility on the environment as well as on individuals. Therefore, a planned, regular sampling and monitoring programme should be conducted.

165. Monitoring is not restricted to analytical measuring, it also includes regular maintenance, visual and safety checks.

F. Handling, separation, collection, packaging, compaction, transportation and storage

166. Handling, separation, collection, packaging, compaction, transportation and storage are important elements in the management of plastic wastes, including in relation to the prevention of plastic leakage. Procedures and processes for managing wastes should be considered for these activities, both for hazardous and non-hazardous plastic wastes, to prevent spills and leaks, e.g., through wind, resulting in worker exposure, releases to the environment or exposure of the community.

1. Handling

167. Plastic wastes should be handled appropriately to minimize risk to human health and the environment. It should be taken into account that wastes from polymer manufacturing and blending processes are often in the form of powders or granulates contained in bulk bags or containers. Post-consumer wastes are likely to be in bulky form and may require baling or bagging for transportation to waste processors. Employees should be supplied with appropriate protective clothing, trained in the safe handling of large/heavy containers and equipped with equipment such as sack-barrows, pallet trucks and fork-lift trucks.

2. Separation

168. Separation at source of generated plastic wastes increases efficiency and reduces costs related to segregating mixed waste and can improve the quality of the outputs from downstream pre-treatment, sorting and recovery operations. Source separation entails the sorting of plastic waste from other types of waste before collection as opposed to separation from other waste after collection. In order for source separation to be an effective approach, plastic waste generators should be given clear instructions and information about the required separation method prior to collection (e.g., by means of on-pack recycling labels or other simple separation instructions such as ‘clear drink bottles only’).

169. Source separation can be described as a form of multi-stream collection system in which the waste generator is responsible for manually sorting plastic wastes and placing them into designated bins or bags, to keep them separate by type or according to certain established criteria.

170. Source separation of post-consumer plastic packaging wastes may be performed in:

(a) Mono-material separation systems, where plastic wastes are segregated at source as one material fraction including more than one type of plastic together (as mixed plastics) or targeting specific plastic types (e.g., PET bottles, or rigid plastic such as pots, tubs and trays);

(b) Co-mingled separation systems, where several types of source separated dry wastes (e.g., metal and plastic wastes) are collected together.

171. The collection of clean plastic wastes that have been separated at source should be a priority as this will facilitate a simpler recycling process system and will generally produce recyclate polymers with a higher quality, with lower waste fractions and improved environmental performance (i.e., lower energy cost per tonne, reduced washing effluent flows).

3. Collection

172. Care should be taken in establishing and operating collection programmes for plastic wastes in order to increase the efficiency of the waste collection system.

(a) Household plastic wastes collection schemes

173. The three main recognized household plastic wastes collection schemes are:

(a) Source-separated or multiple-stream collection scheme;

(b) Co-mingled fractions or single-stream collection scheme;

(c) Residual waste or mixed waste collection scheme.

174. These schemes utilise the following collection systems for the collection of plastic wastes:

(a) Kerbside collection system: The system includes containers at ground level for collection from the street. Packaging plastic wastes are collected as a single stream or together (co-mingled) with a different waste fraction i.e., plastic and metal wastes are collected in the same bin;

(b) Door-to-door collection system: Door-to-door collection schemes involve a system whereby plastic waste streams in bags, bins, and/or containers are collected directly at households with regular frequency. Packaging plastic wastes are collected as a single stream or together (co-mingled) with different dry waste fractions i.e., plastic and metal wastes are collected in the same bin;

(c) Bring system (Drop-off) system: Consumers bring their plastic wastes such as plastic bottles and plastic bags to a certain collection site. While this is generally used for enhancing collection of plastic bottles, it could also be used for plastic bags and wraps, like grocery bags, zipper sandwich bags and some cereal bags, to be dropped off at depots and stores. Collection sites may include municipal staffed collection sites where several types of wastes (e.g., WEEE and bulky waste from households) can be brought by residents (civic amenity sites).

175. Deposit-and-return system (DRS): DRS is a system whereby consumers buying a product pay an additional amount of money (a deposit) that will be reimbursed upon the return of the packaging or product to a collection point. The system is based on offering an economic incentive for consumers to return empty containers to any shop to ensure that they will be reused or recycled. For beverage containers, these systems are already operating in many countries. The DRS could be expanded to other types of plastic packaging.

176. The highest quality plastic wastes are typically from separate collection via DRS, followed by kerbside separated/door-to-door collection. The quality will, however, also depend on the type and quality of further pre-treatment before recycling, such as washing.

177. The possibility of organizing selective collection schemes depends mainly on the volume of plastic waste collected separately and the frequency of collection. Collection schemes may be much more difficult for drop-off systems than for kerbside systems and in rural areas compared to urban or semi-urban areas. When selective collection is organized with compartmentalized trucks, both plastic wastes and residual household wastes can be collected simultaneously.

178. The informal sector, including individuals and small enterprises, is involved in the collection of plastic wastes. This is a common practice in geographies where the formal sector provides insufficient waste management (Wilson et al., 2006; Kumar et al., 2018; Hande, 2019). Collection of recyclables takes place from all possible places where access is possible, for example, (open) dumpsites, the streets, and door-to-door collection. For further information on these types of situations, see the guidance on how to address the environmentally sound management of wastes in the informal sector (UNEP, 2019a).

179. Communities in mountainous [and remote] regions face challenges, due to the terrain, isolation, and remoteness, for the collection of plastic waste that may not be experienced in other regions. [Such communities may rely heavily on the informal sector for plastic waste collection (see paragraph 178).] Challenges in collection of plastic waste in these communities can stem from transportation, influx of plastic waste from those outside the community, e.g. tourists, or lower volumes of recyclable waste to make separate collection realistic. Community-based solutions for the collection of plastic waste should be explored, such as raising community awareness of the value of plastics, incentivizing the return of plastics, e.g., through a deposit program, and targeting tourist lodge owners to collect and [recycle] their plastic waste (Alfthan *et al.,* 2016).]

(b) Industrial, commercial, institutional, and agricultural plastic and other waste collection schemes

180. Collection of industrial and institutional plastic wastes, commercial packaging plastic wastes and agricultural plastic wastes could be organized by waste generators themselves, or with large drop-off containers rented by the generators and collected regularly by private operators. The collection systems should be designed in such a manner that the plastic wastes are transported to specialized treatment facilities. In the European agriculture sector, many countries have implemented collection schemes, funded by producers, which allow farmers to bring collected farm plastic wastes to organised hubs on specific dates and times during the year. This facilitates efficient manual sorting and baling of the various plastic types at those hubs using mobile baling equipment, prior to transportation to reprocessing facilities. Plastic packaging waste from hazardous pesticides, herbicides and other bio-active substances should be separately collected.

181. Plastic wastes originating from maritime activities such as aquaculture and fisheries, both as their own waste and marine litter that gets caught in the fishing gear of commercial fishing vessels (e.g., nets, trawls and ropes), should be brought back on land and delivered to port reception facilities.

182. Waste leakages from marine activities, e.g., loss of fishing gear, should also be collected and delivered to a municipally or privately operated waste management system, as should plastic wastes from clean-ups along beaches, rivers and waterways and other water bodies. This also applies to the unintended leakage of other plastics, such as plastic pellets. Special collection schemes may be applied to retrieve unintentionally lost plastic products. For instance, lost fishing gear can be located, e.g., by equipping the gear with GPS thereby ensuring targeted retrieval of lost gear. Plastic wastes from marine litter, collected by clean-ups or by fishing vessels, typically contain significant amounts of ropes and nets. Extra separation operations will therefore be needed to untangle the materials in order to facilitate recycling of the waste.

4. Separating and extracting plastic wastes from other waste streams

183. Efforts should be made to separate and extract plastic waste from other waste streams which contain a considerable volume of plastics such as WEEE, waste vehicles, construction and demolition

waste, waste cables and waste textiles. Source separation is the most desirable option. When this is not possible, effort should be made to separate plastics from the respective waste stream post collection to the extent that is feasible. Some of these wastes are large, and it should be ensured that collection and treatment infrastructure is in place that is capable of handling them. The method of separation of plastics from the waste stream will depend on factors like characteristics of the waste stream in consideration, availability of sorting technology, possibility of automation and associated cost. A 'one size fits all' approach may not be possible, and the appropriate method used for separation should be chosen based on the factors mentioned above.

184. For example, in very dense urban environments, source separation of plastic wastes can be difficult. In these cases, plastic wastes can be sorted out of mixed MSW. By using advanced sensor sorting technology and avoiding contamination with organic and paper waste in the mixed MSW, the quality of the resulting plastic wastes can be similar to the quality of plastic wastes from source separation systems. Other simpler techniques may result in plastic wastes of an inferior quality, in terms of physical/mechanical and other properties, to plastic wastes collected from source separation systems. For example, recyclate produced from plastic wastes from simple post-sorting operations can have a strong odour, particularly when the original mixed MSW contained organic waste. This can limit the possibility, or potentially make it impossible, to use the material in consumer applications.

5. Packaging

185. Packaging of plastic wastes falls into two categories: packaging for transportation and packaging for storage.

186. Packaging for transportation of hazardous plastic wastes is often controlled by national dangerous goods transportation legislation. For packaging specifications for transportation, reference materials published by IATA, IMO, United Nations Economic Commission for Europe (UNECE), and national governments should be consulted.

187. Plastic wastes, whether hazardous or not, should be properly packed for both ease of transportation and as a safety measure to reduce the risk of leaks and spills. For certain plastic wastes, baling might be appropriate. However, if this is an inappropriate size, transportation in big bags or closed bulk containers can be a reasonable measure.

188. Packaging of plastic wastes for storage should be conducted as follows:

(a) Plastic wastes should be properly packaged;

(b) In most cases packaging that is acceptable for transportation is suitable for storage, unless more stringent storage requirements are specified. Plastic wastes in the original containers of plastic products before becoming plastic wastes are generally safe for storage if the packaging is in good condition;

(c) Plastic wastes should not be stored in containers that were not intended to contain such wastes, that have labels on them that incorrectly identify their contents, or which may be contaminated;

(d) Containers that are deteriorating or deemed unsafe should be emptied or placed inside a sound outer package (overpack). When unsafe containers are emptied, the contents should be placed in appropriate new or refurbished containers. All new or refurbished containers should be clearly labelled as to their contents;

(e) Smaller containers can be packaged together in bulk by placing them in appropriate or approved larger containers containing absorbent material.

6. Compaction, shredding, compressing and baling

189. Plastic wastes from semi-finished product conversion, packaging wastes and other plastic wastes may be bulky and may contain more than one type of plastic waste. For economical transportation and storage some compaction may be necessary. The most common compaction processes are shredding, compressing and baling. Some plastics, such as EPS, should not be shredded but can be compacted. Compaction may destroy the plastic corpus which may contain important labels or markings from which technical information can be derived for the recycler [. As such, compaction may not be appropriate if such technical information needs to be retained.] With complete plastic items, it can be determined what the material it is and what additives it contains.

190. Shredding, compressing and baling should take place spatially separated from other technical equipment / process steps and a fire-prevention system should be installed. This is because explosive

substances may be contained in the waste (e.g., lithium-ion batteries in electrical appliances or spray cans with residual contents) due to incorrect disposal or sorting.

191. Shredding may be either a dry or a wet process. Wet shredding is used not only to achieve compaction but also to begin the process of cleansing the plastic residues of paper labels, glue and dirt. Both baling and shredding require properly trained and equipped personnel, including occupational exposure protection strategies for the processes, as well as processes for handling wastewater and other wastes from the shredding.

192. Wherever possible, sorting into single material streams should be undertaken before the compaction process. However, shredded material may not be accepted in certain cases because quality standards beyond common sorting processes are required.

193. Mixed plastic wastes should only be shredded if there is an assured application for the mixed output or if a post-shredding sorting system is available to produce single material streams of acceptable quality.

194. Shredding should be conducted as follows:

(a) Shredders should be constructed and installed so as to protect the operator from flying fragments, hazardous substances, entangling film waste and noise, in addition to protection from other types of health hazards during the process;

(b) Shredders should be protected from metallic contamination by metal detector/removal systems, if a shredder is not able to handle metal contamination;

(c) Before shredded material is re-processed it should be dried and/or conditioned to the specification used by downstream industry/waste processors.

195. Baling is suitable for component, film and bottle wastes. Baling should be conducted as follows:

(a) The size and form of the bale should be optimized for its transportation and further processing;

(b) Over-compaction of baled plastic waste may weld the waste together producing a solid mass that can be difficult to separate;

(c) It should be considered that compacted bales contain considerable mechanical energy. The rust-resistant steel or polyester strapping should be strong enough to contain the long-term load of the compacted material;

(d) Care should be taken when opening bales to avoid injury caused by the sudden release of compacted materials;

(e) It should be taken into account that under-compacted bales may be unstable;

(f) Bales should only be handled by means of a pallet truck or fork-lift truck due to the potential large weights involved.

196. The compressing of plastic waste may be carried out to facilitate storage and transportation, depending on the nature of the wastes and the method of subsequent treatment. For example, wastes with high moisture content may not be suitable for compression.

7. Transportation

197. The transportation of shredded or baled plastic waste requires considerable attention to the stability and protection of the load. Bags and bales should be stacked no more than 2.5 meters high, and the load should be secured either with strong ropes or tarpaulins. Loads should be protected from weather and vandalism. When loading and unloading plastic wastes, particular care should be taken to ensure the safety of workers. Plastic wastes should be prevented from entering the environment during transportation.

8. Storage (D15 or R13)

198. Plastic wastes in shredded or baled form should be stored on clean concrete floors. If plastic wastes are stored indoors, a fire-prevention system should be available to prevent fires and ease firefighting. If plastic wastes are stored outdoors, it should be protected from contamination and weather damage by means of tarpaulins or [other suitable weatherproof covering. This will also help prevent plastic leakage, e.g., through wind drift. Protection against fire should also be in place. Contamination of plastic wastes from dust and dirt can be avoided by the use of pallets.

199. Plastic wastes stored outside should be covered with a UV-protective material as polymers degrade with prolonged exposure to UV light, resulting in the deterioration of the physicochemical properties of the plastic.

200. Storage space should not be completely occupied by plastic wastes. There should be access to all areas for handling equipment and for emergency services vehicles. There should be sufficient exit paths from the storage area for employees and they should be well marked and easy to find. The storage area should be secured against unauthorised entry. Fire-fighting equipment should also be readily available (see section H below).

G. Environmentally sound disposal

1. General considerations

201. According to the waste management hierarchy, prevention, minimization, reuse and recycling should be prioritized over other recovery operations and final disposal operations. For pursuing recycling and recovery of plastic wastes, the guidance to assist parties in developing efficient strategies for achieving recycling and recovery of hazardous wastes and other wastes (UNEP, 2019c) may be useful.

202. Disposal operations relevant to plastic waste and provided in Annex IV, part A and B of the Basel Convention are the following, ordered according to the waste management hierarchy, whereby operations that take place prior to the submission to the following operations are addressed in paragraph 214:

(a) R3 Recycling / reclamation of organic substances which are not used as solvent;

(b) R1 Use as a fuel (other than in direct incineration) or other means to generate energy;

(c) D5 Specially engineered landfill and D10 Incineration on land.

203. Some disposal operations that occur prior to the submission to any operations referred to in paragraph 202 above are applicable to plastic wastes. These operations are addressed in sections F.5, F.6, F.8 and G.2 and include the following operations:

R12 Exchange of wastes for submission to operations R1, R3, or R13;
R13 Accumulation of material intended for operations R1, R3, or R12;
D9 Physico-chemical treatment prior to submission to operations D5, D10, D14 or D15;
D13 Blending or mixing prior to submission to operations D5, D9, D10, D14 or D15;
D14 Repackaging prior to submission to operations D5, D9, D13 or D15;
D15 Storage pending operations D5, D9, D10, D13 or D14.

204. It should be noted that some applicable disposal operations for plastic wastes containing or contaminated with mercury or POPs are different than those identified in paragraph 205 and 206. Specific guidance on the environmentally sound disposal operations applicable to plastic wastes containing or contaminated with mercury or mercury compounds or POPs is provided in the technical guidelines on the ESM of wastes consisting of, containing, or contaminated with mercury or mercury compounds (UNEP, 2022c) and the general technical guidelines on the ESM of wastes consisting of, containing or contaminated with POPs (UNEP, 2022), respectively.

205. Plastic waste recycling (operation R3) can be categorized as follows:

(a) Mechanical recycling, whereby plastic waste is processed by sorting, size reduction, cleaning and drying, thermal melt-extrusion and pelletizing, and compounding;

(b) Physical recycling, whereby plastic waste is dissolved in a solvent and the polymer is separated from constituents (e.g., flame-retardants) from plastic waste using solvents while keeping the plastic polymer molecules chain largely intact (solvent-based purification);

(c) Chemical recycling, whereby plastic polymer molecules are broken down into smaller component parts (monomers or oligomers), subjected to further processing and used as base chemicals, including feedstock for plastic manufacture (feedstock recycling).

206. Plastic waste recycling can be hindered by other methods of plastic waste disposal. For example, energy recovery of plastic wastes may become competitive in financial terms and reduce plastic waste recycling. Parties may consider introducing policy, regulatory and financial instruments to prioritise plastic waste recycling over other recovery and final disposal.

207. The recycling of plastic wastes can be challenging because of the wide variety of uses, additives, and blends that are used in a multitude of products. Recycling can be either reprocessing

into the original product application with equivalent properties (closed-loop recycling) or a different plastic application with similar material properties (open-loop recycling).

208. As noted above, closed-loop recycling refers to a recycling method in which recycled plastic wastes are processed and returned to their original use. A well-established example of closed-loop recycling is bottle-to-bottle recycling. Open-loop recycling refers to the recycling process whereby plastics wastes are converted into new use. An example of open-loop recycling is the recycling of waste PET bottles into polyester staple fibre, polyester filament, film, etc. When choosing closed-loop recycling or open-loop recycling, inter alia the physical properties, and the environmental benefits should be considered. Improving the quality of the recycled materials, as well as supporting and improving markets for secondary materials, should be promoted.

2. Mechanical recycling (covered by R3)

209. Mechanical recycling [refers to the processing of plastic wastes by physical means. It] is commonly used to treat thermoplastic polymers such as PP, PE and PET. Thermoplastics polymers are better suited for mechanical recycling compared to thermosetting polymers because thermoplastics can be re-melted and reprocessed into new products with relative ease.

210. Mechanical recycling can be divided into the following main process stages:

(a) Physical sorting, size reduction, cleaning and drying to make purified, polymer flakes (see subsections (i) to (iv) below);

(b) Thermal melt-extrusion and pelletizing to make shaped profiles or wide sheets, or homogenous polymer pellets (see subsection (v) below); and/or compounding to make recyclate pellets with improved mechanical properties to meet the quality specifications for end-use product applications (see subsection (vi) below).

211. There are multiple configurations of equipment and individual unit operations to create a complete mechanical recycling process. Various designs, methods and approaches having been developed for the very wide range of different plastic waste streams. Some of such methods are ‘mature technologies’ (e.g., PET bottle recycling), while others are new and still evolving (e.g., robotic artificial intelligence (AI) sorting machines, or combined laser light, X-ray and induction sensor sorters).

212. Direct recycling of plastic wastes refers to the direct thermal plasticization of plastic wastes, followed by profile or shaped product forming. Normally this simplified ‘direct’ process can only be applied to clean, single-polymer industrial waste streams (e.g., the waste mould-flow sprues ejected from an injection forming process being immediately granulated and re-moulded). However, when this practice is conducted within an existing industrial process facility, the material may not become ‘waste’.

213. Table 14 describes some of the generic processing unit operations employed for mechanical recycling of plastic wastes. However, it should be noted that every individual design of a facility will utilize its own set of equipment items, machinery layout and sequence of techniques needed for obtaining high-quality output recyclates from the particular mix, type and format of the incoming plastic waste streams.

Table 14: Mechanical recycling operations (not necessarily sequential)

Process	Description
Sorting: 1. To remove non-plastic materials 2. To separate individual polymers or similar plastic types 3. To remove plastics containing unwanted additives [4. To separate hazardous plastic waste] [5. To sort by colour]	Sorting methods are used to separate plastic wastes, remove [non-target materials including unwanted contaminants] and purify to a single polymer type. The main separation methods are manual separation, size & shape sorting, induction sorting, magnetic ferrous removal, eddy current metal separation, air-flow separation, automatic sensor sorting of materials, float-sink density separation and hydro-cyclone density separation. Other novel techniques are employed based upon any detectable physical differences in materials.
Size Reduction: Granulation / grinding Shredding / chopping Milling / comminution Crushing / impaction	Size reduction is used to chop plastic wastes into small flakes or chips, liberating joined materials & enables downstream separation (e.g., metals, glass, paper) and separating different plastic types (e.g., PET bottles from PP lids).

Process	Description
Cleaning / Washing	Manual or machine cleaning methods are used to remove various [non-target materials or contaminants] [, such as] oils, dust, dirt, biodegradable waste[, labels, adhesives and printing inks] from the surface of waste plastics. Can be wet or dry-friction methods.
Drying	Drying is used to remove surface moisture after wet washing.
Melting	Heating and melting plastic wastes into raw materials or products, including single-type plastic wastes and composite plastic wastes.
Extrusion	Extrusion is used to melt similar plastic flakes in a heated screw-barrel. Blending, mixing, vapour venting and melt-filtration can be applied to create a homogenous and uniform polymer material. Other additives can be added to the infeed mix to create a specific plastic compound grade. Polymer melt exits through a die-head, typically to allow for pelletisation. Direct formation of product is also feasible – e.g., thin sheets, or shaped profiles or filaments.
Pelletizing	Pelletizing can be done via chopping of water-cooled strands OR by direct die-face cutting to make small, regular free-flowing pellets.
Compounding	Compounding may be conducted through physical modification (by mixing of additive components before extrusion) or chemical modification (by adding active ingredients before extrusion).

214. Some examples of mechanical recycling steps for specific types of post-consumer plastic wastes are the following [, not necessarily taking place in the same facility]:

(a) PET bottles: Sorting (including colour sorting) → grinding → washing → separating → drying → processing into PET bottles, polyester fibres, sheets or containers;

(b) LDPE films used in agriculture and industrial packaging: Pre-washing → grinding → washing → separating → drying → melt-filtration → processing for example into refuse bags or agricultural films;

(c) PVC pipes: Grinding → washing → separating → drying → reprocessing into similar or other applications;

(d) EPS fish boxes: Sorting → washing and drying → grinding → regranulation and melt filtration → reprocessing into PS or EPS pellets or product;

(e) Mixed WEEE and/or ELV plastic waste: Sorting and separation → shredding and separating of plastic from metal fractions → screening and size reduction → air-separation of fluff and dust removal → density separation in modified liquid media → spin-drying → sensor sorting → colour sorting rubber and elastomer removal → bulk-mixing in silo → extrusion compounding → de-gassing → melt-filtration → pelletisation.

215. The following potential [human health and] environmental impacts from the mechanical recycling of plastic wastes should be [managed and] [avoided or] reduced ~~[in respect of the following]~~:

(a) Air emissions in the form of dust and volatile organic compounds (VOCs) (He et al., 2015);

(b) Wastewater ~~emissions~~ releases[for example] from the washing of plastics flakes;

(c) Indirect air emissions associated with heat production (e.g., for flake washing), if the heat is generated on-site by gas, oil, etc;

(d) Site littering;

(e) [Unsound residuals management such as dumping and open burning of unrecycled fractions;]

(f) ~~[Excessive]~~ Unnecessary water ~~[consumption]~~ [use] ~~[intensity]~~, e.g., for washing, sink float separation, ~~agglomeration,~~ and pellet cooling;]

(g) ~~[Reintroduction~~ Retention of hazardous substances into recyclates e.g., from additives or contaminants, unless otherwise regulated under final product specifications;]

(h) Contamination of the recycling site and surrounding areas with POPs as well as other hazardous substances (Tang et al., 2015);

(i) Pellet loss (Karlsson et al., 2018).

216. In most cases, well managed material handling, process safety procedures and good housekeeping can minimize the risk of these adverse impacts taking place, when carried out under professional supervision and within a waste management regulatory control system.

217. Certain types of plastic wastes are not suitable for mechanical recycling. This can for example be due to the complexity of the physical structure of the wastes and the way different polymer types and other materials have been combined within the original product design. Examples include thermosetting plastic composites, where the plastic resin cannot be thermally re-formed and the fibres are very difficult to remove, and thin-walled, multi-layer packaging films made with various plastic and metallic layers bonded together.

218. [It is important to remove plastics that contain or are contaminated with additives or processing aids, which are listed in Tables 6 and 7 of this document, in order to avoid contamination of subsequent recycling and manufacturing processes.] It is important to remove plastics that contain or are contaminated with additives, processing aids [or other substances,] notably POPs or SVHC (see Tables 6 and 7), to an extent to render the waste hazardous[, difficult to recycle] or [otherwise] problematic, in order to avoid contamination of subsequent recycling and manufacturing processes. Where such removal is not possible or difficult, it is important to manage the subsequent recycling and manufacturing processes accordingly.

219. [With the currently applied pre-treatment technologies, such as sorting, washing, float-sink and grinding, there may still be contaminants present in the post-consumer plastic waste, as these techniques are not able to thoroughly clean the polymers and remove the impurities embedded in the polymer structure. [Other] [Solvent-based extraction] methods can be applied to remove target additives from the polymer matrix without dissolving (Kol et al 2021).[68]]

220. [In case recycled plastic, for example PET or HDPE, is used in food contact materials, strict national legislation for using recycled plastics in food contact materials should be in place to minimize migration of substances into food.]

[ALT 220. Regarding recycled plastic applications with direct human exposure such as in food-contact materials, strict national legislation for using recycled plastics in such applications should be in place to meet national health and safety requirements (e.g. the US Food and Drug Administration (FDA).]

(a) Sorting

221. Sorting can be classified into manual sorting, automated/mechanical sorting, float-sink separation, liquid density separation, electrostatic separation and sorting by hydro-cyclones and centrifugal sorting. Automated/mechanical sorting technologies can be broadly classified into screen separators, air separators, ballistic separators and film grabbers based on their ability to sort items based on particle shape, size and density (see table 15). Furthermore, based on their ability to remove different types of metals from the waste stream, they can be classified into overband/conveyer head-roller magnets, eddy current separators, and induction sensors. Sensor based sorting and robotic sorting are examples of advanced forms of automated sorting.

222. Since plastic wastes may be mixed with impurities and other types of plastic wastes, which may not only cause difficulty in recycling plastic wastes but may also greatly affect the quality of the products produced, plastic wastes should be separated from non-plastic wastes (e.g., metals, rubber, sand, fabrics) through sorting and, where appropriate and feasible, sorted into single polymer types.

223. Manual sorting involves identification [notably] by shape, colour, appearance [and trademark] of the plastic that distinguishes it for visual identification by the operators (Ruj et al., 2015). Manual sorting operations may be a pre-sorting stage before or after mechanical sorting in order to remove unwanted or contaminated input materials and improve the efficiency of a downstream-automated process. Manual sorting may also be used in final quality checks at the end of a sorting process to ensure that sorted plastics meet technical specifications.

224. Manual sorting may be suitable when larger plastic items are present in large amounts in mixed waste and have not yet been size reduced to small flakes, or when separating different polymer types

[68] Solvent-based extraction techniques such as the dissolution-precipitation technique have shown to be able to remove target additives from the polymer matrix as well as to selectively recover different polymers.

from mixed plastic wastes. In most cases, when plastic items or particles to be sorted are below circa 75 to 100mm in size, then manual sorting will become overly laborious and not be practicable.

225. Manual separation of plastic wastes into single plastic material streams could be performed directly from piles of plastic wastes or from the surface of sorting conveyors. In both cases manual sorting requires experience, knowledge, dexterity and concentration for long time periods. In many cases, the use of polymer-type labels (see Table 1) on individual items or components is not practical.

226. Manual sorting can be augmented by the use of hand-held analytical instruments and sensors to rapidly test individual polymer pieces in the field or sorting yard. However, sample test times above circa 30 seconds per item can make this impracticable for all but the largest items (e.g., whole car bumper assemblies).

227. For workers involved in manual sorting, there should be appropriate working conditions (e.g., provision of personal protective equipment, adequate safety training, proper ergonomics to reduce worker strain (see for example Illinois Recycling Association, 2010)).

228. Automated/mechanical sorting should be used where appropriate to increase the separation efficiency and is most effective at industrial scale (i.e., 5,000 to >50,000 tonne per annum input waste volume). The exact method of identification, separation and sorting can depend upon a wide range of physical and chemical properties of the plastic and the contaminant materials, as well as the size, shape and format in which it is presented to the sorting equipment. Automated mechanical sorting systems for plastic wastes can include a very wide range of technologies and separation methods.

229. Screen separators, air classifiers and ballistic separators are used for the removal of small, light, 2D pieces such as film and paper and for removal of heavy pieces such as glass and stone. The separation method depends upon the physical size, shape (i.e., 2 or 3 dimensions), density and mass of the sorted items. The creation of a waste stream which has a uniform range of particles or items within a controlled size and shape format is important for the successful application of downstream sorting methods. Table 15 below provides an overview of size, shape and density sorting technologies.

Table 15: Overview of size, shape and density sorting technologies (automated/mechanical sorting)

Technology	Sub- Type	Description
Screen separators	Trommel screen	An angled rotating cylinder with holes that allows wastes of a given size to fall through.
	Disk Screen	A bed of vertical-spaced discs that transports large waste items but allows smaller items to drop through the gaps.
	Oscillating screen	A vibrating/oscillating declined bed that allows smaller waste to pass through holes in the mesh deck while transporting larger wastes to the end.
	Flip-flop screens	A flexible, oscillating screen deck is used to transport material down an inclined belt. The resulting motion allows smaller items to pass through the set size of hole in the screen deck. Particularly useful for sticky or wet materials which have a tendency to clog screen holes.
Air separators	Zigzag air classifier	Waste is dropped through an upward air current in a zig-zag shaped flue. Light wastes are blown to the top, while heavier wastes fall to the bottom.
	Rotary air classifier	A trommel screen separator with an air current that captures the lightweight fraction.
	Cross-current air classifier	Wastes are fed on a conveyor and dropped through an air stream. The light components are blown horizontally to a collection point and the heavy components drop through.
	Suction hood	Sucks light weight wastes directly from the conveyor belt.
Ballistic Separator	N/A	A steeply inclined bed with a perforated plate screen deck, with alternate vibrating elements. Light fractions are lifted by cams to the top of the bed, heavy fractions fall to the bottom.
Film grabber	N/A	Wastes are accelerated onto a rotating drum with spikes. These hook plastic film and let other waste drop.

Source: International Solid Waste Association (ISWA) 2017

230. In most cases it is sensible to remove unwanted metallic contaminant prior to any size reduction or further material-type separation. Normally this follows a logical three-step approach to metal removal:

(a) First – Ferrous and magnetic metals (cast iron, mild-steel);

(b) Second – Non-ferrous metals (aluminium, copper, brass, zinc etc.);

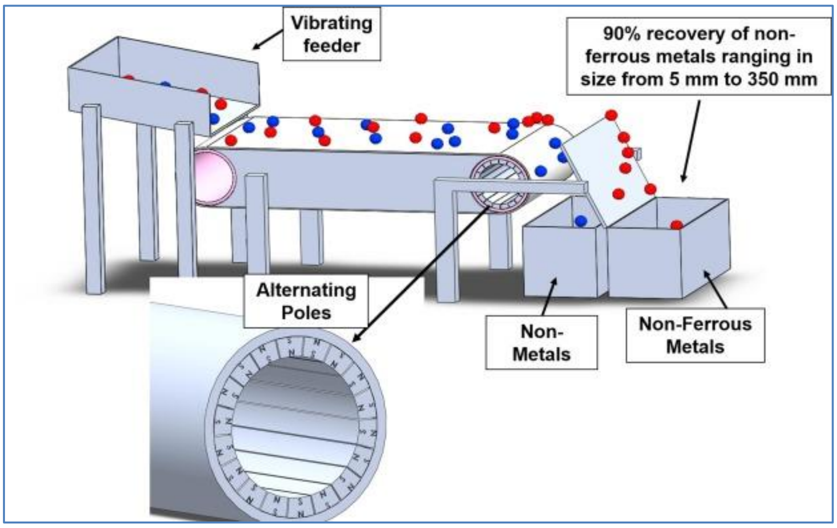
(c) Third – Stainless-steels and metal composites (304 / 316– stainless grades).

231. Based on their ability to remove different types of metals from the waste stream, automated sorting technologies can be classified into overband/conveyer head-roller magnets (removal of magnetic/ferrous metals), eddy current separators (sorting of non-ferrous metals), and induction sensors (sorting of stainless steel and composites).

232. Overband magnets can be used to lift ferrous metal from the moving waste stream, and often move the trapped metal items away to a side-located metal waste bin. Belt-conveyor head-roller magnets attract and hold ferrous metal items onto the conveyor belt as it passes over and back under the cylindrical top-roller, while other non-magnetic waste drops down its natural ballistic path under gravity. A splitting plate is normally positioned just below the roller, between the two different falling paths, to ensure a good separation and capture of the recovered metal parts.

233. Eddy current separators (see Figure 3) are used to separate non-ferrous metal contaminant items, e.g., copper, aluminium, brass, zinc with pieces at 5 to 30 mm nominal size. The plastic waste stream is passed over a very high-speed rotating magnetic roller that induces a rapidly changing magnetic flux field up through the transfer conveying belt and this causes an induced electric current inside each moving conductive metal particle. The resulting repulsive force causes the metal item to 'jump up' and away from the belt, so that it follows a higher trajectory ballistic path, enabling a separation plate to divert most metals away from the bulk plastic stream.

Figure 3: Eddy Current Separator – generic operating principle



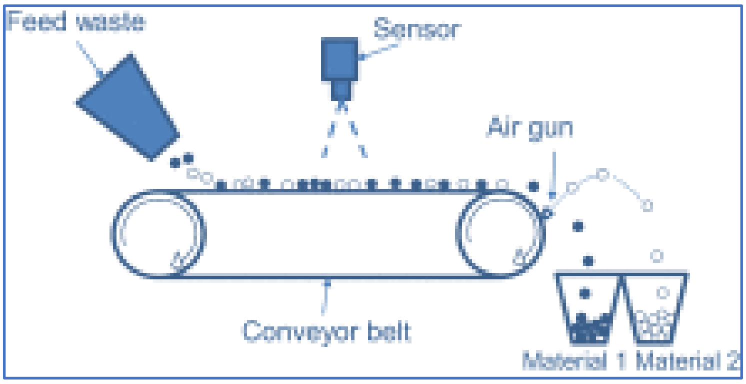
Source: York et al (2019)

234. Sensor-based sorting machines, with induction loops positioned immediately below the sorting conveyor belt, can be used to detect and then eject stainless steel and/or composite conductive items as they pass through the electro-magnetic field generated by the induction sensor loop. The exact position and approximate size of the metallic item are detected by the electric signal induced in the loop and this information is rapidly analysed to trigger an air-jet pulse that blows the unwanted contaminant particle away from the bulk flow of plastics as it leaves the end of the belt. In many cases, this type of detection technology is combined with over-belt optical and X-ray sensor methods to provide additional identification and characterization information during a single pass along a multi-material sorting (e.g., Near Infrared (NIR) / XRF / Induction combined).

235. Automatic sensor-based technology can be used to sort materials according to its type. Sensor-based sorting technology (see Figure 4) including, but not limited to, near infrared (NIR), mid infrared

(MIR), laser-induced breakdown spectroscopy (LIBS), visual spectrometry (VIS), XRF and, (X-ray transmission (XRT) enables separation of plastics by polymer type, plastic density or colour, as well as removing other materials (e.g., paper/cardboard, glass and metals) thus optimizing the plastic waste recycling process and ensuring a higher final quality. In most applications, mixed plastic wastes are transported on a fast-moving conveyor under strong light or X-ray source where high-speed sensing cameras record the position, shape and reflected light or wave signals and make instant analysis of the received spectrum. This allows the polymer type and certain additive chemicals to be identified. Immediately post-detection precisely controlled compressed air-jets are used to eject the sorted items away from the bulk material flow at the end of the transport cover, with splitting plates positioned to affect the final separation process.

Figure 4: Generic layout for most over-belt, sensor-based sorting detect-and-eject methods



Source: Serranti et al (2019)

236. Advanced, automated sensor sorting can also be used to separate plastic wastes from mixed, residual MSW. In addition, these technologies can be used to sort plastic wastes separated and extracted from bulk flow streams of other waste streams, such as mixed WEEE, ELV and mixed construction waste, as described in section F.4. Table 16 provides an overview of available sensor sorting technologies. Constant and rapid technology developments are continually adding new and novel sorting methods to this family of sorting methods. Modern flake sorting designs of sensor equipment can operate on particles as small as 3 to 10mm, but for whole packaging items the normal size of sorted items is in the 40 to 300mm range.

Table 16: Overview of sensor sorting technologies

Near infrared (NIR)	Used to differentiate between plastic types (PET, HDPE, PVC, PP and PS) and to differentiate plastic waste from mixed, residual MSW and other materials such as paper and metals.
Visual spectrometry (VIS)	Used to identify materials based on colour
X-ray Fluorescence (XRF)	Used to differentiate between metals / alloys (for example, copper from steel). Also used for potential POPs or SVHC screening of brominated, chlorinated and fluorinated plastic additives
X-ray Transmission (XRT)	Identifies materials based on atomic density – for example, halogens and organic components, mineral fillers, hidden metal particles inside plastic parts etc.

Source: Cuauhtémoc et al (2021)

237. Robotic sorting is an advanced form of automated sorting. Robots can identify specific products using cameras and analyse images against an internal database of products identified by shape, size, colour, and texture. Typically, rapid speed mechanical arms and grabbers are used to pick and deflect the selected items from the bulk material flow. These systems can also utilize a wide range of detection sensors and camera types, in a similar approach to the over-belt sorting equipment described above.

238. In certain cases, float sink separation and liquid density separation can be used to separate various types of polymers. For float-sink separation, small flakes or particles of mixed plastic are fed into a vessel or tank filled with liquid of a known and controlled density. Plastics in the mix which have a solid density lower than the liquid separation medium will float; those plastics heavier than the liquid density will sink.

239. Water is most commonly used as the separation liquid, to create a density separation at a specific gravity of 1.00. Other fluid densities can be achieved by making controlled salt solutions or

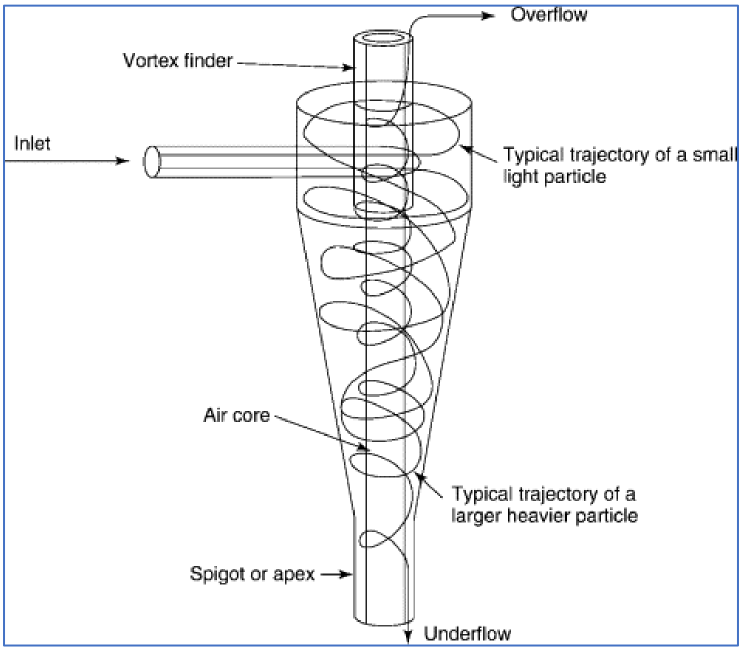
adding suspended solids as fine powders to create density split points at up to a specific gravity of 1.40 (Ragaert et al, 2017).

240. Float-sink separation in water can effectively separate polyolefins (PP, HDPE, LDPE) from PVC, PET and PS, with higher liquid salinity, for sink-float sorting of PS and ABS (in the range of a specific gravity of 1.08 to 1.20). Use of different media can allow separation of PS from PET, but PVC cannot be removed from PET in this manner as their density ranges overlap. In fact, a density gap of 0.1 to 0.2 g/cm³ is recommended to enable a successful float-sink separation with reasonable purity of fractions.

241. Float-sink separation is not effective for separating plastics with similar density. Electrostatic separation can be used to separate polymeric materials of the same or very similar density (e.g., ABS and PS). The principle of electrostatic separation is based on differences in electrostatic forces acting on particles of the mixture exposed to the electric field. The effectiveness of electrostatic separation depends, among others, on the size and shape of particles in the mixture (which has a stochastic character), environmental conditions like humidity, pressure and temperature, the moisture content of the mixture as well as its voltage level, the configuration of the electrode system, and the position of the feeding unit. (Rybarczyk et al, 2020) A plastic containing BFR additives has a higher density (circa +10% higher) than the same plastic without BFR. This density technology can be used to sort plastic waste separated and extracted from WEEE and ELV, as the polyolefin and styrenics floated fraction obtained are almost free of BFRs. BFRs (minor impurities in the ppm range) can persist, but the vast majority of BFRs should be separated into the denser plastic residuals.

242. Hydro-cyclones are based on the principle of centrifugal acceleration to separate plastic waste mixtures by density. A hydro-cyclone transfers fluid pressure energy into high-speed rotational fluid motion (see Figure 5). This rotational motion creates a strong centripetal force within the spinning liquid chamber (i.e., a G-force of multiple times gravity) causing a rapid and strong relative movement of solid particles suspended in the fluid in relation to the particle and fluid density, thus permitting rapid density separation of materials from one another. Hydro-cyclones have a very high throughput rate and result in highly accurate density separation if plastic particle size is small (<6mm nominal size) and of a regular shape.

Figure 5: General configuration liquid hydro-cyclones



Source: Makenji (2009)

243. A similar sorting process for shredded plastics is centrifugal sorting. A cylindrical water-filled centrifuge is used for this purpose and the whole body of the chamber is rotated at very high speed to induce a centrifugal force within the liquid suspension (with up to ~300 G-force). The technique can selectively separate plastic flakes from a mixture of polymer waste materials (Karaman et al., 2015). Various designs of industrial scale continuous power-driven centrifuges are available to provide very accurate density separations of plastics.

(b) Size reduction

244. Shredding, granulation, crushing, cutting, chopping, milling and grinding are mechanical methods for the size reduction of plastic waste items. Selection of the appropriate machinery and method will depend upon the input size of the waste stream, the size and thickness of the items and the toughness of the plastic type as well as the plastic waste format (e.g., solid mouldings, flexible films, woven textiles etc). Size reduction is a necessary process for plastic waste recycling, which delivers a controlled particle size range to the downstream sorting process while also enabling separation of different material types from complex waste components (e.g., HDPE screwcaps from PET beverage bottles; brass screw inserts from electronics casings). Size reduction methods for plastic wastes can be divided into dry and wet systems, but the dry method is most commonly used for cleaner plastic waste streams.

245. When using a dry method to shred or grind plastic wastes, dust prevention and noise reduction equipment is recommended. When using a wet method to crush plastic wastes, the use of a liquid effluent filtration system is recommended to prevent small particles from entering the wastewater.

246. Regardless of which size reduction method is used it is advisable to acquire efficient, energy-saving technology, equipped with effective safety protection measures. Cutting blade wear rates and replacement parts also contribute significantly to operating costs.

(c) Cleaning

247. Plastic wastes may be contaminated with dirt, dust, oils and greases and other wastes. Effective surface cleaning of plastic wastes is vital to reduce impurities before entering a thermal extrusion or granulation process and to reduce consumption of polymer-melt waste in particle filtration screens.

248. Many designs and configurations of cleaning machinery using liquids, in particular water, exist, as well as complete multi-stage plastic washing processes. Mixing, stirring, scrubbing, surface friction, abrasion and high-pressure liquid jets are all employed to remove surface dirt, dust, oils, paints, adhesives and paper-labels etc. The addition of chemical detergents and other cleaning agents (e.g., caustic soda) is common, as is the use of hot-water to provide more effective cleaning (e.g., for label-glue removal from bottles)

249. A circulating liquid system can be used for cleaning plastic wastes and fresh liquid should only be used to supplement the system losses. Phosphorus free cleaning agents or other green cleaning agents are preferable.

250. The cleaning liquid should be collected, assessed for contamination and treated before release to the environment or recycled within the recycling unit.

251. Dry cleaning recycling systems, where water is not required, may be used to pre-clean plastics from sand, stones, glass, paper, etc.

(d) Drying

252. Drying of plastic wastes is carried out to remove excess moisture.

253. Commonly used plastic waste drying technologies include centrifugal spin-drying, air-blast drying, fluidized bed drying, infra-red drying and these often include heated airflow to increase the drying rate.

254. Most common plastic types (e.g., PE, PP and PS) need to be dried to below circa 0.5% water prior to feeding into thermal melt processing equipment. Certain polymer types require much longer drying times to remove all traces of absorbed moisture from within the plastic granules (e.g., PET, ABS, PC, Nylon), otherwise cosmetic and structural problems will result post-extrusion and during moulding.

255. The gas produced by drying of plastic wastes should be treated appropriately before being released to the atmosphere in particular if it is odorous or it contains harmful volatile contaminants.

(e) Thermal melt-extrusion and pelletizing

256. Plastic extrusion processing equipment is the most commonly used method for the final stages of mechanical recycling. Electrical power is used to rotate mechanical screw elements within a heated metal barrel. The combined effects of the physical screw mass-transfer forces and the applied barrel heaters melts the waste polymer flakes and mixes and blends the input raw material components to make a homogenous polymer compound with consistent material properties.

(a) Melt-Filtration - Metal wire-mesh melt-filter screens are often used to remove the final traces (to reach below ~0.5% of plastic mass) of solid particulate contaminants during high-pressure polymer melt flow through a heated extruder screw-and-barrel machine. Used filters should be collected and re-processed;

(b) Pelletizing - The molten output flow leaving the extruder is normally shaped into the form of filament strands by a multi-port die-head, and then cutting or ‘chipping’ is applied to create small (circa 2 to 3 mm) solid plastic pellets. Cooling water baths plus strand-chippers or die-face cutters with pumped water-rings are frequently used to solidify the plastic pellets ready for bagging or bulk storage in silo;

(c) Profile Extrusion - Alternatively, thermal extrusion equipment can be fitted with direct shape-forming die heads to make continuous shaped profiles (e.g., PVC window frames) or wide sheets to create rolls of thin plastic suitable for onward shape forming (e.g., vacuum forming of flowerpots and trays).

(f) Compounding

257. The main purpose of compounding is to make recyclate pellets with improved mechanical properties to meet the quality specifications for end-use product applications. Cosmetic improvements to colour, odour and surface finish can also take place during extrusion compounding of plastic. All of these improvements increase the quality of the recyclate. Compounding may be conducted through physical or chemical modifications, as follows:

(a) Physical Modification - The most common methods for compounding involve the physical mixing of additive components at an accurately controlled mass-ratio to the main recycled plastic waste infeed at the extruder barrel inlet-port. Typical additives that effect physical changes to the output recyclate properties are fillers, impact- and flow-modifiers, fibre re-enforcements, plasticizers, antioxidants, UV-stabilizers etc. Pigments and dyes are commonly added to meet a defined output plastic colour specification. In all cases, a thorough and complete blending, dispersion and mixing of the additive components is important to create a consistent and homogenous output recyclate quality (as described in Table 5 – Additives);

(b) Chemical Modification – during compounding it is possible to effect chemical changes to the recycled plastic waste input by the addition of active ingredients to the input mixture and by control of the physical conditions within the extrusion barrel (e.g., temperature-time profile, degree of shear-mixing and barrel pressure). Typically, chemical improvements to the polymer molecular structure are the desired outcome, with re-building of chain-length, cross-linking bonds, modified crystallinity and improved phase-mixing being examples of this technique. Increasing the polymer viscosity of PET bottle flakes by polycondensation during the extrusion recycling phase is a well-known example of this approach.

3. [Physical Recycling] [Solvent-based recycling] (covered by R3)

258. [During solvent-based recycling the solid plastic’s physical macro-structure is dissolved while the original molecular structure of the individual polymer chains is preserved.] [ALT. Physical recycling refers to solvent-based purification which dissolves the solid plastic’s physical macro-structure but preserves the original molecular structure of the individual polymer chains.] This method can be used to separate and remove additive chemicals and fillers bound within the waste polymer compound. The resulting cleaned polymer molecules can then be recovered (e.g., by precipitation), dried and re-formed into the original plastic material at close to 100% product purity and mass yield.

259. Based on the similar compatibility between solvent and solute molecules, solvent-based recycling separates the plastic resin from various additives and fillers. Solvent-based recycling is a novel technology allowing the recycling of, among others, complex polymer compounds like multilayer packaging or contaminated polystyrene using selective dissolution.

4. [Chemical recycling (covered by R3)

260. ~~[~~The term ‘chemical recycling’ describes a broad range of methods, which have significantly different outputs arising from the applied process techniques. The various methods can be classified into, but not limited to, three categories:

(a) Solvolysis (monomer recycling);

(b) Pyrolysis (falls under chemical recycling in case the output ~~[~~of the facility~~]~~ is used as material for base chemicals ~~[~~and~~-~~ is not used as ~~for~~ fuel or for energy production)~~not as a fuel]~~);

(c) Gasification (falls under chemical recycling in case the output ~~[~~of the facility~~]~~ is used as material for base chemicals ~~[~~and is not used as~~for~~ fuel or for energy production)~~not as a fuel]~~).~~]~~

261. ~~[~~Solvolysis is the collective term used for various types of solvent-specific methods, including ‘glycolysis’, ‘methanolysis’ etc. Solid plastic is dissolved into a liquid phase solvent and the polymer molecules then further break-down into smaller component parts ~~[~~(mainly monomer or oligomers)~~]~~. This technique ~~[is]~~ ~~[~~can be~~]~~ used for polymers with specific targetable bonds~~. For example, it is used for, such as polyurethane, where the original polymerisation reaction is reversed in the liquid solvent phase and the resulting building-blocks, or intermediates, can be purified (i.e., to remove pigments and fillers), prior to being fed-back into the original polymerization process (Dow, 2021; Sołtysiński et al, 2018).~~ This approach preserves the useful chemical components of the waste polymer molecules, and these can be re-used back into full-scale industrial reactors, as direct replacement for primary feedstock raw materials. In the process of purification, hazardous wastes may be generated which should be treated appropriately. The mass of output polymer material recovered by this method ~~can be classified as~~ could be used as the basis for ‘recycled plastic’.~~]~~

262. ~~[~~In the context of chemical recycling, pyrolysis is a method that refers to ~~sealed-reactor~~a thermal process without oxygen. Plastic wastes are subjected to intense heat and~~/or~~ chemical break-down during a thermal reaction process which~~and~~ ~~normally~~ results in output streams that are a mixture of gases, liquids and waxes, plus a residual carbonaceous char. In this process, hazardous wastes may be generated which should be treated appropriately. Often the lightest gaseous output fractions are incinerated within the process to generate some of the~~-~~ heat energy for the chemical break-down. In most cases this is carried out in the absence of oxygen or moisture. Pyrolysis may be used for polymers consisting exclusively of hydrocarbons such as polyethylene, polypropylene and polystyrene.~~]~~

263. ~~[~~Some of the resulting output mass fractions ~~[~~from pyrolysis~~]~~ can be used as chemical feedstock to replace prime (e.g., oil-derived) naphtha materials, as part of the cracking and polymerization reaction stages that make-up large-scale petrochemical process plants. However, the tracking and tracing of the exact end-destination for the waste-derived monomer and short-chain fractions is ~~[difficult]~~ ~~[~~usually not possible.~~][, so]~~ ~~[~~M~~][m]~~ass-balance approaches (a type of chain of custody model) are ~~[needed][~~a means~~]~~ to estimate the actual mass-flow from input plastic waste into the polymer end-products.~~]~~

264. ~~[ISO 22095 (Chain of custody — General terminology and models) can be used as the basis for the definition and description of chain of custody models.~~ Within the mass-balance ~~[chain of custody model][~~approaches~~]~~, there can be significant variation ~~[between the precise approaches]~~ used for this type of chemical recycling with respect to allocation of inputs to outputs. There are various measurement schemes to certify mass-balance processes, which vary in their definitions of recycling and recycled content (Edwards, 2021). ISO 22095 (Chain of custody — General terminology and models) can be used as the basis for the definition and description of chain of custody models. Out of the Chain of Custody models according to the terminology described in ISO 22095, book and claim removes all physical links between inputs and outputs and therefore is not considered a valid approach for chemical recycling of plastic wastes.~~]~~

265. [In the context of chemical recycling, gasification involves plastic wastes being subjected to high-temperatures in the presence of an oxidizing agent to break down the polymer to a ‘syngas’ containing carbon dioxide, monoxide, water and hydrogen (Solis, 2020). This can, in some cases, be converted into ethanol and then used to make new hydrocarbons (e.g., polyethylene).]

266. [Chemical recycling, compared to mechanical recycling, is generally an energy-intensive process ~~[~~and ~~may [emit] a significant amount of [greenhouse gases]~~ [may lead to a significantly higher amount of greenhouse gas emissions]~~]~~. Additionally, hazardous substances can be found in liquid and solid residues and ~~[~~in air emissions from chemical recycling~~]~~ ~~-~~(European Chemicals Agency, 2021). ~~As such, [the following potential environmental impacts from the chemical recycling of plastic wastes should be avoided or reducedminimized:~~ The following potential [human health and] environmental impacts from the chemical recycling of plastic wastes should be [managed and] [avoided or] [minimized] reduced [avoided, minimized or otherwise managed [in an ESM manner]] [managed and ideally avoided or minimized] ~~]~~]:

(a) Emissions of greenhouse gases;

(b) ~~Impacts~~Disposal or releases of unrecycled fractions and other wastes generated from chemical recycling, notably any impacts from their unsound management such as dumping and open burning;

(c) Reintroduction of hazardous substances into ~~[the][~~output~~]~~, including~~[and/or]~~ ~~[~~recycled ~~][~~fractions from the process~~]~~ e.g., from additives or contaminants;

(d) Wastewater releases into any environmental media such as water bodies and land prior to treatment ~~[emissions]~~;

(e) Site littering;

(f) [Use of][Effects from] hazardous solvents in solvolysis (Ügdüler, 2020—)]

267. ~~[~~Chemical recycling, an evolving field, may be a complementary technology to mechanical recycling for certain plastic waste types[69]. Various examples of chemical recycling methods for plastic wastes are available at the pilot-plant stage and also at close to full-scale operating throughput. There is a lack of evidence to generate conclusions around the viability of many technologies, and a lack of understanding of the life-cycle impacts (Hann et al., 2020)~~]~~. Therefore, more evidence is needed on the applicability of the ESM concept to chemical recycling. ~~[For these reasons it is not yet fully proven that chemical recycling can be considered an ESM operation for all applications]~~]

268. For further information refer to the report “Chemical Recycling of Polymeric Materials from Waste in the Circular Economy” (European Chemicals Agency, 2021), “Chemical recycling: A critical assessment of potential process approaches (Quicker et al, 2022)”, “Chemical Recycling of Plastic Waste: Comparative Evaluation of Environmental and Economic Performances of Gasification- and Incineration-based Treatment for Lightweight Packaging Waste” (Voss et al, 2022) and “Chemical Recycling: State of Play” (Hann et al, 2020).**]**

5. Energy recovery (R1)

269. Plastic wastes suitable for energy recovery may, for example, be non-recyclable or hard-to-recycle plastic wastes, plastic wastes consisting of small items dispersed among other waste materials, plastic wastes with a POP content at or above the low POP content limit values and residues from the recycling process containing plastic wastes which cannot themselves be recycled. In line with the waste hierarchy, [recycling of plastic wastes should be prioritized over energy recovery], except in the case where certain plastic types or additives represent a particular health risk or environmental hazard and require destruction in a controlled system.

270. For energy recovery, plastic wastes can inter alia be thermally treated through incineration with energy recovery with other kinds of waste, e.g., MSW and industrial wastes, or through co-incineration in blast furnaces and power plants, and through co-processing in cement kilns.

271. Most plastics are hydrocarbon polymer compounds that can burn and have a high calorific value (see Table 17). [Due to its] high calorific value, plastic waste should be mixed with other compatible waste fractions with a low calorific value in order to achieve a preferably constant calorific value of the mixture.

Table 17: Energy values of plastic wastes, including mixed plastic wastes, in comparison with other waste and fuels.

Single polymers / *Fuels or wastes*	**Lower calorific value[70](MJ/kg)**
LDPE / HDPE	45
PP	45
PS	41
ABS, *Oil*	40
Coal	25
PET	23
PVC	22
Packaging Derived Fuels (PDF)	20
Refuse Derived Fuel (RDF)	15-17
MSW, Wood	8-10
Mixed polymers (Plastic Fuels)	
LDPE/PP/ HDPE (food packaging)	45
PP/ABS/HDPE (computers)	43

[69] Paragraph~~.~~ 217 considers certain types of plastic wastes that are not suitable for mechanical recycling.

[70] Other terms meaning the same as “lower calorific value” are “lower heating value”, “net heating value”, and “net calorific value”. It is noted there are different methods for calculating it.

LDPE/PP/PVC (mixed packaging) PP/ LDPE/PVC (non-food packaging)	37 37
PU/PP/PVC/ABS (bumpers/fuel tanks)	33

272. Plastic wastes can be part of fuels derived from waste such as Solid Recovered Fuel (SRF) in accordance with the European standard (EN 15359) and RDF. SRF usually has a higher calorific value than RDF. RDF is produced by removing non-combustible components such as metals, glass and putrescible materials from MSW and then pelletizing the combustible material. As this is processed MSW, RDF has a higher concentration of plastic waste than MSW and consequently a higher energy value.

273. For further information on incineration with energy recovery of plastic wastes containing or contaminated with POPs, refer to the General technical guidelines on the environmentally sound management of wastes consisting of, containing, or contaminated with persistent organic pollutants (UNEP, 2022a). For further information on incineration with energy recovery of plastic wastes other than plastic wastes containing or contaminated with POPs, refer to the technical guidelines on the environmentally sound incineration of hazardous wastes and other wastes as covered by disposal operations D10 and R1 (UNEP, 2022d). For information on the reduction of mercury releases from the energy recovery of plastic waste containing or contaminated with mercury, refer to the technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with mercury or mercury compounds (UNEP, 2022c).

274. For further information on the co-processing of plastic wastes in cement kilns, refer to the technical guidelines on the environmentally sound co-processing of hazardous wastes in cement kilns (UNEP, 2011).

275. For further information on the disposal of incineration residues, refer to the technical guidelines on the environmentally sound incineration of hazardous wastes and other wastes as covered by disposal operations D10 and R1 (UNEP, 2022d), and the technical guidelines on the environmentally sound disposal of hazardous wastes and other wastes in specially engineered landfill (D5) (UNEP, 2022e). For further information on the disposal of incineration residues containing or contaminated with POPs, refer to the General technical guidelines on the environmentally sound management of wastes consisting of, containing, or contaminated with persistent organic pollutants (UNEP, 2022).

6. Final disposal operations (D5, D10)

276. According to the waste management hierarchy, final disposal of plastic wastes is the least preferred option. Final disposal operations that may be relevant to plastic wastes include specially engineered landfill (D5), and incineration on land (D10).

277. Since plastics can be very light, special care should be taken to ensure plastic wastes are not blown off-site by wind.

278. Some additives such as phthalates, decaBDE, HBCD, PFOS and PFOA contained in plastics could enter the leachate of landfills (Teuten et al., 2009; Wowkonowicz & Kijenska, 2017; Stuart et al., 2019).

279. When carrying out incineration on land (D10) of plastic waste, a preferably constant calorific value of the mixture should be achieved (see paragraph 272 and Table 17).

280. For further information on landfilling of plastic wastes, refer to the technical guidelines on the environmentally sound disposal of hazardous wastes and other wastes in specially engineered landfill (D5) (UNEP, 2022e). For further information on landfilling of plastic wastes containing or contaminated with POPs, refer to the General technical guidelines on the environmentally sound management of wastes consisting of, containing, or contaminated with persistent organic pollutants (UNEP, 2022). For information on the reduction of mercury releases from plastic wastes containing or contaminated with mercury from specially engineered landfill (D5), refer to the technical guidelines on the environmentally sound management of wastes consisting of, containing, or contaminated with mercury or mercury compounds (UNEP, 2022c).

281. For further information on incineration on land (D10) of plastic wastes containing or contaminated with POPs, refer to the General technical guidelines on the ESM of wastes consisting of, containing or contaminated with Persistent Organic Pollutants (POPs) (UNEP, 2022a). For further information on incineration on land (D10) of plastic waste other than plastic wastes containing or contaminated with POPs, refer to the technical guidelines on the environmentally sound incineration of hazardous wastes and other wastes as covered by disposal operations D10 and R1 (UNEP, 2022d).

For information on the reduction of mercury releases from incineration on land (D10) of plastic wastes containing or contaminated with mercury, refer to the technical guidelines on the environmentally sound management of wastes consisting of, containing, or contaminated with mercury or mercury compounds (UNEP, 2022c).

7. Specific aspects related to recycling of certain types of plastic wastes

(a) Specific aspects related to recycling of common types of plastic wastes

282. Specific aspects of recycling of common types of plastic waste (PE, PP, PS, ABS, PET, PC, PVC) are provided below.

(i) Recycling of waste PE

283. LDPE can be mechanically recycled and this involves initial removal of contaminants followed by washing, drying and melt re-processing. Post-extrusion, the LDPE melted paste can be re-formed into thin plastic sheets which can be used for manufacturing plastic products. Good quality LDPE is used for household items like plastic wrap, grocery bags, and non-food containers. Recycled LDPE can be made into garbage cans, garbage bags, construction panelling, furniture, flooring and bubble wrap.

284. Bales of LDPE film can provide a high yield depending on the waste source, with clean distribution film performing best. The recyclate can be reintroduced into many primarily film related applications (e.g., non-food contact packaging, grocery bags, refuse bags, drip irrigation systems).

285. HDPE is normally treated through mechanical recycling. At first, the plastic waste is sorted and cleaned in order for any unwanted non-plastic debris to be removed. Then it needs to be segregated and purified, so that only HDPE items will be re-processed together. If other, non-compatible plastic polymers were to remain in the batch, the recycled end-product will be poor quality. HDPE can be separated by NIR sensor sorting techniques. However, if the plastic is too dark in colour, which means it absorbs the infrared waves, it is difficult to use this technique. Sorted HDPE is then shredded, washed melted and filtered to further purify the polymer. Finally, the plastic is cooled into pellets which can be used in product manufacturing. Recycled HDPE is used, for example, in pens, plastic lumber, plastic fencing, picnic tables and non-food bottles.

286. HDPE obtained from MSW (e.g., milk containers), distribution (e.g., crates and pallets), and construction (e.g., pipes) can be sorted at the article level into relatively pure HDPE streams.

287. HDPE obtained from waste vehicles and WEEE is often sorted by density separation. Preferably, this stream should be further separated (e.g., through electrostatic sorting). Alternatively, HDPE from waste vehicles and WEEE can be co-processed into a compounded blend, although the properties of the final plastic may be of a lower quality than individual 100% pure polymers.

288. Plastic wastes consisting of PE are usually mixed with PP and, occasionally, PVC. HDPE and LDPE may also be mixed together. PE has a degree of compatibility with PP, but has poor compatibility with PVC, so even if the amount of PVC is small, it must be removed before melt processing.

289. The PE/PP compatibility can be enhanced through the use of compatibilization additives. The presence of a small amount of PP in PE will not greatly reduce the performance of the recycled material, but if the amount of PP is large, then, for example, EPDM (ethylene propylene diene monomer rubber) can be considered as a possible compatibilizer for improved melt-blending.

290. [In case recycled HDPE is used in food contact materials, strict national legislation for using recycled plastics in food contact materials should be in place to minimize migration of chemicals into food.]

(ii) Recycling of waste PP

291. PP obtained from MSW (e.g., margarine tubs), bulky waste (e.g., garden furniture), distribution (e.g., crates and pallets), ELV and WEEE mixed-plastics and construction wastes can be sorted into relatively homogeneous single-polymer waste streams. Good segregation of these different waste streams helps to deliver well-characterised mixed plastic waste items into recycling sorting facilities and aids higher recycling yields and recyclate quality.

292. Regarding the mechanical recycling of PP, like other plastics, good sorting, washing, purification and melt re-processing are all critical steps to delivering high yield and quality of recyclate output. In the melt reprocessing phase, high purity PP flake is fed into an extruder where it is melted at 180 to 220 °C then homogenized, de-gassed, melt-filtered and die-formed into strands

before cooling to be chipped into pellet granules. This is the common format for secondary PP raw-material polymer product.

293. Recycled PP can be mixed with virgin PP in any ratio for the production of new products such as clothes hangers, playground equipment, compost bins and kerbside recycling crates. However, there are many recent examples of high-quality PP recyclates being used at 100% levels for the production of car-parts, pipes, drainage goods and electrical product casings, as well as for non-food contact packaging items.

(iii) Recycling of waste PS

294. PS can be recycled physically and/or mechanically. HIPS is easier to recycle since its properties are not greatly affected even after multiple re-processing. The recycling rate of PS packaging waste is low due to the difficulty in removing food residues and odours from used packages.

295. PS foams can be troublesome for most rigid plastic recycling facilities. If oily molecules, water, and other contaminants make it into recycled materials, the substances can disrupt and weaken the polymers. PS clamshell containers and coffee cups are especially likely to be dirty, adding to the effort of processing them for recycling (Lemonick. S, 2019).

296. Solvent-based dissolution of foamed PS and rigid-PS waste materials can be used to remove unwanted contaminants, odours, and additives (e.g., BFR) to create high-purity PS recyclates[71].

(iv) Recycling of waste ABS

297. ABS can be successfully recycled mechanically from mixed waste streams. Similar to the recycling of PS from these waste fractions, NIR sorting is difficult due to the extensive use of black plastics. However, density separation can be employed to create a mixed-styrenics fraction (PS+ABS) that is almost free from BFR additives. The presence of mineral filled-PP in the plastic waste infeed mixture will result in some PP contamination in the PS+ABS density sorted fraction, which is incompatible for melt-blending even at low levels. Further separation may not always be necessary, because ABS and PS polymers display a level of compatibility in extrusion, although further purification is possible using electrostatic sorting, to remove filled-PP and PS, to make near-pure ABS for higher-end applications. The ABS recyclates can be reintroduced into their original applications (e.g., vacuum cleaners) or other used for other applications (e.g., non-food containers; automotive parts; furniture feet).

298. ABS regenerated material can sometimes be blended with other similar types of compatible plastic waste (e.g., HIPS), and, by adding various functional additives, modified ABS blended materials with good toughness, corrosion resistance, oil resistance, cold resistance, weatherability and anti-aging properties can be produced. When recycled, ABS from plastic wastes can be used either in a mixture with virgin material, or as 100% recyclate, to produce products.

(v) Recycling of waste PET

299. PET makes up a large percentage of rigid, household packaging items in the form of blow-moulded bottles and thermoformed trays, often in clear, natural colour. The collection of rigid packaging from municipal sources means that PET recycling rates are some of the highest for any plastic, especially in countries where DRS are well-established (e.g., Norway has over 90% bottle collection rates)[72]. Polyester fibre recycling from clothing, household fabrics and bedding (e.g., duvet fillings) remains at very much lower rates, due to less prevalence of collection systems for these products.

300. Blow-moulded PET from bottles is one of the plastic wastes that are easiest to recycle and have the highest recycling rate of any common plastic. Closed loop recycling (e.g., bottle to bottle) is possible. This is because it is relatively easy to wash, separate out coloured flakes and then upgrade the intrinsic viscosity (polymer chain length) during the recycling process to near-virgin quality using polycondensation reactions. Food-contact approval certification has been given to advanced recycling processes that can demonstrate very high purity and tight quality control of the closed-loop recycled PET (r-PET), with usage levels of up to 100% r-PET to make new consumer drinks bottles.

301. The process of recycling PET bottles (or other rigid PET packaging wastes) for use in fibres is generally to sort, granulate, float sink, wash and dry. The fibres are made by adding colouring (as required), extrusion melting, filtering, and spinning into fibres. The output quality of the fibres

[71] See https://www.ivv.fraunhofer.de/en/recycling-environment/recycling-plastics.html#creasolv.

[72] See https://www.bpf.co.uk/suppliers/packaging/deposit-return-schemes.aspx.

depends upon the input quality of the PET flakes and the capability of the recycling process. The most demanding woven applications with very fine denier yarns can be successfully made from 100% recycled PET.

302. PET textiles and fibres can be recycled by thorough washing and re-melting. Recycled PET can be used for carpets, garments and non-woven applications.

303. [In common with recycled HDPE, recycled PET is also used in food contact materials. Noting paragraph 290, there should be national legislation in place to minimize migration of chemicals into food.]

(vi) Recycling of waste PC

304. Waste PC can be recycled by mechanical recycling. PC is difficult to separate from mixed WEEE and ELV waste plastic streams due to the difficulty in reaching a high enough purity of the individual PC sorted flakes. Most PC recycling happens where source segregated PC-rich waste streams exist, such as used CD and DVD discs. After repeated recycling and reprocessing PC is prone to degradation and its mechanical properties, especially notched impact strength, will be significantly reduced. Therefore, PC recycled material can be reinforced by adding a toughening agent.

(vii) Recycling of waste PVC

305. PVC can be recycled by mechanical recycling, which involves mechanically treating the waste (e.g., grinding) to reduce it into much smaller particles (i.e., powder or 'pulver'). The resulting granules can be melted and re-moulded into different products, usually the same product from which it came, such as window frame profiles.

306. Certain PVC wastes may contain high concentrations of lead compounds, phthalates, or other additives to an extent to render the waste hazardous or problematic. In such cases, the future use of the recycled PVC should be carefully assessed in order to ensure its adequacy with the permitted uses in case of restrictions due to the presence of such additives in products.

(b) Specific aspects related to recycling of other types of plastic wastes

307. Specific aspects related to recycling of other types of plastic wastes (cured resins, fluorinated polymers, biodegradable plastic wastes, textile plastic wastes) are provided below.

(i) Recycling of waste cured resins

308. Cured resins are thermoset polymers which cannot be remelted or dissolved in a solvent. This makes such polymers difficult to recycle.

(ii) Recycling of waste fluorinated polymers

309. The recycling of waste fluorinated polymers is not well established inter alia as they may contain additives (e.g., glass fibres, glass beads, graphite, and soot) to an extent to render the waste hazardous or problematic (Schlipf et al., 2014). In addition, fluorinated polymers applied to metal articles (e.g., non-stick frying pans) may not be recycled as it is difficult to separate them from metal wastes during metal recycling.

310. In addition to the fluorinated polymers referred to in table 3, polytetrafluoroethylene (PTFE) is of practical relevance and the main material used. Currently, recycling of fluorinated polymers is mainly applied to certain PTFE wastes. Some of the fluorinated polymers are thermosets, such as PTFE, which cannot undergo thermal melt-extrusion or compounding, but can be recycled after size reduction. The recyclates obtained in this process can be used as additives e.g., in plastics other than PTFE. It is not possible to use such recyclates in their original applications. Some other fluorinated polymers, such as FEP and PFA, are thermoplastics and can undergo thermal melt-extrusion or compounding. It is noted that the fluoride content of fluorinated polymers may lead to corrosion during recycling.

(iii) Recycling of biodegradable plastic wastes

311. ~~[~~ ~~[~~Biodegradable plastic ~~[~~wastes~~]~~, including compostable wastes, are not suitable for mechanical recycling ~~[~~together~~]~~ with non-biodegradable plastic wastes~~]~~. To avoid contaminating or otherwise reducing the quality of plastic recyclate, biodegradable plastics ~~[~~should not be mixed~~]~~ with non-biodegradable plastics in the recycling stream.~~]~~ If collected in a separate stream, ~~a few~~ some types of biodegradable plastic wastes may be ~~treated~~ recycled e.g., with mechanical recycling ~~[and composting]~~. Research and development in this area is still ongoing. While ~~M~~mechanical recycling of some types of biodegradable plastic wastes is possible, ~~but~~ it may be difficult to convert them into

useful products, especially due to thermomechanical degradation during extrusion. Therefore, after each cycle the product quality is lower compared with the starting material.~~]~~

312. ~~[~~As an example of biodegradable plastic wastes, PLA may be effectively sorted out during a mechanical recycling process using ~~available detection technologies. PLA can be sorted out using~~ spectroscopy~~.,~~ H~~h~~owever it is not possible to separate it using mechanical sorting techniques such as density separation. ~~There is~~ ~~however~~ T~~t~~herefore ~~a risk that mechanical sorting techniques are not able to sufficiently sort out~~ biodegradable plastics ~~from conventional polymers, which~~ can ~~then~~ contaminate the recycled fraction and degrade the quality of recyclate. ~~Also,~~ PLA is denser than water so in the flotation tank any PLA fragments ~~will~~ may eventually follow the PET stream towards mechanical recycling. This mixing of PLA with PET materials may cause problems in the reprocessing stage ~~to the reprocessing unit~~ since PLA and PET have different melting points (Luc et al., 2018).~~]~~

313. [-There is a need to recognize the environmental impacts related to the use of biodegradable plastics, its durability, affordability, and ESM of biodegradable plastic when its turns to waste especially there is a need to have a proper environmental conditions and capacity] ~~[Not every plastic that is biodegradable is compostable. Whereas biodegradable plastic may be engineered to biodegrade in soil or water, compostable plastic refers to biodegradation into soil conditioning material (i.e., compost) under a certain set of conditions. In order for a plastic to be labeled as commercially "compostable" it must be able to be broken down by biological treatment at a commercial or industrial composting facility. Composting utilizes microorganisms, heat and humidity to yield carbon dioxide, water, inorganic compounds, and biomass that is similar in characteristic to the rest of the finished compost product. Decomposition of the plastic must occur at a rate similar to the other elements of the material being composted (within 6 months) and leave no toxic residue that would adversely impact the ability of the finished compost to support plant growth. The American Society for Testing and Materials (ASTM International) has established ASTM Standards D6400 and D6868 which identify specifications that must be met to label a plastic as commercially "compostable". There are currently no ASTM standard test methods in place for evaluating the ability of a plastic to compost in a home environment (EPA webpage: https://www.epa.gov/trash-free-waters/frequently-asked-questions-about-plastic-recycling-and-composting).]~~

~~313.~~

(iv) Recycling of textile plastic wastes

314. Textiles with fabrics that contain more than one fibre are inherently difficult to recycle mechanically because the fibres cannot be easily separated. (e.g., cotton and polyester blends).

315. Recycling of Nylon-6 (polyamides type) has been widely used in the carpet industry, through combining mechanical and chemical (depolymerization) processes (Hann et al., 2020). Nylon 6.6 (polyamides type) is commonly recycled mechanically from pre-consumer fibres (Le, 2018).

316. PP carpet fibres can be recycled, but the process is simplified when the complete carpet structure (i.e., pile fibres; adhesives; foam underlay) has been designed and constructed for ease-of-recycling by using fully compatible polymer types in the product composition. This approach works well for short-life carpets used, e.g., for large area exhibition halls and sports arenas.

~~[~~8. Specific aspects related to the disposal of compostable plastic wastes~~]~~

317. ~~[[Composting in industrial composting facilities currently can be applied for compostable plastic wastes e.g., PLA used for waste collection bags (Spierlinga, 2017) and starch-based plastics used for food-waste caddy sacks etc.]~~Composting of compostable plastic wastes together with organic waste can be applied in certain controlled industrial composting facilities e.g., PLA- and starch-based plastics used for waste collection bags (Spierlinga, 2017). However, not all industrial composting facilities can treat compostable plastic waste within the operating timeframe, as each facility operates with varying conditions of time, temperature, moisture, oxygen, and microbial activity. ~~[It should however be noted that compostable plastic, including PLA, may contain hazardous substances and therefore not be suitable for composting (Zimmerman et al., 2020).]~~

317bis While international standards on compostable plastic have requirements in relation to plant toxicity[73], research is ongoing about whether compostable plastic contains hazardous substances. Zimmerman et al (2020) found that certain biodegradable plastic, which included some compostable plastic, for example PLA, can contain hazardous substances in a similar way to fossil-based plastics and may therefore not be suitable for composting.

~~]~~

318. ~~[~~When collecting ~~and accepting~~ compostable plastic for treatment in ~~[~~a~~]~~ ~~[~~controlled~~]~~ ~~[an]~~ ~~[~~industrial~~]~~ composting facility~~,~~, clear guidance should be provided to residents and other waste generators about which type of ~~plastics~~ ~~are~~ compostable plastic waste can ~~to~~ be collected together with the [organic] waste streams destined for composting in ~~professionally /~~ ~~[~~controlled~~]~~ industrial composting ~~ly managed~~ facilities. ~~Otherwise, there is a risk of attracting other non-compostable plastics and creating subsequent technical problems in the composting activity.]~~

~~[~~318bis. Collecting non-compostable plastics together with compostable plastic and organic waste should be avoided. Sorting should be undertaken to ensure that non-compostable plastic wastes are removed from the waste stream destined for composting to the industrial composting facility, in accordance with the relevant acceptance criteria ~~[at~~ for the facility~~]~~.~~]~~

319. ~~[In cases where compostable plastic waste are disposed of in controlled industrial composting facilities that are not able to fully treat them, this may result [In addition, compostable~~ in compostable ~~plastics may not break~~ing ~~down sufficiently in the composting facility, especially in colder climates. Residual plastic may therefore remain visible, hindering marketing efforts, depending on the acceptance of anticipated customers for the final product.]~~

~~[~~319bis. The time it takes for ~~a material~~ compostable plastic waste to be composted in ~~go through~~ a controlled industrial composting facility can vary significantly for example depending on the chosen composting process, ~~local~~ and the ~~[composting] [environmental]~~ conditions and the properties of the compostable ~~biodegradable~~ plastic wastes (such as the material thickness). This should be done in accordance with the relevant standard the compostable plastic waste was certified with (e.g., decomposition occurs at a rate similar to the other elements of the material being composted). The outputs of composting compostable plastics are CO2, water, biomass, and inorganic compounds. In cases where the compostable plastic wastes are disposed of in controlled industrial composting facilities that are not able to treat them, this may result in residual plastic remaining in the compost and could subsequently lead to plastic leakage and the release of microplastics. [It is worth to mention that care has been taken that using the compostable plastics will affect the food value chain and can be a source for CO2 generation. It also has not well established processes of collection and sortation as compared to fossil-based plastics.]

~~]~~

~~[~~319ter. As compostable plastics are designed to break down in specific conditions of a~~n~~ controlled industrial composting facility, it should be noted that compostable plastic waste ~~[would]~~ ~~[~~will~~]~~ not completely break down in a landfill in accordance with its certification criteria, and may result in increased methane releases. Therefore, compostable plastics should be composted in a controlled industrial composting facility rather than landfilled, where such facilities exist.~~]~~

H. Health and safety

320. Both the supplier and/or operator of the facility ~~managing [plastic waste]~~ should ensure that the following information is available and safety measures are in place, when required:

(a) The identity, quality and form of the plastic waste, especially the content of chemicals of concern such as POPs;

(b) The safe handling instructions appropriate to the plastic wastes;

[73] For example, under ASTM D6400-21 compostable plastic is not permitted to leave toxic residue that would adversely impact the ability of the finished compost to support plant growth.

(c) The protective clothing that should be worn by employees, including eye and ear protection, gloves, protective footwear, filter masks and hard hats, depending on the processing to which the plastic waste is subjected;

(d) The safe storage of the compacted plastic wastes, including mechanical handling equipment, stack heights/stability and stack spacing;

(e) Fire prevention, firefighting, fire extinguishers, emissions from burning plastic wastes, advice to fire fighters, means of dealing with fire residues.

321. To improve knowledge regarding possible risk due to contamination, the origin of the waste and information on how the waste is generated will help improve recycling and reduce risk to employees. Waste operators should have access to sufficient information on relevant hazardous substances (additives etc.) used at the production step of the plastic.

322. Contaminated plastic wastes, such as packaging of pesticides or other hazardous chemicals, should be handled with specific care, in particular if it constitutes a hazardous waste dependant on the type and amount of contamination.

323. When plastic waste is contaminated with larger quantities of food residues problems with micro-organisms, odour and attraction of pests may occur. Measures should be taken to reduce odour and pests around the workplace.

~~323.~~

324. ~~Plastic containers used to supply hospitals with sterile water and other aqueous solutions may safely be recycled provided they have been kept separated from medical/clinical wastes (e.g., RECOMED UK[74]). Plastic wastes may become contaminated with water, insect pests and dirt during transport and storage if not properly protected.~~ Plastic containers used to supply hospitals with sterile water and other aqueous solutions may safely be recycled provided they have been kept separated from medical/clinical wastes [(e.g., RECOMED UK[75])]. These clean plastic wastes may be subject to traceability requirements when recycled (e.g., ISO11607[76]), or they may be recycled for non-healthcare applications.

324bis. Care should be taken to protect plastic wastes from contamination with water, insect pests or dirt during transport and storage.

325. ~~With respect to health and safety in relation to plastic wastes from healthcare facilities, the Technical guidelines on environmentally sound management of biomedical and healthcare wastes (Y1, Y3) (UNEP, 2002) should also be considered.~~ Kept for consistency of para numbers

326. The following rules should apply in the workplace:

(a) Smoking should be forbidden in the plastic waste storage and disposal areas and such areas should be protected by secure fencing;

(b) Ready access to all parts of storage areas should be maintained by well-organised and supervised stacking patterns in order to ensure efficient working conditions, easy emergency escape routes for workers and ready access for emergency services vehicles;

(c) Suitable extinguishers should be readily available in storage areas and staff should attempt to extinguish fires in their very earliest stages.

327. Working conditions for employee health and safety should include, as applicable (Illinois Recycling Association, 2010):

(a) An environmentally comfortable and safe working environment. This includes:

(i) Space that is heated in the winter, cooled in the summer, and has good air exchange (ventilation);

~~[74] See https://recomed.co.uk/about-recomed.~~

[75] See https://recomed.co.uk/about-recomed.

[76] ISO11607- Packaging for terminally sterilized medical devices (available from: https://www.iso.org/standard/70799.html~~ PENDING Co-leads to insert LINK~~)

(ii) Anti-fatigue mats to reduce the physical discomfort of standing in one place for long periods of time;

(iii) Sufficient lighting to reduce eye strain;

(iv) Gloves, safety glasses, hearing protection, steel-toed boots, and, if applicable, hardhats, facemasks and respirators;

(b) All stations and conveyors should be ergonomically designed. For instance, sorting conveyors should be of a comfortable reach across width, if sorting from one side of the conveyor.

1. Fire and safety

328. In the event of a fire (at any industrial operation):

(a) All staff should evacuate the premises immediately and assemble at recognised points and be counted;

(b) The emergency services should be summoned immediately and should be reminded:

(i) Of the speed at which fire can spread in burning plastics;

(ii) That burning plastics may form a mobile stream of burning material which can rapidly transfer the fire to other areas and can also block drains;

(iii) Of the need for self-contained breathing apparatus when entering a building in which any material is burning.

329. Good practice guidance for managing fire safety during the reception, treatment and storage of solid combustible wastes is provided by the Waste Industry Safety and Health (WISH) forum on reducing fire risks at waste management sites (WISH, 2020).

2. Smoke and toxic gases

330. The major cause of deaths in accidental fires is through the inhalation of carbon monoxide and smoke which should be prevented (Fardell, 1993). Fire brigades usually regard the smoke and fumes from any accidental fire as toxic and employ self-contained breathing apparatus when entering a burning building regardless of the materials present.

331. It should be taken into account that combusting PVC and fluoropolymers may emit acidic gases. The high chlorine content of PVC reduces its ignitability and also generates less heat compared with other types of plastics[77]. It should also be noted that combusting fluorinated polymers can produce hydrogen fluoride which is acutely toxic and ecotoxic.

332. Toxic gases emitted during thermal degradation are harmful on their own, but those harms can be multiplied when they are emitted in combination. For example, when carbon monoxide and hydrogen cyanide are emitted together from polyurethane insulation foam (a thermoset plastic) this can significantly increase the risk of cardiac arrest and cancer, hazards well-known to firefighters (Drager Safety AG & Co).

333. Soot from combusting materials, natural and man-made, contain small concentrations of more toxic materials and so should be handled with care using appropriate protective clothing.

I. Emergency response

334. Emergency response plans should be in place for plastic wastes in production, use, storage and transport or at disposal sites. The principal elements of an emergency response include:

(a) Identifying all potential hazards, risks and accidents;

(b) Identifying relevant local and national legislation governing emergency response plans;

(c) Planning for anticipated emergency situations and possible responses to them;

(d) Maintaining a complete up-to-date inventory of the plastic wastes on site;

(e) Training personnel in response activities, including simulated response exercises, and first aid;

(f) Maintaining mobile spill response capabilities or retaining the services of a specialized firm for spill response;

[77] See https://envorinex.com/web_assets/docs/products/PVC%20and%20Fire.pdf

(g) Installing mitigation measures such as fire suppression systems, spill containment equipment, fire-fighting water containment, spill and fire alarms, and firewalls;

(h) Installing emergency communication systems, including signs indicating emergency exits, telephone numbers, alarm locations and response instructions;

(i) Installing and maintaining emergency response kits containing sorbents, personal protective equipment, portable fire extinguishers and first aid supplies;

(j) Integrating facility plans with local, regional, national and global emergency plans, if appropriate;

(k) Regularly testing emergency response equipment and reviewing emergency response plans.

335. Emergency response plans should be prepared jointly by interdisciplinary teams that include emergency response, medical, chemical and technical personnel and labour and management representatives. When applicable, representatives of potentially impacted communities should also be included.

J. Awareness and participation

336. Public participation is a core principle of the 1999 Basel Declaration on Environmentally Sound Management and many other international agreements. It is essential that the public and all stakeholder groups have a chance to participate in the development of policy related to plastic wastes, the planning of programmes, the development of legislation, the review of documents and data and decision making on local issues related to plastic wastes. Paragraphs 6 (g) and (h) of the Basel Declaration reflect an agreement to enhance and strengthen efforts and cooperation to achieve ESM with regard to the enhancement of information exchange, education, and awareness-raising in all sectors of society, along with cooperation and partnership at all levels between countries, public authorities, international organizations, industry, non-governmental organizations and academic institutions.

337. Articles 6, 7, 8, and 9 of the UNECE 1998 Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention), along with the Escazú Convention, require the parties to conduct fairly specific types of activities regarding public participation in specific government activities, the development of plans, policies and programmes and the development of legislation and call for access to justice for the public with regard to the environment.

338. Public awareness and attitudes to plastic wastes can affect the population's willingness to cooperate and participate in adequate plastic waste management practices. General environmental awareness and information on health risks due to deficient plastic waste management are important factors which need to be continuously communicated to all sectors of the population.

339. Raising public awareness and promoting public participation is especially critical for separation and collection as important steps for environmentally sound management of plastic wastes.

340. Local authorities should organize awareness raising campaigns/events addressed to business (commercial, beach users, fishermen, etc.) and the public (tourists, households, etc.) to make people aware of the importance of ESM of waste plastics in tackling environmental problems such as marine litter and in improving people's lives. There exists a variety of communication techniques that can be used, such as door to door information, leaflets, community meetings, media etc. Communication objectives could (Climate and Clean Coalition, 2013):

(a) Address cultural practices and beliefs;

(b) Emphasize health benefits;

(c) Use simple messages and multiple media types;

(d) Build on existing neighbourhood networks;

(e) Emphasize the economic benefits of proper plastic waste management;

(f) Frame plastic waste management activities as a topic of great interest for voters, particularly on important issues (e.g., marine plastic litter);

(g) Increase visibility and credibility of plastic waste management activities (e.g., by issuing uniforms to workers);

(h) Identify instances where city activities support national goals;

(i) Communicate about the national benefits of proper local plastic waste management (e.g., to attract investments);

(j) Tailor communication to the intended audience;

(k) Emphasize the economic benefits to businesses (e.g., better conditions for attracting investment);

(l) Target groups with broad influence (e.g., tourism boards).

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BASEL CONVENTION

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Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
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Item 4 (b) (v) of the provisional agenda**

Matters related to the implementation of the Convention: scientific and technical matters: further consideration of plastic waste

Further consideration of plastic waste

Note by the Secretariat

I. Introduction

1. Following the amendments to Annexes II, VIII and IX adopted in decision BC-14/12, the Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, in paragraph 1 of decision BC-15/15, took note of the background information related to a possible future assessment of the effectiveness of the measures taken under the Basel Convention to address plastic waste and to possible further activities that could be conducted under the Convention.[1]

2. In paragraphs 10 and 11 of the same decision, the Conference of the Parties invited Parties and others to provide comments to the Secretariat, by 31 October 2022, on possible further activities that could be conducted under the Basel Convention in response to developments in scientific knowledge and environmental information related to plastic waste as a source of land pollution, marine plastic litter and microplastics,[2] and requested the Secretariat to make those comments available on the website of the Convention and to suggest possible such activities, taking into consideration the comments received and the work undertaken in follow-up to United Nations Environment Assembly resolution 5/14 entitled "End plastic pollution: towards an international legally binding instrument", as appropriate, for consideration by the Open-ended Working Group at its thirteenth meeting and by the Conference of the Parties at its sixteenth meeting.

3. In the same decision, the Conference of the Parties decided to update the technical guidelines on the environmentally sound management of used and waste pneumatic tyres[3] and invited Parties and others to provide comments to the Secretariat, by 31 October 2022, on whether technical guidelines on the environmentally sound management of rubber wastes (entry B3040) and waste parings and scrap

* Reissued for technical reasons on 13 March 2023.
** UNEP/CHW.16/1.
[1] UNEP/CHW.15/INF/10.
[2] Ibid.
[3] UNEP/CHW.10/6/Add.1/Rev.1, annex.

of rubber (entry B3080) should be developed. Further information on those technical guidelines can be found in document UNEP/CHW.16/6, on technical guidelines.

II. Implementation

4. In line with paragraph 10 of decision BC-15/15, Parties and others provided comments to the Secretariat on possible further activities that could be conducted under the Basel Convention in response to developments in scientific knowledge and environmental information related to plastic waste as a source of land pollution, marine plastic litter and microplastics. The comments received from Parties and others are available on the Basel Convention website.[4]

5. Taking into consideration the comments received and the work undertaken in follow-up to Environment Assembly resolution 5/14, the Secretariat prepared a draft document on possible further activities that could be conducted under the Convention in response to developments in scientific knowledge and environmental information and health impacts related to plastic waste as a source of land pollution, marine plastic litter and microplastics, for consideration by the Open-ended Working Group at its thirteenth meeting.[5] Parties and observers were invited to provide comments on the draft document by 31 March 2023. Comments received by the 31 March 2023 deadline are available on the website of the Convention. A revised version of the draft document on possible further activities, taking into consideration the comments received, the work undertaken in follow-up to United Nations Environment Assembly resolution 5/14, as appropriate, and the discussions at the thirteenth meeting of the Open-ended Working Group, is set out in document UNEP/CHW.16/INF/18 for consideration by the Conference of the Parties at its sixteenth meeting.

6. The information relating to the Secretariat's cooperation with the intergovernmental negotiating committee to develop a legally binding instrument on plastic pollution can be found in documents UNEP/CHW.16/22–UNEP/FAO/RC/COP.11/17–UNEP/POPS/COP.11/23, UNEP/CHW.16/INF/40–UNEP/FAO/RC/COP.11/INF/23–UNEP/POPS/COP.11/INF/45 and UNEP/CHW.16/INF/58–UNEP/FAO/RC/COP.11/INF/41–UNEP/POPS/COP.11/INF/59.

III. Proposed action

7. The Conference of the Parties may wish to adopt a decision along the following lines:

The Conference of the Parties

1. *Takes note* of the draft document on possible further activities that could be conducted under the Basel Convention in response to developments in scientific knowledge and environmental information and health impacts related to plastic waste as a source of land pollution, marine plastic litter and microplastics;[6]

2. *Decides* to undertake the following activities: [to be inserted];[7]

3. *Decides* to include in the work programme of the Open-ended Working Group for 2024–2025, under topic II D on further consideration of plastic waste, the consideration of further activities that could be conducted under the Convention in response to developments in scientific knowledge and environmental information related to plastic waste, as well as in the consideration by the intergovernmental negotiating committee referred to in paragraph 1 of resolution 5/14 of the United Nations Environment Assembly.

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[4] www.basel.int/tabid/9357.

[5] UNEP/CHW/OEWG.13/INF/11.

[6] UNEP/CHW.16/INF/18.

[7] This is a placeholder for any activities that the Conference of the Parties may wish to decide to undertake, taking into account the elements of possible further activities that could be conducted under the Basel Convention set out in document UNEP/CHW.16/INF/18.

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Matters related to the implementation of the Convention: scientific and technical matters: further consideration of plastic waste

Revised draft of possible further activities that could be conducted under the Basel Convention in response to developments in scientific knowledge and environmental information and health impacts related to plastic waste as a source of land pollution, marine plastic litter and microplastics

Note by the Secretariat

1. As is mentioned in the note by the Secretariat on further consideration of plastic waste (UNEP/CHW.16/10), the annex to the present note sets out a revised version of the draft document on possible further activities that could be conducted under the Convention in response to developments in scientific knowledge and environmental information and health impacts related to plastic waste as a source of land pollution, marine plastic litter and microplastics.

2. As is mentioned in the note by the Secretariat on the outcomes of and follow up to the thirteenth meeting of the Open-ended Working Group (UNEP/CHW.16/20/Add.1), Parties and others were invited to submit, by 31 March 2023, comments on the version of the draft contained in document UNEP/CHW/OEWG.13/INF/11.

3. The revised version set out in the annex to the present note was prepared by the Secretariat, taking into account the comments received from Parties and others referred to in paragraph 2 above,[1] the work undertaken in follow-up to United Nations Environment Assembly resolution 5/14, as appropriate, and the discussions at the thirteenth meeting of the Open-ended Working Group.

4. The present note, including its annex, has not been formally edited.

* UNEP/CHW.16/1.

[1] http://www.basel.int/tabid/9505.

Annex

Revised draft of possible further activities that could be conducted under the Basel Convention in response to developments in scientific knowledge and environmental information and health impacts related to plastic waste as a source of land pollution, marine plastic litter and microplastics

I. Consideration of possible further activities that could be conducted under the Basel Convention

1. Recent scientific knowledge and environmental information highlight the severity of plastic pollution as a global environmental problem. The Basel Convention has a unique role in addressing this issue due to its legally binding status in controlling the transboundary movements of hazardous wastes and other wastes, including its environmentally sound management.

2. The fifth session of the United Nations Environment Assembly (UNEA) decided that an intergovernmental negotiating committee is to develop an international legally binding instrument on plastic pollution, including provisions to promote cooperation and coordination with relevant regional and international conventions, instruments and organizations, while recognizing their respective mandates, avoiding duplication, and promoting complementarity of action. UNEA also reaffirmed the importance of cooperation, coordination and complementarity among relevant regional and international conventions and instruments, with due respect for their respective mandates, including the Basel, Rotterdam, and Stockholm conventions.

3. A study funded by the Government of Norway is being conducted to identify gaps and complementarities in global governance of plastics and associated chemicals.[1]

4. Technical guidelines on the environmentally sound management of plastic waste[2] are being updated and are opportunely placed to provide guidance based on new developments in scientific knowledge and environmental information related to plastic waste to minimize leakages into the environment in the waste phase.

5. The Plastic Waste Partnership,[3] established by the Basel Convention, has four project groups[4] working on prevention and minimization, plastic waste collection, recycling, financing and related markets, transboundary movements and outreach and awareness raising.[5] The Partnership provides a multistakeholder platform for knowledge sharing, capacity building, and technology transfer related to plastic waste management. The Partnership's broad mandate also highlights the need for coordination and collaboration, as appropriate, on activities with other organizations and initiatives to establish synergies and prevent duplication. Further activities could be conducted within the framework of the Partnership, should this be mandated by the Conference of the Parties.

II. List of possible further activities that could be conducted under the Basel Convention

6. Reflecting on recent developments in scientific knowledge and environmental information and taking into account the activities conducted under the Basel Convention, including the Plastic Waste Partnership and by other international and regional entities, it is suggested that further activities be considered under the Basel Convention. The activities should prioritize those that support the implementation of the Plastic Waste Amendments, and they should complement the new international legally binding instrument on plastic pollution, including in the marine environment,[6] as well as the

[1] UNEP/CHW.16/INF/58–UNEP/FAO/RC/COP.11/INF/41–UNEP/POPS/COP.11/INF/59; http://www.basel.int/tabid/8335.

[2] UNEP/CHW.16/INF/11/Rev.1.

[3] Decision BC-14/13.

[4] http://www.basel.int/tabid/8410.

[5] UNEP/CHW.16/INF/34.

[6] UNEA Resolution 5/14.

science-policy panel for chemicals, waste and pollution prevention[7] that are currently under development. These activities are listed below:

(a) Information collection, monitoring and reporting:

(i) Invite Parties, on a voluntary basis, to collect and transmit the following:

a. Information on the generation, management of plastic waste;

b. Information on the trade of plastic waste covered by entries A3210 and Y48 and of plastic waste covered by entry B3011;

c. Information on the capacities of importing countries to deal with imported plastic waste;

d. Information on illegal traffic and mismanagement of plastic waste;

e. Information on potential challenges in the application and implementation of the existing provisions, such as determining which types of plastic waste are covered by the various entries in the Basel Convention and distinction between waste and non-waste in relation to plastics;

f. The extent to which the above-mentioned entries on plastic waste have contributed to protecting human health and the environment against adverse effects which may result from the generation and management of plastic wastes;

(ii) Invite Parties, on a voluntary basis, to adopt the following measures:

a. A procedure for reducing plastic discharges into the environment by supporting civil society organizations and consulting firms specializing in environmental pollution, innovation, energy and climate change through a financing fund;

b. A regulation and accountability system for private sector with an aim of enhancing the sound management of plastic waste;

c. Promotion of the installation of plastic waste recovery units using local resources, and specialized state-affiliated structures;

d. Promotion of the sorting of plastic waste in households;

(iii) Request the Secretariat, subject to the availability of resources, to support Parties:

a. To quantify or estimate the quantities of plastic waste generated, managed, exported and imported, recycled and disposed of, including through the development of plastic waste inventories, to inform national action plans addressing minimization, environmentally sound management and control of transboundary movements of plastic waste;

b. To quantify or estimate the quantities of plastic waste leaked into the environment and to identify priority areas for reducing such leakage;

c. To disseminate the information referred to in subparagraph 6 (a) (i) above through the clearing-house mechanism;

(b) Support for the implementation of the Basel Convention provisions relevant to plastic waste:

(i) Conduct an assessment based on the existing practical guidance and activities under the Convention, notably the practical guidance available in the ESM toolkit, activities under the Plastic Waste Partnership, practical guidance for the implementation of the Basel Convention, the provisions within the Convention and its technical guidelines on the environmentally sound management of plastic waste, on the following:

a. Prevention and minimization of plastic waste and its hazardous constituents;

[7] UNEA Resolution 5/8.

b. Environmentally sound management of specific waste streams where plastic is relevant;

c. Technologies for the recycling of plastic waste;

d. Transboundary movements of plastic waste, including information on illegal traffic;

e. Financing the environmentally sound management of plastic waste, e.g. through extended producer responsibility;

(ii) Invite the Basel Convention regional and coordinating centres for training and technology transfer and the Stockholm Convention regional and subregional centres for capacity-building and transfer of technology to continue their activities relevant to addressing plastic pollution.

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Matters related to the implementation of the Convention: Basel Convention Partnership Programme

Basel Convention Partnership Programme

Note by the Secretariat

I. Introduction

1. In paragraph 2 of section I of decision BC-15/22 on the Basel Convention Partnership Programme, on the Follow-up Partnership to the Partnership for Action on Computing Equipment, the Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal adopted the amendments to the terms of reference of the Partnership,[1] including the new name of the Partnership,[2] and the programme of work for the biennium 2022–2023 of the working group of the Partnership, and requested the working group of the Partnership to implement the activities included in the programme of work. In paragraph 3 of the decision, the Conference of the Parties invited Parties, signatories and all other stakeholders, including manufacturers, recyclers, refurbishers, academia, relevant e-waste platforms, non-governmental and intergovernmental organizations, and former partners of the Partnership for Action on Computing Equipment, to communicate to the Secretariat no later than 31 August 2022 their wish to be admitted as a member of the working group of the Partnership. The Secretariat was requested to report on progress in the implementation of the decision to the Open-ended Working Group of the Basel Convention at its thirteenth meeting and to the Conference of the Parties at its sixteenth meeting.

2. In the same decision, in section II, on the Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic, the Conference of the Parties took note of decision BC-15/17, on the Committee Administering the Mechanism for Promoting Implementation and Compliance,[3] by which it amended the terms of reference of the Network and made a number of requests for action to the Network's members and the Secretariat. Furthermore, in decision BC-15/17, the Conference of the Parties requested the Secretariat, subject to the availability of resources, to organize annual meetings

* UNEP/CHW.16/1.

[1] UNEP/CHW.15/INF/39/Add.1.

[2] Partnership for Action on Challenges relating to E-waste (PACE II).

[3] See section II of decision BC-15/17, on the review of general issues of compliance and implementation under the Convention, subsection on illegal traffic: cooperative arrangements including the Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic, paras. 30–39.

of the Network and to report on the Network's activities to the Conference of the Parties at its sixteenth meeting.

3. In decision BC-15/22, in paragraph 14 of section III, on the Household Waste Partnership, the Conference of the Parties invited Parties and others to provide further comments on the draft overall guidance document on the environmentally sound management of household waste[4] to the Secretariat by 15 October 2022. In paragraph 15, the Conference of the Parties requested the working group to prepare, by 15 December 2022, a revised draft of the overall guidance document for consideration by the Conference of the Parties at its sixteenth meeting. Furthermore, in paragraph 16, it invited Parties and others to provide comments on the revised draft of the overall guidance document to the Secretariat by 15 February 2023 and requested the Secretariat to publish the comments received on the Convention website and prepare a compilation of those comments for consideration by the Conference of the Parties at its sixteenth meeting. In paragraph 18, the working group was requested to implement a number of activities, which constituted the workplan of the Household Waste Partnership for the biennium 2022–2023. The Secretariat was requested to report on progress in the implementation of the decision to the Open-ended Working Group at its thirteenth meeting and to the Conference of the Parties at its sixteenth meeting.

4. In the same decision, in paragraph 22 of section IV, on the Plastic Waste Partnership, the Conference of the Parties invited Parties and others who had not yet nominated members to the working group and who wished to do so to inform the Secretariat of their nominations, while in paragraph 23, the working group was requested to continue to implement its workplan for the biennium 2020–2021[5] during the biennium 2022–2023. Finally, the Secretariat was requested to report on the progress of work within the Plastic Waste Partnership to the Open-ended Working Group at its thirteenth meeting and to the Conference of the Parties at its sixteenth meeting.

II. Implementation

A. Partnership for Action on Challenges Relating to E-waste

5. On 28 June 2022, in a letter sent in follow-up to the fifteenth meeting of the Conference of the Parties to the Basel Convention,[6] the Secretariat invited Parties, signatories and others to indicate by 31 August 2022 their interest in participating in the working group of the Partnership for Action on Challenges Relating to E-Waste (PACE II). The Secretariat subsequently sent a reminder of the invitation, extending the deadline to 30 September 2022. Other invitation letters were sent by the co-chairs of the working group and by the Secretariat to inform additional stakeholders of the new scope of the Partnership and to invite them to join the working group. As at 15 December 2022, the Partnership working group comprised 63 members, including 19 Parties, 4 intergovernmental organizations, 21 regional centres, 2 governmental bodies or agencies, 3 non-governmental organizations, and 14 industries or industry associations. The list of members is available on the website of the Convention.[7]

6. To implement the activities of its programme of work for 2022–2023, the working group decided to establish four project groups, each focusing on one area of implementation of the programme of work: project group 1 on dissemination activities; project group 2 on the development of guidance on the environmentally sound repair and refurbishment and environmentally sound management of used and waste television screens, and audio and video equipment; project group 3 on the development of guidance on the environmentally sound repair and refurbishment and environmentally sound management of used and waste refrigerators, and cooling and heating equipment; and project group 4 on pilot projects. Each project group developed a programme of work which was shared with the working group for suggestions and endorsement. The working group decided to conduct its work electronically and to try to meet face-to-face to finalize the guidance documents under development. The Secretariat organized a number of teleconferences of the working group and the project groups between June 2022 and January 2023 to support the project groups on the implementation of the programme of work of the working group for 2022–2023, in particular the development of the above-mentioned guidance documents. The draft versions of the two guidance documents are provided respectively in annexes I and II of document UNEP/CHW.16/INF/31. A report by the working group on progress made in the implementation of the activities set out in the

[4] UNEP/CHW.15/18/Rev.1/Add.1.

[5] UNEP/CHW.14/INF/16/Rev.1, annex II.

[6] www.basel.int/TheConvention/Communications/tabid/1596/Default.aspx.

[7] www.basel.int/Implementation/TechnicalAssistance/Partnerships/PACEII/Membership/tabid/9303/Default.aspx.

programme of work for 2022–2023 is included in document UNEP/CHW.16/INF/32. The draft programme of work for the biennium 2024–2025 prepared by the working group is identical to the programme of work of the working group for the biennium 2022–2023. It is set out in document UNEP/CHW.16/19/Add.1 and was also made available to the Open-ended Working Group at its thirteenth meeting for its consideration.[8] Parties and observers were invited to provide comments on the draft programme of work by 31 March 2023. Comments received by the 31 March 2023 deadline are available on the website of the Convention.[9] The Partnership received financial support from the European Union, France, Germany, Sweden and Switzerland.

B. Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic

7. Owing to restrictions related to the coronavirus disease (COVID-19) pandemic, the sixth meeting of the Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic was held online from 11 to 13 April 2022. The seventh meeting of the Network will be held on 26 and 27 January 2023 in Paris, France. Both meetings were held thanks to generous financial support from the Government of France.

8. The members of the Network exchanged information and identified opportunities for cooperation, including through the roadmap of activities for 2023−2024 set out in the note by the Secretariat on the progress report by the Chair on the activities of the Network (UNEP/CHW.16/INF/33). In the meeting to be held in 2023, members will also discuss the amended terms of reference and the requests directed to the network's members and the Secretariat in decision BC-15/17, on the Committee Administering the Mechanism for Promoting Implementation and Compliance, including, for example, the creation of a network of expertise among the members on the enforcement of the Convention. Additional information on the Network's activities is contained in document UNEP/CHW.16/INF/33.

C. Household Waste Partnership

9. In follow-up to decision BC-15/22, the Secretariat received two sets of comments on the draft overall guidance document on the environmentally sound management of household waste by the 15 October 2022 deadline.[10] Subsequently, the Secretariat worked with interested members of the Household Waste Partnership working group to prepare a revised draft by 15 December 2022. This draft is made available to the Conference of the Parties in document UNEP/CHW.16/19/Add.2. Comments received by Parties and others on this draft, together with a compilation of the comments, will be made available on the website of the Convention after the 15 February 2023 deadline for consideration by the Conference of the Parties.[11]

10. With respect to the workplan of the Household Waste Partnership for the biennium 2022–2023, the working group met periodically online during the intersessional period to discuss activities for awareness-raising and outreach, particularly with respect to the overall guidance document. Additionally, in September 2022, a pilot project implemented by the Basel Convention Regional Centre for the Caribbean to test the overall guidance document was finalized, the report of which was published on the website of the Convention.[12] Recommendations arising from the report have been integrated into the draft overall guidance document made available to the Conference of the Parties in document UNEP/CHW.16/19/Add.2.

D. Partnership on Plastic Waste

11. As at 15 December 2022, the Plastic Waste Partnership working group comprised 278 representatives from 58 Parties and one signatory, 14 intergovernmental organizations, 12 regional centres, 27 non-governmental organizations and 20 industry or industry associations. The list of members is updated on a weekly basis and is available on the website of the Convention.[13]

[8] UNEP/CHW/OEWG.13/INF/15, annex III.

[9] http://www.basel.int/Implementation/TechnicalAssistance/Partnerships/PACEII/Programmeofwork/tabid/9305/Default.aspx.

[10] www.basel.int/Implementation/HouseholdWastePartnership/OverallGuidanceDocument/tabid/8227/Default.aspx.

[11] www.basel.int/Implementation/HouseholdWastePartnership/OverallGuidanceDocument/tabid/8227/Default.aspx.

[12] www.basel.int/Implementation/HouseholdWastePartnership/Overview/tabid/5082/Default.aspx.

[13] www.basel.int/Implementation/Plasticwaste/PlasticWastePartnership/Membership/tabid/8098/Default.aspx.

12. The third meeting of the Plastic Waste Partnership working group took place from 23 to 25 November 2022 in Punta del Este, Uruguay, back to back with the first session of the intergovernmental negotiating committee to develop an international legally binding instrument on plastic pollution, including in the marine environment. The meeting was held thanks to generous financial support from the European Union and the Government of Norway. During its meeting, the working group considered progress made in the implementation of the project group workplans and the pilot project programme and developed a draft of its workplan for the biennium 2024–2025. Other key outcomes of the meeting included approval of a report on best practices and lessons learned on measures taken by key stakeholders to prevent and reduce single-use plastic waste and packaging waste,[14] and a compilation of national and international specifications related to the Basel Convention plastic waste amendments aimed at assisting Parties in their implementation of the amendments.[15] The report of the meeting is available on the website of the Convention.[16]

13. Drafts of the Partnership working group's workplan and of the four project groups workplans for the biennium 2024–2025 were made available to the Open-ended Working Group at its thirteenth meeting for its consideration and Parties and observers were invited to provide comments on the drafts by 31 March 2023. The draft workplan of the working group for the biennium 2024–2025 is available to the meeting in document UNEP/CHW.16/19/Add.3, while the four project groups' workplans are set out in UNEP/CHW.16/INF/57. Comments received by the 31 March 2023 deadline are available on the website of the Convention.[17] Lastly, a report on the activities of the Plastic Waste Partnership working group, which includes progress made by the respective project groups, is available in document UNEP/CHW.16/INF/34.

III. Proposed action

14. The Conference of the Parties may wish to adopt a decision along the following lines:

The Conference of the Parties

I

Partnership for Action on Challenges relating to E-waste

1. *Welcomes* the activities undertaken by the working group of the Partnership for Action on Challenges relating to E-waste (hereinafter "the Partnership") to implement its programme of work;[18]

2. *Invites* Parties and others who have not yet nominated members to the working group and who wish to do so to inform the Secretariat of their nominations;

3. *Approves* the programme of work of the Partnership for the biennium 2024–2025[19] and requests the working group of the Partnership to implement it;

4. *Requests* the Secretariat to report on progress in the implementation of the present decision to the Open-ended Working Group at its fourteenth meeting and to the Conference of the Parties at its seventeenth meeting;

II

Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic

5. *Welcomes* the activities undertaken by the Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic since the fifteenth meeting of the Conference of the Parties;[20]

[14] See document UNEP/CHW.16/INF/55.

[15] See document UNEP/CHW.16/INF/56.

[16] www.basel.int/Implementation/Plasticwaste/PlasticWastePartnership/Consultationsandmeetings/3rdPWPmeeting/Overview/tabid/9297/Default.aspx.

[17] http://www.basel.int/Implementation/Plasticwaste/PlasticWastePartnership/tabid/8096/Default.aspx.

[18] UNEP/CHW.15/INF/39/Add.1, annex II.

[19] UNEP/CHW.15/19/Add.1, annex.

[20] UNEP/CHW.16/INF/33, annex.

6. *Invites* entities with a specific mandate to deliver implementation and enforcement capacity-building activities that could assist Parties to the Basel Convention in preventing and combating illegal traffic of hazardous wastes and other wastes to consider sending a duly motivated request to the Chair of the Network regarding admission as members of the Network;

7. *Elects* the following representatives of three Parties to the Basel Convention to serve as members of the Network until the eighteenth meeting of the Conference of the Parties:

From African States: [*to be completed*];

From Western European and other States: [*to be completed*];

From Eastern European States: [*to be completed*];

8. *Designates* the following two representatives of the Basel Convention regional and coordinating centres to serve as members of the Network until the eighteenth meeting of the Conference of the Parties:

From the African region: [*to be completed*];

From the Eastern European region: [*to be completed*];

9. *Encourages* members with the mandate to undertake enforcement operations activities on preventing and combating illegal traffic of hazardous wastes and other wastes under the Basel Convention at the global level to jointly plan and deliver such activities in cooperation with the other members of the Network and the Secretariat as appropriate;

10. *Requests* the Secretariat to report on progress in the implementation of the present decision to the Conference of the Parties at its seventeenth meeting;

III

Household Waste Partnership

11. *Adopts* the overall guidance document on the environmentally sound management of household waste;[21]

12. *Invites* Parties and others to undertake activities to use, promote and disseminate the overall guidance document on the environmentally sound management of household waste;[22]

13. *Welcomes* the activities of the working group of the Household Waste Partnership to implement its workplan for the biennium 2022–2023;[23]

14. *Requests* the working group to implement the following activities, which constitute the workplan of the Household Waste Partnership for the biennium 2024–2025:

(a) Activities for awareness-raising and training relating to the environmentally sound management of household waste, coordination of outreach activities and cooperation with other organizations working on household waste management;

(b) Continued coordination of outreach activities and cooperation with other organizations working on household waste management, including the Partnership on Plastic Waste, to prevent overlap between programmes and to share lessons learned;

15. *Requests* the Secretariat to report on progress in the implementation of the present decision to the Open-ended Working Group at its fourteenth meeting and to the Conference of the Parties at its seventeenth meeting;

[21] UNEP/CHW.16/19/Add.2.

[22] Ibid.

[23] Decision BC-15/22, para. 18.

IV

Partnership on Plastic Waste

16. *Welcomes* the activities of the working group of the Partnership on Plastic Waste to implement its workplan for the biennium 2022–2023;[24]

17. *Invites* Parties and others who have not yet nominated members to the working group and who wish to do so to inform the Secretariat of their nominations;

18. *Takes note* of the report on best practices and lessons learned on measures taken by key stakeholders to prevent and reduce single-use plastic waste and packaging waste,[25] and the compilation of national and international specifications related the Basel Convention plastic waste amendments aimed at assisting Parties in their implementation of the amendments;[26]

19. *Approves* the workplan of the Partnership for the biennium 2024–2025[27] and requests the working group of the Partnership to implement it;

20. *Requests* the working group to continue to approve the work products and reports prepared by the project groups in accordance with its workplan, and to widely disseminate such information and knowledge gathered and generated through the activities of the Partnership;

21. *Requests* the Secretariat to report on progress in the implementation of the present decision to the Open-ended Working Group at its fourteenth meeting and to the Conference of the Parties at its seventeenth meeting.

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[24] UNEP/CHW.14/INF/16/Rev.1, annex II, and decision BC-15/22.

[25] See document UNEP/CHW.16/INF/55.

[26] See document UNEP/CHW.16/INF/56.

[27] UNEP/CHW.16/19/Add.3.

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Matters related to the implementation of the Convention: scientific and technical matters: amendments to Annexes II, VIII and IX on e-waste

Assessment of the need to update existing guidance, technical guidelines and fact sheets to reflect adjustments consequential to the adoption of the e-waste amendments

Note by the Secretariat

I. Introduction

1. In decision BC-15/18, on amendments to Annexes II, VIII and IX to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, the Conference of the Parties to the Basel Convention decided to amend Annexes II, VIII and IX to the Basel Convention in relation to electrical and electronic waste (hereinafter referred to as the e-waste amendments).

2. As is set out in the annex to decision BC-15/23, on the work programme of the Open-ended Working Group of the Basel Convention for the biennium 2022–2023, the Open-ended Working Group was requested to consider the need to update existing guidance, technical guidelines and fact sheets to reflect adjustments consequential to the adoption of the e-waste amendments.

II. Implementation

3. At its thirteenth meeting, the Open-ended Working Group considered an assessment, including draft recommendations, of the need to update existing guidance, technical guidelines and fact sheets to reflect adjustments consequential to the adoption of the e-waste amendments, prepared by the Secretariat (UNEP/CHW/OEWG.13/INF/12).

4. The outcomes of the thirteenth meeting of the Open-ended Working Group, including draft recommendations for consideration by the Conference of the Parties, are set out in document UNEP/CHW.16/20/Add.1. The assessment prepared by the Secretariat of the need to update existing guidance, technical guidelines and fact sheets to reflect adjustments consequential to the adoption of the e-waste amendments, revised as appropriate by the Open-ended Working Group at its thirteenth meeting, is contained in document UNEP/CHW/COP.16/INF/19.

* UNEP/CHW.16/1.

III. Proposed action

5. The Conference of the Parties may wish to consider the information in the present note and in the documents mentioned therein. It may also wish to take action as appropriate on updates to existing guidance, technical guidelines and fact sheets to reflect adjustments consequential to the adoption of the e-waste amendments, taking into account the recommendations developed by the Open-ended Working Group at its thirteenth meeting as set out in document UNEP/CHW.16/20/Add.1.

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Geneva, 1–12 May 2023
Agenda item 4 (b) (vi)

Matters related to the implementation of the Convention: scientific and technical matters: amendments to Annexes II, VIII and IX on e-waste

Draft decision BC-16/[--]: Updating existing guidance, technical guidelines and fact sheets in order to reflect adjustments consequential to the adoption of the e-waste amendments

Submission by the Secretariat

The text below reflects the discussions in plenary session on the afternoon of 7 May 2023 and further consultations with Parties that intervened in plenary session.

The Conference of the Parties

1. *Requests* the Secretariat, subject to the availability of resources, to prepare draft updates of the following documents in order to reflect adjustments consequential to the adoption of the amendments to Annexes II, VIII and IX to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, set out in decision BC-15/18 and known as the "e-waste amendments":

(a) Practical guidance for the development of inventories of waste electrical and electronic equipment (version of April 2017);[1]

(b) Revised fact sheets on specific waste streams (UNEP/CHW.13/INF/7/Rev.1, annex);

(c) Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with hexabromocyclododecane (UNEP/CHW.12/5/Add.7/Rev.1, annex);

(d) Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with hexabromodiphenyl ether and heptabromodiphenyl ether, or tetrabromodiphenyl ether and pentabromodiphenyl ether, or decabromodiphenyl ether (UNEP/CHW.14/7/Add.3/Rev.1, annex);

(e) Technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with polychlorinated biphenyls, polychlorinated terphenyls, polychlorinated naphthalenes or polybrominated biphenyls including hexabromobiphenyl (UNEP/CHW.13/6/Add.4/Rev.1, annex);

(f) Guidance document on environmentally sound management of used and end-of-life computing equipment (UNEP/CHW.13/INF/31/Rev.1, annex I);

[1] http://www.basel.int/Countries/NationalReporting/Guidanceoninventoryofhazardouswastes/tabid/8755/Default.aspx.

(g) Revised guideline on environmentally sound testing, refurbishment and repair of used computing equipment (UNEP/CHW.11/INF/12/Rev.1, annex);

(h) Revised guideline on environmentally sound material recovery and recycling of end-of-life computing equipment (UNEP/CHW.11/INF/13/Rev.1, annex);

(i) Report with environmentally sound management criteria recommendations;[2]

(j) Report on strategies, actions and incentives to promote environmentally sound management of end-of-life-computing equipment;[3]

(k) Manual on Steps to Establish and Implement Environmentally Sound Management for Used and Waste Computing Equipment (UNEP/CHW/OEWG.10/INF/13, annex III);

2. *Decides* to include the following sentence at the beginning of the guidance document on the environmentally sound management of used and end-of-life mobile phones:[4] "This guidance document does not reflect the amendments to Annexes II, VIII and IX to the Basel Convention, set out in decision BC-15/18 adopted by the Conference of the Parties at its fifteenth meeting";

3. *Requests* the Secretariat to submit the draft updates of the documents referred to in paragraph 1 of the present decision, once updated to reflect adjustments consequential to the adoption of the e-waste amendments, for consideration by the Open-ended Working Group at its fourteenth meeting and the Conference of the Parties at its seventeenth meeting.

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[2] http://www.basel.int/Implementation/TechnicalAssistance/Partnerships/PACEII/PACE/PACEGuidanceDocument/tabid/3246/Default.aspx.

[3] Ibid.

[4] http://www.basel.int/Implementation/TechnicalAssistance/Partnerships/MPPI/MPPIGuidanceDocument/tabid/3250/Default.aspx.

UNITED NATIONS

UNEP/CHW.16/19

BASEL CONVENTION

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Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
Sixteenth meeting
Geneva, 1–12 May 2023
Item 4 (e) of the provisional agenda*

Matters related to the implementation of the Convention: Basel Convention Partnership Programme

Basel Convention Partnership Programme

Note by the Secretariat

I. Introduction

1. In paragraph 2 of section I of decision BC-15/22 on the Basel Convention Partnership Programme, on the Follow-up Partnership to the Partnership for Action on Computing Equipment, the Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal adopted the amendments to the terms of reference of the Partnership,[1] including the new name of the Partnership,[2] and the programme of work for the biennium 2022–2023 of the working group of the Partnership, and requested the working group of the Partnership to implement the activities included in the programme of work. In paragraph 3 of the decision, the Conference of the Parties invited Parties, signatories and all other stakeholders, including manufacturers, recyclers, refurbishers, academia, relevant e-waste platforms, non-governmental and intergovernmental organizations, and former partners of the Partnership for Action on Computing Equipment, to communicate to the Secretariat no later than 31 August 2022 their wish to be admitted as a member of the working group of the Partnership. The Secretariat was requested to report on progress in the implementation of the decision to the Open-ended Working Group of the Basel Convention at its thirteenth meeting and to the Conference of the Parties at its sixteenth meeting.

2. In the same decision, in section II, on the Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic, the Conference of the Parties took note of decision BC-15/17, on the Committee Administering the Mechanism for Promoting Implementation and Compliance,[3] by which it amended the terms of reference of the Network and made a number of requests for action to the Network's members and the Secretariat. Furthermore, in decision BC-15/17, the Conference of the Parties requested the Secretariat, subject to the availability of resources, to organize annual meetings

* UNEP/CHW.16/1.

[1] UNEP/CHW.15/INF/39/Add.1.

[2] Partnership for Action on Challenges relating to E-waste (PACE II).

[3] See section II of decision BC-15/17, on the review of general issues of compliance and implementation under the Convention, subsection on illegal traffic: cooperative arrangements including the Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic, paras. 30–39.

of the Network and to report on the Network's activities to the Conference of the Parties at its sixteenth meeting.

3. In decision BC-15/22, in paragraph 14 of section III, on the Household Waste Partnership, the Conference of the Parties invited Parties and others to provide further comments on the draft overall guidance document on the environmentally sound management of household waste[4] to the Secretariat by 15 October 2022. In paragraph 15, the Conference of the Parties requested the working group to prepare, by 15 December 2022, a revised draft of the overall guidance document for consideration by the Conference of the Parties at its sixteenth meeting. Furthermore, in paragraph 16, it invited Parties and others to provide comments on the revised draft of the overall guidance document to the Secretariat by 15 February 2023 and requested the Secretariat to publish the comments received on the Convention website and prepare a compilation of those comments for consideration by the Conference of the Parties at its sixteenth meeting. In paragraph 18, the working group was requested to implement a number of activities, which constituted the workplan of the Household Waste Partnership for the biennium 2022–2023. The Secretariat was requested to report on progress in the implementation of the decision to the Open-ended Working Group at its thirteenth meeting and to the Conference of the Parties at its sixteenth meeting.

4. In the same decision, in paragraph 22 of section IV, on the Plastic Waste Partnership, the Conference of the Parties invited Parties and others who had not yet nominated members to the working group and who wished to do so to inform the Secretariat of their nominations, while in paragraph 23, the working group was requested to continue to implement its workplan for the biennium 2020–2021[5] during the biennium 2022–2023. Finally, the Secretariat was requested to report on the progress of work within the Plastic Waste Partnership to the Open-ended Working Group at its thirteenth meeting and to the Conference of the Parties at its sixteenth meeting.

II. Implementation

A. Partnership for Action on Challenges Relating to E-waste

5. On 28 June 2022, in a letter sent in follow-up to the fifteenth meeting of the Conference of the Parties to the Basel Convention,[6] the Secretariat invited Parties, signatories and others to indicate by 31 August 2022 their interest in participating in the working group of the Partnership for Action on Challenges Relating to E-Waste (PACE II). The Secretariat subsequently sent a reminder of the invitation, extending the deadline to 30 September 2022. Other invitation letters were sent by the co-chairs of the working group and by the Secretariat to inform additional stakeholders of the new scope of the Partnership and to invite them to join the working group. As at 15 December 2022, the Partnership working group comprised 63 members, including 19 Parties, 4 intergovernmental organizations, 21 regional centres, 2 governmental bodies or agencies, 3 non-governmental organizations, and 14 industries or industry associations. The list of members is available on the website of the Convention.[7]

6. To implement the activities of its programme of work for 2022–2023, the working group decided to establish four project groups, each focusing on one area of implementation of the programme of work: project group 1 on dissemination activities; project group 2 on the development of guidance on the environmentally sound repair and refurbishment and environmentally sound management of used and waste television screens, and audio and video equipment; project group 3 on the development of guidance on the environmentally sound repair and refurbishment and environmentally sound management of used and waste refrigerators, and cooling and heating equipment; and project group 4 on pilot projects. Each project group developed a programme of work which was shared with the working group for suggestions and endorsement. The working group decided to conduct its work electronically and to try to meet face-to-face to finalize the guidance documents under development. The Secretariat organized a number of teleconferences of the working group and the project groups between June 2022 and January 2023 to support the project groups on the implementation of the programme of work of the working group for 2022–2023, in particular the development of the above-mentioned guidance documents. The draft versions of the two guidance documents are provided respectively in annexes I and II of document UNEP/CHW.16/INF/31. A report by the working group on progress made in the implementation of the activities set out in the

[4] UNEP/CHW.15/18/Rev.1/Add.1.

[5] UNEP/CHW.14/INF/16/Rev.1, annex II.

[6] www.basel.int/TheConvention/Communications/tabid/1596/Default.aspx.

[7] www.basel.int/Implementation/TechnicalAssistance/Partnerships/PACEII/Membership/tabid/9303/Default.aspx.

programme of work for 2022–2023 is included in document UNEP/CHW.16/INF/32. The draft programme of work for the biennium 2024–2025 prepared by the working group is identical to the programme of work of the working group for the biennium 2022–2023. It is set out in document UNEP/CHW.16/19/Add.1 and was also made available to the Open-ended Working Group at its thirteenth meeting for its consideration.[8] Parties and observers were invited to provide comments on the draft programme of work by 31 March 2023. Comments received by the 31 March 2023 deadline are available on the website of the Convention.[9] The Partnership received financial support from the European Union, France, Germany, Sweden and Switzerland.

B. Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic

7. Owing to restrictions related to the coronavirus disease (COVID-19) pandemic, the sixth meeting of the Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic was held online from 11 to 13 April 2022. The seventh meeting of the Network will be held on 26 and 27 January 2023 in Paris, France. Both meetings were held thanks to generous financial support from the Government of France.

8. The members of the Network exchanged information and identified opportunities for cooperation, including through the roadmap of activities for 2023−2024 set out in the note by the Secretariat on the progress report by the Chair on the activities of the Network (UNEP/CHW.16/INF/33). In the meeting to be held in 2023, members will also discuss the amended terms of reference and the requests directed to the network’s members and the Secretariat in decision BC-15/17, on the Committee Administering the Mechanism for Promoting Implementation and Compliance, including, for example, the creation of a network of expertise among the members on the enforcement of the Convention. Additional information on the Network’s activities is contained in document UNEP/CHW.16/INF/33.

C. Household Waste Partnership

9. In follow-up to decision BC-15/22, the Secretariat received two sets of comments on the draft overall guidance document on the environmentally sound management of household waste by the 15 October 2022 deadline.[10] Subsequently, the Secretariat worked with interested members of the Household Waste Partnership working group to prepare a revised draft by 15 December 2022. This draft is made available to the Conference of the Parties in document UNEP/CHW.16/19/Add.2. Comments received by Parties and others on this draft, together with a compilation of the comments, will be made available on the website of the Convention after the 15 February 2023 deadline for consideration by the Conference of the Parties.[11]

10. With respect to the workplan of the Household Waste Partnership for the biennium 2022–2023, the working group met periodically online during the intersessional period to discuss activities for awareness-raising and outreach, particularly with respect to the overall guidance document. Additionally, in September 2022, a pilot project implemented by the Basel Convention Regional Centre for the Caribbean to test the overall guidance document was finalized, the report of which was published on the website of the Convention.[12] Recommendations arising from the report have been integrated into the draft overall guidance document made available to the Conference of the Parties in document UNEP/CHW.16/19/Add.2.

D. Partnership on Plastic Waste

11. As at 15 December 2022, the Plastic Waste Partnership working group comprised 278 representatives from 58 Parties and one signatory, 14 intergovernmental organizations, 12 regional centres, 27 non-governmental organizations and 20 industry or industry associations. The list of members is updated on a weekly basis and is available on the website of the Convention.[13]

[8] UNEP/CHW/OEWG.13/INF/15, annex III.

[9] http://www.basel.int/Implementation/TechnicalAssistance/Partnerships/PACEII/Programmeofwork/tabid/9305/Default.aspx.

[10] www.basel.int/Implementation/HouseholdWastePartnership/OverallGuidanceDocument/tabid/8227/Default.aspx.

[11] www.basel.int/Implementation/HouseholdWastePartnership/OverallGuidanceDocument/tabid/8227/Default.aspx.

[12] www.basel.int/Implementation/HouseholdWastePartnership/Overview/tabid/5082/Default.aspx.

[13] www.basel.int/Implementation/Plasticwaste/PlasticWastePartnership/Membership/tabid/8098/Default.aspx.

12. The third meeting of the Plastic Waste Partnership working group took place from 23 to 25 November 2022 in Punta del Este, Uruguay, back to back with the first session of the intergovernmental negotiating committee to develop an international legally binding instrument on plastic pollution, including in the marine environment. The meeting was held thanks to generous financial support from the European Union and the Government of Norway. During its meeting, the working group considered progress made in the implementation of the project group workplans and the pilot project programme and developed a draft of its workplan for the biennium 2024–2025. Other key outcomes of the meeting included approval of a report on best practices and lessons learned on measures taken by key stakeholders to prevent and reduce single-use plastic waste and packaging waste,[14] and a compilation of national and international specifications related to the Basel Convention plastic waste amendments aimed at assisting Parties in their implementation of the amendments.[15] The report of the meeting is available on the website of the Convention.[16]

13. Drafts of the Partnership working group's workplan and of the four project groups workplans for the biennium 2024–2025 were made available to the Open-ended Working Group at its thirteenth meeting for its consideration and Parties and observers were invited to provide comments on the drafts by 31 March 2023. The draft workplan of the working group for the biennium 2024–2025 is available to the meeting in document UNEP/CHW.16/19/Add.3, while the four project groups' workplans are set out in UNEP/CHW.16/INF/57. Comments received by the 31 March 2023 deadline are available on the website of the Convention.[17] Lastly, a report on the activities of the Plastic Waste Partnership working group, which includes progress made by the respective project groups, is available in document UNEP/CHW.16/INF/34.

III. Proposed action

14. The Conference of the Parties may wish to adopt a decision along the following lines:

The Conference of the Parties

I

Partnership for Action on Challenges relating to E-waste

1. *Welcomes* the activities undertaken by the working group of the Partnership for Action on Challenges relating to E-waste (hereinafter "the Partnership") to implement its programme of work;[18]

2. *Invites* Parties and others who have not yet nominated members to the working group and who wish to do so to inform the Secretariat of their nominations;

3. *Approves* the programme of work of the Partnership for the biennium 2024–2025[19] and requests the working group of the Partnership to implement it;

4. *Requests* the Secretariat to report on progress in the implementation of the present decision to the Open-ended Working Group at its fourteenth meeting and to the Conference of the Parties at its seventeenth meeting;

II

Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic

5. *Welcomes* the activities undertaken by the Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic since the fifteenth meeting of the Conference of the Parties;[20]

[14] See document UNEP/CHW.16/INF/55.

[15] See document UNEP/CHW.16/INF/56.

[16] www.basel.int/Implementation/Plasticwaste/PlasticWastePartnership/Consultationsandmeetings/3rdPWPmeeting/Overview/tabid/9297/Default.aspx.

[17] http://www.basel.int/Implementation/Plasticwaste/PlasticWastePartnership/tabid/8096/Default.aspx.

[18] UNEP/CHW.15/INF/39/Add.1, annex II.

[19] UNEP/CHW.15/19/Add.1, annex.

[20] UNEP/CHW.16/INF/33, annex.

6. *Invites* entities with a specific mandate to deliver implementation and enforcement capacity-building activities that could assist Parties to the Basel Convention in preventing and combating illegal traffic of hazardous wastes and other wastes to consider sending a duly motivated request to the Chair of the Network regarding admission as members of the Network;

7. *Elects* the following representatives of three Parties to the Basel Convention to serve as members of the Network until the eighteenth meeting of the Conference of the Parties:

From African States: [*to be completed*];

From Western European and other States: [*to be completed*];

From Eastern European States: [*to be completed*];

8. *Designates* the following two representatives of the Basel Convention regional and coordinating centres to serve as members of the Network until the eighteenth meeting of the Conference of the Parties:

From the African region: [*to be completed*];

From the Eastern European region: [*to be completed*];

9. *Encourages* members with the mandate to undertake enforcement operations activities on preventing and combating illegal traffic of hazardous wastes and other wastes under the Basel Convention at the global level to jointly plan and deliver such activities in cooperation with the other members of the Network and the Secretariat as appropriate;

10. *Requests* the Secretariat to report on progress in the implementation of the present decision to the Conference of the Parties at its seventeenth meeting;

III

Household Waste Partnership

11. *Adopts* the overall guidance document on the environmentally sound management of household waste;[21]

12. *Invites* Parties and others to undertake activities to use, promote and disseminate the overall guidance document on the environmentally sound management of household waste;[22]

13. *Welcomes* the activities of the working group of the Household Waste Partnership to implement its workplan for the biennium 2022–2023;[23]

14. *Requests* the working group to implement the following activities, which constitute the workplan of the Household Waste Partnership for the biennium 2024–2025:

(a) Activities for awareness-raising and training relating to the environmentally sound management of household waste, coordination of outreach activities and cooperation with other organizations working on household waste management;

(b) Continued coordination of outreach activities and cooperation with other organizations working on household waste management, including the Partnership on Plastic Waste, to prevent overlap between programmes and to share lessons learned;

15. *Requests* the Secretariat to report on progress in the implementation of the present decision to the Open-ended Working Group at its fourteenth meeting and to the Conference of the Parties at its seventeenth meeting;

[21] UNEP/CHW.16/19/Add.2.

[22] Ibid.

[23] Decision BC-15/22, para. 18.

IV

Partnership on Plastic Waste

16. *Welcomes* the activities of the working group of the Partnership on Plastic Waste to implement its workplan for the biennium 2022–2023;[24]

17. *Invites* Parties and others who have not yet nominated members to the working group and who wish to do so to inform the Secretariat of their nominations;

18. *Takes note* of the report on best practices and lessons learned on measures taken by key stakeholders to prevent and reduce single-use plastic waste and packaging waste,[25] and the compilation of national and international specifications related the Basel Convention plastic waste amendments aimed at assisting Parties in their implementation of the amendments;[26]

19. *Approves* the workplan of the Partnership for the biennium 2024–2025[27] and requests the working group of the Partnership to implement it;

20. *Requests* the working group to continue to approve the work products and reports prepared by the project groups in accordance with its workplan, and to widely disseminate such information and knowledge gathered and generated through the activities of the Partnership;

21. *Requests* the Secretariat to report on progress in the implementation of the present decision to the Open-ended Working Group at its fourteenth meeting and to the Conference of the Parties at its seventeenth meeting.

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[24] UNEP/CHW.14/INF/16/Rev.1, annex II, and decision BC-15/22.

[25] See document UNEP/CHW.16/INF/55.

[26] See document UNEP/CHW.16/INF/56.

[27] UNEP/CHW.16/19/Add.3.

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Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
Sixteenth meeting
Geneva, 1–12 May 2023
Agenda item 4 (e)

Matters related to the implementation of the Convention: Basel Convention Partnership Programme

Draft decision BC-16/[--]: Basel Convention Partnership Programme: part V – subscription fees*

Submission by the Secretariat

The text below reflects the discussions in plenary session in the morning of Tuesday, 9 May 2023 and further consultations with the Party that intervened in plenary session.

The Conference of the Parties,

Having considered the financial and staffing implications of having the Secretariat implement the annual subscription fees system as per the respective terms of reference of the Partnership for Action on Challenges relating to E-waste, the Household Waste Partnership and the Partnership on Plastic Waste,

1. *Considers it necessary* to withdraw the requirement to apply annual subscription fees for business and industry, non-governmental organizations and academia by amending relevant paragraphs in the terms of reference of the above-mentioned partnerships;

2. *Decides*, in relation to the Partnership for Action on Challenges relating to E-waste, to amend paragraphs 13 (e), 31 (c), 32 and 33 of the Partnership's terms of reference,[1] as follows:

> 13. ~~(e) Demonstrated commitment and ability to provide annual membership pledges in accordance with the financial arrangements in paragraphs 31–33, as a prerequisite for membership in the working group;~~
>
> 31. (c) Intergovernmental organizations, United Nations bodies and Basel and Stockholm Conventions Regional and Coordinating Centres are welcome to make in-kind and financial contributions towards the Partnership generally or towards specific projects of the Partnership. ~~No annual subscription would apply to these organizations.~~
>
> ~~32. Industry associations, individual companies, non-governmental organizations and academia that are members of the working group will provide contributions as an annual subscription based on the scale of assessment set out in Table 1 below. Such contributions shall be made promptly by 1 January of the year they relate to. Representatives of industry associations, individual companies, and non-government organizations will be able to participate as partners in the partnership meetings provided that their body has paid the appropriate annual subscription~~

* All text quoted from terms of reference is reproduced without formal editing.

[1] UNEP/CHW.15/INF/39/Add.1.

~~33. Experts and observers invited by the officers of the working group can participate in the working group for a limited time at no charge.~~

~~Table 1~~

~~**Scales of assessment for annual subscriptions to the Partnership**~~

~~**Total annual revenue or budget (USD)**~~	~~**Annual Partnership subscription (USD)**~~
~~Over 2 billion~~	~~20,000~~
~~100 million to 2 billion~~	~~10,000~~
~~1 million to 100 million~~	~~5,000~~
~~Below 1 million~~	~~500~~

3. *Also decides*, in relation to the Household Waste Partnership, to amend paragraph 18 (e) of the Partnership's terms of reference[2] and paragraphs 2, 6, 7 and 8 of appendix II, on financial arrangements, to the terms of reference, as follows:

18. ~~(e) Demonstrated commitment and ability to provide annual membership pledges in accordance with the financial arrangements in Annex 2 as a prerequisite for membership in the working group; and~~

Appendix II: Financial Arrangements

I. Introduction

~~2. Representatives of industry bodies or associations, individual companies, and non-government organizations would be able to participate as partners in the partnership meetings and teleconferences where their body had paid the appropriate annual subscription, based on the proposed sliding scale of assessment (see below table: Sliding scales of assessment for annual subscriptions to the partnership).~~

II. Contributions

6. Private Sector and Public-interest Non-governmental Organizations: Individual companies, industry associations and public-interest non-governmental organizations may ~~can~~ provide in-kind and financial contributions ~~will provide an annual subscription to participate as partners in the partnership, based on proposed sliding scales of assessment (table).~~

7. Invited Non-governmental Organization Observers and Experts may ~~can~~ provide in-kind and financial contributions ~~Non-governmental organization observers and experts invited by the partnership can participate at no charge~~.

8. Research Institutions, Academic Institutions, Regional Centres and other UN Bodies: Independent research institutes, academic institutions, Basel and Stockholm Convention Regional and Coordinating Centres and other UN Bodies are welcome to attend the partnership meetings as active participants, and to make in kind and financial contributions towards its work. ~~No membership fee would apply to these organisations.~~

~~**Table: Sliding scales of assessment for annual subscriptions to the partnership**~~

~~**Individual Companies and Producer Responsibility Organizations**~~

~~Total asset (USD)~~	~~Annual contribution (USD)~~
~~Over 30 billion~~	~~$25,000~~
~~30 billion – 20 billion~~	~~$20,000~~
~~20 billion to 10 billion~~	~~$15,000~~
~~10 billion – 5 million~~	~~$10,000~~

[2] UNEP/CHW.13/INF/33/Rev.1, annex II.

~~Below 5 million[1] $5,000~~

~~**Business Associations and**~~
~~**Environmental NGOs (not for profit organizations)**~~

~~Total budget (USD) Annual contribution (USD)~~

~~Over 10 million $10,000~~

~~10 million to 1 million $3,000~~

~~1 million to 100,000 $1,000~~

~~Below 100,000[2] $200~~

4. *Further decides*, in relation to the Partnership on Plastic Waste, to amend paragraphs 12 (e) and 30 (b) and (c) of the Partnership's terms of reference,[3] as follows:

12. ~~(e) Demonstrated commitment and ability to provide annual membership pledges in accordance with the financial arrangements in paragraph 30 below as a prerequisite for membership in the working group;~~

30. (b) Business/industry, non-governmental organizations, academia: Individual companies, industry associations, non-governmental organizations and academia <u>may</u> ~~could~~ make voluntary contributions. ~~will provide an annual subscription based on proposed sliding scales of assessment set out in Table 1 below; representatives of industry bodies or associations, individual companies, and non-government organizations will be able to participate as partners in the Partnership meetings and teleconferences provided that their body has paid the appropriate annual subscription, based on the proposed sliding scale of assessment set out in Table 1 below.~~

30. (c) Intergovernmental organizations, United Nations bodies and Regional Centres: Intergovernmental organizations, United Nations bodies and Basel and Stockholm Conventions Regional and Coordinating Centres are welcome to make in-kind and financial contributions towards the Partnership generally or towards specific projects of the Partnership. ~~No annual subscription would apply to these organisations;~~

[…]

~~Table 1~~
~~**Sliding scales of assessment for annual subscriptions to the Partnership**~~

~~**Total asset or budget (USD)**~~	~~**Annual contribution (USD)**~~
~~Over 2 billion~~	~~20,000~~
~~100 million to 2 billion~~	~~10,000~~
~~1 million to 100 million~~	~~5,000~~
~~Below 1 million~~	~~500~~

5. *Requests* the Secretariat to make other relevant non-substantive conforming changes to the above-mentioned terms of reference in relation to withdrawing the requirement to apply annual subscription fees for business and industry, non-governmental organizations and academia, and to make the amended terms of reference available on the website of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.

~~[1] Exemption from subscriptions may have to be considered for small-scale enterprises.~~

~~[2] Exemption from subscriptions may have to be considered for small-scale environmental non-governmental organizations.~~

[3] UNEP/CHW.14/INF/16/Rev.1, annex I.

UNITED
NATIONS

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Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal

Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade

Stockholm Convention on Persistent Organic Pollutants

Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
Sixteenth meeting
Geneva, 1–12 May 2023

Conference of the Parties to the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade
Eleventh meeting
Geneva, 1–12 May 2023

Conference of the Parties to the Stockholm Convention on Persistent Organic Pollutants
Eleventh meeting
Geneva, 1–12 May 2023

Draft report of the joint sessions of the sixteenth ordinary meeting of the Conference of the Parties to the Basel Convention, the eleventh ordinary meeting of the Conference of the Parties to the Rotterdam Convention and the eleventh ordinary meeting of the Conference of the Parties to the Stockholm Convention

Introduction

1. The sixteenth meeting of the Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, the eleventh meeting of the Conference of the Parties to the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade and the eleventh meeting of the Stockholm Convention on Persistent Organic Pollutants (hereinafter, “the 2023 meetings”) were held in Geneva from 1 to 12 May 2023. In decisions BC-15/29, RC-10/18 and SC-10/25, on the dates and venue of the next meetings of the conferences of the Parties to the Basel, Rotterdam and Stockholm conventions, the conferences of the Parties decided that the meetings would include joint sessions on joint issues and would not feature a high-level segment.

2. Accordingly, and as described in greater detail below under “Organization of work”, the 2023 meetings featured joint sessions to address cross-cutting issues of concern to at least two of the three conventions and separate sessions of the meetings of each of the three conferences of the Parties, as

well as the opening and organization of the meetings. Those joint sessions are described in the present report.

3. The present report has been prepared solely as an in-session document to allow the conferences of the Parties to agree upon and adopt the official account of their joint sessions. As a purely in-session document it will not be published as a final post-session document; instead, its text, as adopted, will be reproduced as appropriate in each of the separate final reports of the 2023 meetings.

I. Opening of the meetings

4. Abiola Olanipekun, Chief, Science and Technical Assistance Branch, Secretariat of the Basel, Rotterdam and Stockholm Conventions, acting as master of ceremonies, welcomed participants to the 2023 meetings.

5. The meetings began with a Swiss cultural musical performance.

A. Opening remarks

6. Opening remarks were delivered by Katrin Schneeberger, State Secretary, Federal Office for the Environment, Federal Department of the Environment, Transport, Energy and Communications of Switzerland; Elizabeth Mrema, Deputy Executive Director of the United Nations Environment Programme (UNEP); Rolph Payet, Executive Secretary of the Basel, Rotterdam and Stockholm conventions; Christine Fuell, Executive Secretary ad interim of the Rotterdam Convention; and Reginald Hernaus, President of the Conference of the Parties to the Basel Convention, speaking on behalf of the three presidents of the conferences of the Parties.

7. In her remarks, Ms. Schneeberger welcomed participants to Geneva and, highlighting that the Basel, Rotterdam and Stockholm conventions were a crucial part of the global framework for the sound management of chemicals and waste, said that participants at the present meetings would have several opportunities to take significant steps in strengthening that sound management. One such opportunity was by listing new chemicals in the annexes to the Rotterdam and Stockholm conventions, following the recommendations of the respective scientific committees, to pave the way for the elimination of, or improved management of, hazardous chemicals in order to protect human health and the environment. Other opportunities included updating the electronic and electrical waste (e-waste) guidelines under the Basel Convention to reflect the e-waste amendment, adopted by the Conference of the Parties to the Basel Convention at its fifteenth meeting, thereby supporting national authorities in addressing the global e-waste challenge and directing e-waste to state-of-the-art recovery; launching work to improve the functioning of the prior informed consent procedure under the Basel Convention in order to benefit both companies and authorities; and adopting plastic waste guidelines, in order to improve the management of plastic waste. A further opportunity was by adopting the proposed amendments and additional annex to the Rotterdam Convention to create a tool to support countries in managing shipments of hazardous chemicals, thereby retaining the aim of sharing responsibility for the sound management of chemicals. It was important to recall that the Rotterdam Convention did not ban the manufacture, trade or use of chemicals but rather provided information about the hazards of listed chemicals to assist countries in deciding whether or not they could manage the risks associated with international trade in those chemicals. In conclusion, she highlighted the fact that multilateral efforts, based on collective expertise, were vital in addressing the global challenges faced in protecting human health and the environment.

8. Ms. Mrema, in her remarks, noted that the triple planetary crisis of climate change, nature and biodiversity loss, and pollution and waste was rapidly worsening and that, although the climate and nature elements of the crisis were firmly in the public eye, the pollution and waste element currently lacked the same level of attention and action. UNEP had highlighted in *Global Chemicals Outlook II: From Legacies to Innovative Solutions – Implementing the 2030 Agenda for Sustainable Development* that the size of the global chemical industry was projected to double between 2017 and 2030. Furthermore, over 2,000 new chemicals were currently being released every year, most of which had not been assessed for their effect on human health. In addition, over 2 billion tonnes of waste were currently being produced globally every year, mainly in major cities, and that waste led to significant damage to the natural environment, including through the production of greenhouse gases and, subsequently, climate change. The improper production of chemicals and management of waste, as well as pollution, contributed to major threats to human health, so it was important to adopt a One Health approach. More action was therefore also needed to ensure the environmentally sound management of hazardous chemicals and waste, in particular through strengthened regulations for international trade and the elimination of the most hazardous chemicals, and it was vital to minimize

waste generation and promote a life cycle approach to waste management. Participants at the present meetings had the opportunity to take decisions that would further develop and strengthen the three conventions. Actions to promote the effective implementation of the conventions included the adoption of technical guidelines on plastic waste under the Basel Convention, and meeting the deadlines under the Stockholm Convention for the elimination of polychlorinated biphenyls (PCB). In closing, she noted that 2023 would be a crucial year for the chemicals agenda, as the global community awaited the outcomes of the negotiations on the Strategic Approach to International Chemicals Management and the sound management of chemicals and waste beyond 2020, with a new framework due to be adopted by the International Conference on Chemicals Management at its fifth session, thereby enhancing engagement with key economic sectors to strengthen circular approaches and life cycle thinking, and facilitating cooperation with the Basel, Rotterdam and Stockholm conventions and other thematic areas. UNEP would continue to support and work closely with the Parties to the Basel, Rotterdam and Stockholm conventions and their Secretariat.

9. Mr. Payet, in his remarks, welcomed participants to the 2023 meetings held under the theme “Accelerating action: targets for the sound management of chemicals and wastes”. He noted that much had been achieved in the most recent intersessional period and that the decisions taken at the present meetings would both directly and indirectly address the triple planetary crisis and should be aimed at providing solutions that would contribute to the Sustainable Development Goals for a healthier, cleaner and better planet for all. At the high-level segment of the 2021–2022 meetings of the conferences of the Parties, which had been held in connection with the international meeting entitled “Stockholm +50: a healthy planet for the prosperity of all – our responsibility, our opportunity”, ministers had highlighted the fact that international cooperation was a precondition as well as a means for achieving the sound management of chemicals and waste and had called on all the Parties to the Basel, Rotterdam and Stockholm conventions to set more ambitious targets and goals for tackling pollution. As the three conventions worked in an integrated manner, their cooperation and coordination with other international processes within the chemicals and waste cluster remained important. Recalling that the PCB deadlines under the Stockholm Convention were fast approaching and that Parties would require funding, technical support and government cooperation to meet the related targets, he thanked partners, including the Global Environment Facility (GEF), the European Union and the Governments of France, Germany and Norway, for the support that they had already provided, and encouraged others to provide support in the form of much-needed resources to rid the planet of PCB once and for all. Thanking Parties for their contributions to the general trust funds, in particular those Parties that had paid their outstanding contributions, he invited Parties still in arrears to explore possible solutions with the Secretariat. He also thanked donors to the voluntary trust funds of the conventions, namely Belgium, China, Denmark, the European Union, Finland, Germany, Japan, the Kingdom of the Netherlands, Norway, Sweden, Switzerland, the United Kingdom of Great Britain and Northern Ireland and the United States of America, as well as the French Global Environment Facility and the Norwegian Retailers’ Environment Fund, for their generous contributions during the biennium 2022–2023. In particular, he expressed his thanks to Denmark, Finland, Germany, Japan, the Kingdom of the Netherlands, Norway, Sweden and Switzerland for their generous support in funding participants from eligible Parties to attend the present meetings.

10. Ms. Fuell also expressed thanks to all the donors to the voluntary trust fund and the Government of Switzerland for its warm welcome and support for the present meetings. She noted that the sound management of chemicals and waste was a major cornerstone of the objectives set out in the 2030 Agenda for Sustainable Development and that significant efforts were still required to reach the deadline for the Goals that was now only seven years away. The Goals were intrinsic to the overall mission and strategic framework of the Food and Agriculture Organization of the United Nations (FAO), which acted as the custodian for 21 of the indicators of those Goals, as well as contributing significantly to Goal 12 on ensuring sustainable consumption and production. In addition to supporting the Sustainable Development Goals, the Kunming-Montreal Global Biodiversity Framework listed its own 4 goals for 2050 and 23 global targets for urgent action to be completed by 2030. Actions to reach those targets needed to be implemented consistently and in harmony with other relevant international obligations. Target 7 called, among other things, for the reduction by at least half of the overall risk from pesticides and highly hazardous chemicals. FAO, the World Health Organization (WHO) and UNEP were currently drafting an action plan on highly hazardous pesticides to be submitted to the International Conference for Chemicals Management at its fifth session for its consideration. At the present meetings, the Parties to the Rotterdam Convention were due to consider the inclusion of 7 chemicals and pesticides in Annex III to the Convention. The listing of the chemicals would not jeopardize food security, as listed chemicals and pesticides could still be used but in an environmentally sound manner based on informed decision-making in order to reduce their risk to human health and the environment. In that regard, the Secretariat of the Rotterdam Convention had continued and accelerated its technical assistance programme with a focus on less hazardous

alternatives, the collection of evidence for pesticide poisoning, and the implementation of major obligations under the Convention. FAO, as one of the hosting organizations, continued to provide significant support for such activities, not least by its continuous financial support of the Convention. In closing, she said that FAO and UNEP remained firmly committed to serving their members and the Parties to achieve the objectives of the conventions related to chemicals and waste.

11. Mr. Hernaus, in his remarks, also highlighted the fact that only seven years remained before the deadline for the achievement of the Sustainable Development Goals, noting that the urgent need to address the triple planetary crisis had been highlighted by the United Nations Environment Assembly of the United Nations Environment Programme at its fifth session, in 2022. Given that the three elements of the planetary crisis were interconnected, it was vital to adopt a holistic and integrated approach to addressing them and, at all costs, to avoid any solutions to one element that could have a detrimental effect on one or both of the other elements. The theme of the 2023 meetings was pertinent to the 2030 Agenda for Sustainable Development, as it was now necessary to accelerate action in order to meet the relevant Sustainable Development Goals, in particular Goal 12 on ensuring sustainable consumption and production patterns, which was key to sustaining the livelihoods of current and future generations of humankind. The Parties to the three conventions should therefore work together to improve resource efficiency, reduce waste and pollution, and shape a new, circular economy. The three conventions also needed to work closely with other conventions and programmes with which they shared common objectives, for example, in relation to target 7 of the Kunming-Montreal Global Biodiversity Framework, and to address both the triple planetary crisis and the achievement of the Sustainable Development Goals through cooperation and coordination among themselves and also in conjunction with the Minamata Convention on Mercury, the Montreal Protocol on Substances that Deplete the Ozone Layer, the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change and the Strategic Approach to International Chemicals Management and the sound management of chemicals and waste beyond 2020.

B. Formal opening

12. The sixteenth ordinary meeting of the Conference of the Parties to the Basel Convention, the eleventh ordinary meeting of the Conference of the Parties to the Rotterdam Convention and the eleventh ordinary meeting of the Conference of the Parties to the Stockholm Convention were formally opened at 11 a.m. on 1 May 2023 by Reginald Hernaus (the Kingdom of the Netherlands), President of the Conference of the Parties to the Basel Convention; Ana Berejiani (Georgia), President of the Conference of the Parties to the Rotterdam Convention; and Keima Gardiner (Trinidad and Tobago), President of the Conference of the Parties to the Stockholm Convention, respectively.

C. Regional statements

13. Representatives speaking on behalf of groups of countries made general statements on issues to be discussed during the meetings and two Parties exercised their right of reply.

II. Adoption of the agenda (item 2 of the agendas for the Basel, Rotterdam and Stockholm conventions)

A. Adoption of the agenda for the sixteenth meeting of the Conference of the Parties for the Basel Convention

14. The Conference of the Parties to the Basel Convention adopted the following agenda for its sixteenth meeting on the basis of the provisional agenda set out in document UNEP/CHW.16/1:

1. Opening of the meeting.
2. Adoption of the agenda.
3. Organizational matters:
   (a) Election of officers;
   (b) Organization of work;
   (c) Report on the credentials of representatives to the sixteenth meeting of the Conference of the Parties.

4. Matters related to the implementation of the Convention:
   (a) Strategic issues:
      (i) Strategic framework;
      (ii) Improving the functioning of the prior informed consent procedure;
      (iii) Development of guidelines for environmentally sound management;
   (b) Scientific and technical matters:
      (i) Technical guidelines;
      (ii) Classification and hazard characterization of wastes;
      (iii) National reporting;
      (iv) Electronic approaches to the notification and movement documents;
      (v) Further consideration of plastic waste;
      (vi) Amendments to Annexes II, VIII and IX on e-waste;
      (vii) Waste containing nanomaterials;
   (c) Legal, compliance and governance matters:
      (i) Committee Administering the Mechanism for Promoting Implementation and Compliance;
      (ii) Providing further legal clarity;
      (iii) National legislation, notifications, enforcement of the Convention and efforts to combat illegal traffic;
      (iv) Proposal by the Russian Federation to amend paragraph 2 of Article 6 of the Convention;
   (d) Technical assistance;
   (e) Basel Convention Partnership Programme;
   (f) Financial resources;
   (g) Work programme of the Open-ended Working Group for the period 2024–2025.
5. International cooperation and coordination:
   (a) Cooperation and coordination with the Minamata Convention on Mercury;
   (b) Cooperation and coordination with other organizations.
6. Enhancing cooperation and coordination among the Basel, Rotterdam and Stockholm conventions:
   (a) Clearing-house mechanism for information exchange;
   (b) Mainstreaming gender;
   (c) Synergies in preventing and combating illegal traffic and trade in hazardous chemicals and wastes;
   (d) From science to action.
7. Programme of work and budget.
8. Implementation of the memorandum of understanding between the United Nations Environment Programme and the Conference of the Parties to the Basel Convention.
9. Venue and dates of the seventeenth meeting of the Conference of the Parties.
10. Other matters.
11. Adoption of the report of the meeting.
12. Closure of the meeting.

15. In adopting its agenda, the Conference of the Parties agreed to consider under item 10, other matters, the admission of observers.

B. Adoption of the agenda for the eleventh meeting of the Conference of the Parties to the Rotterdam Convention

16. The Conference of the Parties to the Rotterdam Convention adopted the following agenda for its eleventh meeting on the basis of the provisional agenda set out in document UNEP/FAO/RC/COP.11/1:

1. Opening of the meeting.
2. Adoption of the agenda.
3. Organizational matters:
    (a) Election of officers;
    (b) Organization of work;
    (c) Report on the credentials of representatives to the eleventh meeting of the Conference of the Parties.
4. Rules of procedure for the Conference of the Parties.
5. Matters related to the implementation of the Convention:
    (a) Status of implementation;
    (b) Listing of chemicals in Annex III to the Convention;
    (c) Enhancing the effectiveness of the Convention;
    (d) Compliance;
    (e) Technical assistance;
    (f) Financial resources.
6. International cooperation and coordination:
    (a) Cooperation and coordination with the Minamata Convention on Mercury;
    (b) Cooperation and coordination with other organizations.
7. Enhancing cooperation and coordination among the Basel, Rotterdam and Stockholm conventions:
    (a) Clearing-house mechanism for information exchange;
    (b) Mainstreaming gender;
    (c) Synergies in preventing and combating illegal traffic and trade in hazardous chemicals and wastes;
    (d) From science to action.
8. Programme of work and budget.
9. Implementation of the memorandum of understanding between the Food and Agriculture Organization of the United Nations, the United Nations Environment Programme and the Conference of the Parties to the Rotterdam Convention.
10. Venue and dates of the twelfth meeting of the Conference of the Parties.
11. Other matters.
12. Adoption of the report of the meeting.
13. Closure of the meeting.

17. In adopting its agenda, the Conference of the Parties agreed to consider under item 11, other matters, the admission of observers.

C. Adoption of the agenda for the eleventh meeting of the Conference of the Parties to the Stockholm Convention

18. The Conference of the Parties to the Stockholm Convention adopted the following agenda for its eleventh meeting on the basis of the provisional agenda set out in document UNEP/POPS/COP.11/1:

1. Opening of the meeting.
2. Adoption of the agenda.
3. Organizational matters:
    (a) Election of officers;
    (b) Organization of work;
    (c) Report on the credentials of representatives to the eleventh meeting of the Conference of the Parties.
4. Rules of procedure for the Conference of the Parties.
5. Matters related to the implementation of the Convention:
    (a) Measures to reduce or eliminate releases from intentional production and use:
        (i) Exemptions;
        (ii) DDT;
        (iii) Polychlorinated biphenyls;
        (iv) Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride;
    (b) Measures to reduce or eliminate releases from unintentional production;
    (c) Measures to reduce or eliminate releases from wastes;
    (d) Implementation plans;
    (e) Listing of chemicals in Annex A, B or C to the Convention;
    (f) Technical assistance;
    (g) Financial resources and mechanisms;
    (h) Reporting pursuant to Article 15;
    (i) Effectiveness evaluation;
    (j) Compliance.
6. International cooperation and coordination:
    (a) Cooperation and coordination with the Minamata Convention on Mercury;
    (b) Cooperation and coordination with other organizations.
7. Enhancing cooperation and coordination among the Basel, Rotterdam and Stockholm conventions:
    (a) Clearing-house mechanism for information exchange;
    (b) Mainstreaming gender;
    (c) Synergies in preventing and combating illegal traffic and trade in hazardous chemicals and wastes;
    (d) From science to action.
8. Programme of work and budget.
9. Implementation of the memorandum of understanding between the United Nations Environment Programme and the Conference of the Parties to the Stockholm Convention.
10. Venue and dates of the twelfth meeting of the Conference of the Parties.

11. Other matters.

12. Adoption of the report of the meeting.

13. Closure of the meeting.

19. In adopting its agenda, the Conference of the Parties agreed to consider under item 11, other matters, the admission of observers.

III. Organizational matters (item 3 of the agendas for the Basel, Rotterdam and Stockholm conventions)

A. Election of officers

1. Basel Convention

20. Introducing document UNEP/CHW.16/2 on the election of officers and drawing attention to document UNEP/CHW.16/INF/4–UNEP/FAO/RC/COP.11/INF/4–UNEP/POPS/COP.11/INF/4, containing the overview table of elections, the representative of the Secretariat recalled that the Conference of the Parties to the Basel Convention would need to elect, from among the representatives of the Parties present at the meeting, a president and nine vice-presidents, including one vice-president to act as rapporteur, to serve from the closure of its sixteenth meeting to the closure of its seventeenth meeting, including for any intervening extraordinary meeting. Given the past practice of regional rotation for the election of officers, the next president would be expected to be elected from among the Eastern European States and the rapporteur from among the Western European and other States.

21. The Conference of the Parties was also expected to elect five officers, including two co-chairs and one rapporteur, to serve as the Bureau of the Open-ended Working Group of the Basel Convention for the biennium 2024–2025, as well 10 members of the Committee Administering the Mechanism for Promoting Implementation and Compliance of the Basel Convention (UNEP/CHW.16/13) and 5 members of the Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic (ENFORCE) (UNEP/CHW.16/19).

22. To facilitate the election of officers and members of subsidiary bodies, on 19 December 2022, the Secretariat had sent a letter to all the Parties to the Basel Convention regarding the elections to take place during the present meeting. In the letter, the Secretariat had invited Parties to communicate the nomination of candidates by 1 March 2023 and reminded them of decision BC-13/20 on mainstreaming gender. Parties had also been reminded of the financial rules of the Basel Convention with respect to the restrictions on eligibility for representatives of Parties, other than least developed countries or small island developing States or Parties that had agreed on and were respecting a schedule of payments, whose contributions had been in arrears for two or more years. A list of Parties to the Basel Convention whose contributions were in arrears as at 28 April 2023 was available on the intranet.

23. In line with the mandates entrusted to them by the Conference of Parties at its fifteenth meeting, the Bureau, with the support of the Secretariat, had facilitated the process for nominating candidates for the elections to take place during the current meetings, including by identifying regional election focal points and facilitating consultations during the regional preparatory meetings. Each region was expected to transmit to the Secretariat through its regional focal point the candidates for election no later than 1 p.m. on Tuesday, 9 May 2023.

24. [to be completed]

2. Rotterdam Convention

25. The representative of the Secretariat introduced document UNEP/FAO/RC/COP.11/2 on the election of officers and drew attention to documents UNEP/CHW.16/INF/4–UNEP/FAO/RC/COP.11/INF/4–UNEP/POPS/COP.11/INF/4, containing the overview table of elections, and UNEP/FAO/RC/COP.11/INF/5, containing the curricula vitae of candidates nominated for appointment during the eleventh meeting of the Conference of the Parties as members of the Chemical Review Committee. She recalled that the Conference of the Parties would need to elect, from among the Parties, a president and four vice-presidents, including one vice-president to act as rapporteur, to serve from the closure of its eleventh meeting to the closure of its twelfth meeting, including for any intervening extraordinary meeting. Given the past practice of regional rotation for the election of officers, the next president would be expected to be elected from among the Asia-Pacific States and the rapporteur from among the Western European and other States.

26. The Conference of the Parties was also expected to appoint 14 new members of the Chemical Review Committee with terms of office from 1 May 2024 for a term of four years (UNEP/FAO/RC/COP.11/5) and 8 members of the Compliance Committee with terms of office from the closure of the eleventh meeting of the Conference of the Parties until the closure of the thirteenth meeting of the Conference of the Parties (UNEP/FAO/RC/COP.11/14).

27. To facilitate the election of officers and members of subsidiary bodies, on 19 December 2022, the Secretariat had sent a letter to all the Parties to the Rotterdam Convention regarding the elections to take place during the present meetings. In the letter, the Secretariat had invited Parties to communicate the nomination of candidates by 1 March 2023 and reminded them of decision RC-8/13 on mainstreaming gender and of the supporting documentation to be put forward for the candidates for election to the Chemical Review Committee. The Parties had also been reminded of the decision adopted by the Conference of Parties with respect to the restrictions on eligibility for representatives of Parties, other than least developed countries or small island developing States or Parties that had agreed on and were respecting a schedule of payments, whose contributions had been in arrears for two or more years. A list of the Parties to the Rotterdam Convention whose contributions were in arrears as at 28 April 2023 was available on the intranet.

28. In line with the mandates entrusted to them by the Conference of the Parties at its eleventh meeting, the Bureau, with the support of the Secretariat, had facilitated the process for nominating candidates for the elections to take place during the current meetings, including by identifying regional election focal points and facilitating consultations during the regional preparatory meetings. Each region was expected to transmit to the Secretariat through its regional focal point the candidates for election no later than 1 p.m. on Tuesday, 9 May 2023.

29. [to be completed]

3. Stockholm Convention

30. The representative of the Secretariat introduced document UNEP/POPS/COP.11/2 on the election of officers and drew attention to documents UNEP/CHW.16/INF/4–UNEP/FAO/RC/COP.11/INF/4–UNEP/POPS/COP.11/INF/4, containing the overview table of elections, and UNEP/POPS/COP.11/INF/6, containing the curricula vitae of candidates nominated for appointment during the eleventh meeting of the Conference of the Parties as members of the Persistent Organic Pollutants Review Committee. She recalled that the Conference of the Parties to the Stockholm Convention would need to elect, from among the representatives of the Parties present at the meeting, a president and nine vice-presidents, including one vice-president to act as rapporteur, to serve from the closure of its eleventh meeting to the closure of its twelfth meeting, including for any intervening extraordinary meeting. Given the past practice of regional rotation for the election of officers, the next president would be expected to be elected from among the Western European and other States and the rapporteur from among the Latin America and Caribbean States.

31. The Conference of the Parties was also expected to appoint 14 new members of the Persistent Organic Pollutants Review Committee with terms of office starting on 5 May 2024 and for a term of four years, and to elect a new chair of the Committee (UNEP/POPS/COP.11/11).

32. Finally, the Conference of the Parties to the Stockholm Convention was also expected to select 10 Parties which would in turn identify one expert each by 30 June 2023 to serve on the DDT expert group starting on 1 September 2023 and for a term of four years (UNEP/POPS/COP.11/5).

33. To facilitate the election of officers and members of subsidiary bodies, on 19 December 2022, the Secretariat had sent a letter to all the Parties to the Stockholm Convention regarding the elections to take place during the present meeting. In the letter, the Secretariat had invited Parties to communicate the nomination of candidates by 1 March 2023 and reminded them of decision SC-8/23 on mainstreaming gender and of the supporting documentation to be put forward for the candidates for election to the Persistent Organic Pollutants Review Committee. Parties had also been reminded of the decision adopted by the Conference of Parties with respect to the restrictions on eligibility for representatives of Parties, other than least developed countries or small island developing States or Parties that had agreed on and were respecting a schedule of payments, whose contributions had been in arrears for two or more years. A list of the Parties to the Stockholm Conventions whose contributions were in arrears as at 28 April 2023 was available on the intranet.

34. In line with the mandates entrusted to them by the conferences of the Parties at the 2022 meetings, the Bureau, with the support of the Secretariat, had facilitated the process for nominating candidates for the elections to take place during the current meetings, including by identifying regional election focal points and facilitating consultations during the regional preparatory meetings.

Each region was expected to transmit to the Secretariat through its regional focal point the candidates for election no later than 1 p.m. on Tuesday, 9 May 2023.

35. [to be completed]

B. Organization of work

36. The three conferences of the Parties agreed to organize their work during the meetings in accordance with the scenario note set out in document UNEP/CHW.16/INF/1–UNEP/FAO/RC/COP.11/INF/1–UNEP/POPS/COP.11/INF/1 and the schedule of work for that segment set out in document UNEP/CHW.16/INF/2–UNEP/FAO/RC/COP.11/INF/2–UNEP/POPS/COP.10/INF/2. The schedule and conduct of the meetings would be adjusted by the bureaux each day, as necessary, in the light of the progress of the meetings.

37. In accordance with the agreed arrangements, and as described in the scenario note, the conferences of the Parties to the three conventions would meet for 11 days of joint and Convention-specific plenary sessions from 1 to 12 May 2023, conducted in the six official languages of the United Nations. During the joint sessions, the conferences of the Parties would discuss the agreed cross-cutting issues affecting at least two of the three conventions. The conferences of the Parties also agreed that the presidents of the three conferences would take it in turn to preside over joint sessions and that each, when so presiding, would act on behalf of all three. All decisions would be adopted pending confirmation from the contact group on budget matters that any activities contemplated by the decisions had been taken into account in the proposed programmes of work and budgets for the biennium 2024–2025 or that they would have no budgetary implications.

38. In carrying out their work at the current meetings, the conferences of the Parties had before them working and information documents pertaining to the items on the respective agendas for the meetings. Lists of those documents for each meeting, arranged according to the agenda items to which the documents pertain, are set out in documents UNEP/CHW.16/INF/61, UNEP/FAO/RC/COP.11/INF/43 and UNEP/POPS/COP.11/INF/5.

39. The conferences of the Parties agreed to work in plenary session and to establish joint or convention-specific contact or other groups as they considered necessary. The Parties agreed that the current meetings would be paperless; documents would accordingly be distributed in electronic form only.

C. Credentials

40. Introducing the item, the President recalled that, in advance of the current meetings, the bureaux of the conferences of the Parties to the Basel, Rotterdam and Stockholm conventions had agreed to take the same common approach to their consideration of credentials for the current meetings as had been taken during the 2015, 2017, 2019 and 2021–2022 meetings of the conferences of the Parties. Pursuant to that approach each Bureau would accept original credentials in good order as well as copies thereof, on the understanding that, in the case of the latter, originals would be submitted as soon as possible. This had been conveyed to all the Parties in advance of the meetings.

41. The representative of the Secretariat drew attention to the documents relevant to the item and noted that rule 18 of the rules of procedure for the Conference of the Parties to the Basel Convention, rule 19 of the rules of procedure for the Conference of the Parties to the Rotterdam Convention and rule 19 of the rules of procedure for the Conference of the Parties to the Stockholm Convention provided that the credentials of representatives of Parties and the names of alternate representatives and advisers must be submitted to the Secretariat (and in the case of the Basel Convention, the Executive Secretary of the meeting) if possible no later than 24 hours after the opening of the meeting. Credentials must be issued either by a Head of State or Government or by the Minister for Foreign Affairs or, in the case of a regional economic integration organization, by the competent authority of that organization. Representatives of Parties could participate provisionally in the meeting pending a decision by the Conference of the Parties on their credentials. Each Conference of the Parties was expected to adopt the report on the credentials of representatives to its meeting prior to the closure of that meeting.

42. As at the beginning of the meetings, there were 190 Parties to the Basel Convention, 165 Parties to the Rotterdam Convention and 186 Parties to the Stockholm Convention.

43. The President stressed the importance of following correct procedures. To that end, she invited Parties to make their best effort to submit their credentials in accordance with the rules of procedure. The Secretariat would collect and verify the credentials and report to the bureaux. Each Bureau would

monitor progress on the submission of credentials on a daily basis, prepare its report based on the credentials submitted to the Secretariat at the latest by 1 p.m. on Thursday, 4 May, and present its report to the conferences of the Parties on Friday, 5 May, for their consideration and possible adoption. She added that the conferences of the Parties would consider the possible adoption of updated reports on credentials on Thursday, 11 May.

44. She reminded Parties to the Basel Convention that, under rule 5.3 (e) (ii) of the financial rules, any Party whose contributions had been in arrears for four or more years was not entitled to vote at any meeting of the Conference of the Parties unless the Conference decided otherwise. Updated information on arrears was available on the intranet website for the 2023 meetings.

1. Basel Convention

45. On 5 May 2023, the representative of the Secretariat presented the report of the Bureau on the credentials of representatives as at 1 p.m. on 4 May 2023, indicating that the Bureau had further examined the credentials of the representatives of the 175 Parties to the Basel Convention that had registered for the meeting to date and had found that the credentials of 158 representatives had been issued by a Head of State or Government or a minister for foreign affairs and were therefore in good order. The credentials of 140 of those 158 representatives were originals, while 18 were copies that were accepted on the understanding that originals would be submitted as soon as possible.

46. It was also reported that the Bureau had agreed to defer consideration of credentials transmitted by one Party, Myanmar, and that the following 16 Parties had not yet submitted credentials for their representatives: Bahamas, Central African Republic, Chad, Comoros, Eswatini, Iraq, Kenya, Libya, Rwanda, Sao Tome and Principe, Sierra Leone, Sudan, Ukraine, Vanuatu, Yemen, Zambia.

47. Subsequent to the deadline of 1 p.m. on 4 May 2023, three Parties had submitted credentials that were found to be in good order by the Bureau, namely Kenya, Sierra Leone and Zambia. The Bureau invited the Conference of the Parties to also accept the credentials of the representatives of those Parties, which the Conference of the Parties duly did.

48. The Conference of the Parties to the Basel Convention adopted the report of the Bureau on credentials.

2. Rotterdam Convention

49. On 5 May 2023, the representative of the Secretariat presented the report of the Bureau on the credentials of representatives as at 1 p.m. on 4 May 2023, indicating that the Bureau had further examined the credentials of the representatives of the 157 Parties to the Rotterdam Convention that had registered for the meeting to date and had found that the credentials of 144 representatives had been issued by a Head of State or Government or a minister for foreign affairs and were therefore in good order. The credentials of 129 of those 144 representatives were originals, while 15 were copies that were accepted on the understanding that originals would be submitted as soon as possible.

50. It was also reported that the following 13 Parties had not yet submitted credentials for their representatives: Chad, Eswatini, Iraq, Kenya, Libya, Rwanda, Sao Tome and Principe, Sierra Leone, Sudan, Ukraine, Vanuatu, Yemen, Zambia.

51. Subsequent to the deadline of 1 p.m. on 4 May 2023, three Parties had submitted credentials that were found to be in good order by the Bureau, namely Kenya, Sierra Leone and Zambia. The Bureau invited the Conference of the Parties to also accept the credentials of the representatives of those Parties, which the Conference of the Parties duly did.

52. The Conference of the Parties to the Rotterdam Convention adopted the report of the Bureau on credentials.

3. Stockholm Convention

53. On 5 May 2023, the representative of the Secretariat presented the report of the Bureau on the credentials of representatives as at 1 p.m. on 4 May 2023, indicating that the Bureau had further examined the credentials of the representatives of the 170 Parties to the Stockholm Convention that had registered for the meeting to date and had found that the credentials of 153 representatives had been issued by a Head of State or Government or a minister for foreign affairs and were therefore in good order. The credentials of 137 of those 153 representatives were originals, while 16 were copies that were accepted on the understanding that originals would be submitted as soon as possible.

54. It was also reported that the Bureau had agreed to defer consideration of credentials transmitted by one Party, Myanmar, and that the following 16 Parties had not yet submitted credentials for their representatives: Bahamas, Central African Republic, Chad, Comoros, Eswatini, Iraq, Kenya, Libya, Rwanda, Sao Tome and Principe, Sierra Leone, Sudan, Ukraine, Vanuatu, Yemen, Zambia.

55. Subsequent to the deadline of 1 p.m. on 4 May 2023, three Parties had submitted credentials that were found to be in good order by the Bureau, namely Kenya, Sierra Leone and Zambia. The Bureau invited the Conference of the Parties to also accept the credentials of the representatives of those Parties, which the Conference of the Parties duly did.

56. The Conference of the Parties to the Stockholm Convention adopted the report of the Bureau on credentials.

57. [to be completed]

IV. Matters related to the implementation of the conventions (item 4 of the agenda for the Basel Convention and item 5 of the agendas for the Rotterdam and Stockholm conventions)

A. Scientific and technical matters

Technical guidelines

Technical guidelines on persistent organic pollutant wastes

58. Introducing the sub-item, the representative of the Secretariat recalled that, following the adoption of decision BC-15/6, on technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants, the Secretariat, with the support of the small intersessional working group and consultants, had led the work to update the general technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants and the technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with perfluorooctane sulfonic acid (PFOS), its salts and perfluorooctane sulfonyl fluoride (PFOSF), perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds, and perfluorohexane sulfonic acid (PFHxS), its salts and PFHxS-related compounds. The small intersessional working group had held an online consultation on 16 September 2022 and a meeting to work on the technical guidelines from 14 to 17 November 2022. At its thirteenth meeting, in February 2023, the Open-ended Working Group had considered the two draft documents and had agreed that the Secretariat, with the help of a consultant, would revise them following that meeting, taking into account the discussion that had taken place, and prepare two revised documents for consideration by the Conference of the Parties at its sixteenth meeting. The revised updated draft general technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants (UNEP/CHW.16/6/Add.1 and UNEP/CHW.16/INF/7) and the revised updated technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with PFOS, its salts and PFOSF, PFOA, its salts and PFOA-related compounds, and PFHxS, its salts and PFHxS-related compounds (UNEP/CHW.16/6/Add.2 and UNEP/CHW.16/INF/8) were before the Conference of the Parties for consideration at the present meeting. The note by the Secretariat on technical guidelines (UNEP/CHW.16/6) set out proposed action.

59. During the ensuing discussion, general appreciation was expressed for the work undertaken by the small intersessional working group in preparing and updating the draft technical guidelines.

60. Many representatives, including one speaking on behalf of a group of countries, highlighted the importance of agreeing on a value for low-persistent-organic-pollutant content, preferably at the present meeting. One of them recalled that there was still no agreed value for low-persistent-organic-pollutant content in relation to decabromodiphenyl ether and short-chain chlorinated paraffins, and that there were still multiple values for the other polybrominated diphenyl ethers, hexabromocyclododecane, polychlorinated dioxins and furans. According to another representative, over time, more and more persistent organic pollutants would be listed under the Stockholm Convention, and it was a major challenge for countries to identify waste flows and low-persistent-organic-pollutant content in relation to each substance. Two representatives, including one speaking on behalf of a group of countries, expressed support for establishing a single low-persistent-organic-pollutant content value for each persistent organic pollutant, given that the level of danger posed by each substance was different.

61. One representative stated the intention of his Party to propose a lower persistent-organic-pollutant-content value for PFOS, its salts and PFOSF. Another representative cautioned, that, although low limits were helpful, excessively strict limits would place an additional burden on the national processes for dealing with the substances concerned.

62. Several representatives stressed the importance of decisions regarding low-persistent-organic-pollutant-content values being made on the basis of sound scientific information, with one suggesting that the guidelines indicated the scientific justification of the presented values and their compliance with existing standards. Another representative noted ongoing research in some counties and suggested that values should be discussed at a later stage when more scientific data were available.

63. Another representative said that it was crucial that Parties had sufficient information on the persistent organic pollutant content of every substance that they dealt with. In the event of cross-border movement, it was important to ensure that the importing country had complete information about the substance that it was receiving.

64. One representative said that the setting of lower-limit values for persistent organic pollutant content was crucial to help developing countries overcome the challenges they faced, such as the circulation of materials rich in persistent organic pollutants in products and waste, the exposure of vulnerable populations to persistent organic pollutants, the illegal dumping of hazardous waste and the management of near-end-of-life products. A number of representatives expressed the view that the lower-limit values should be kept at a level that would enable countries that had differing levels of development to implement the guidelines.

65. Several representatives, including one speaking on behalf of a group of countries, underscored the importance of Parties having adequate resources, training, capacity-building and technical assistance to enable them to implement the guidelines correctly, particularly in the analysis and characterization of types of waste, the development of inventories, the conduct of demonstration projects for the correct treatment and disposal of waste, the management of international trade and combating illegal trade. One of them remarked that, owing to the short intersessional period between the present meeting and the previous meeting of the Conference of the Parties to the Stockholm Convention, no capacity-building or training activities to support Parties in meeting their obligations under paragraph 1 of Article 6 of the Stockholm Convention had been undertaken. It was to be hoped that, subject to the availability of resources, capacity-building and training activities would be undertaken in the two years before the twelfth meeting of the Conference of the Parties.

66. Many representatives, including one speaking on behalf of a group of countries, spoke in favour of pursuing the discussion in a contact group. Some representatives supported the establishment of an intersessional working group mandated to develop the guidelines further.

67. Following the discussion, the Conference of the Parties to the Basel Convention established a contact group on technical matters, to be co-chaired by Magda Gosk (Poland) and Patrick McKell (United Kingdom). The contact group would consider the draft technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants. The contact group was mandated to prepare revised versions of the technical guidelines, basing its work on the revised products of the Open-ended Working Group at its thirteenth meeting (UNEP/CHW.16/INF/7 and UNEP/CHW.16/INF/8), as well as a draft decision based on the proposed draft decision set out in paragraph 15 of document UNEP/CHW.16/6, and taking into account the discussion in plenary.

68. [to be completed]

B. Measures to reduce or eliminate releases from wastes

Persistent organic pollutant wastes under the Stockholm Convention

69. The representative of the Secretariat outlined the information provided in document UNEP/POPS/COP.11/9, recalling that the Conference of the Parties to the Stockholm Convention, with regard to the new persistent organic pollutants listed at its tenth meeting, had invited the appropriate bodies of the Basel Convention to establish the levels of destruction and irreversible transformation of the chemical necessary to ensure that no characteristics of persistent organic pollutants were exhibited; to determine the methods constituting environmentally sound disposal; to establish the concentration levels of the chemical in order to define the low-persistent organic pollutant content; to further update, if necessary, the general technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with

persistent organic pollutants; and to update or develop new specific technical guidelines under the Basel Convention. Accordingly, the small intersessional working group under the Basel Convention had worked on updating the general and one set of specific technical guidelines on the environmentally sound management of wastes consisting of, containing or contaminated with persistent organic pollutants, which had been submitted to the Conference of the Parties to the Basel Convention at the present meeting for its consideration and possible adoption.

70. Many representatives, including two speaking on behalf of groups of countries, expressed appreciation for the work of the small intersessional working group and other appropriate bodies of the Basel Convention in responding to decision SC-10/10, with some also expressing specific support for the draft decision contained in paragraph 7 of document UNEP/POPS/COP.11/9. A number of representatives, including one speaking on behalf of a group of countries, underscored the importance of providing sufficient and effective financial and technical assistance to support developing-country Parties in effectively addressing the environmentally sound management of persistent organic pollutant wastes.

71. [to be completed]

C. Technical assistance

72. Introducing the sub-item, the President recalled that, in discussing the matter of technical assistance to Parties to the Basel, Rotterdam and Stockholm conventions, the Parties would also consider the regional centres under the Basel and Stockholm conventions.

73. On the issue of technical assistance in general, the representative of the Secretariat outlined the information in document UNEP/CHW.16/17–UNEP/FAO/RC/COP.11/15–UNEP/POPS/COP.11/15 on technical assistance and capacity-building for the implementation of the Basel, Rotterdam and Stockholm conventions. More detail about the implementation of the technical assistance plan for the period 2022–2025 in the biennium 2022–2023 was provided in document UNEP/CHW.16/INF/28–UNEP/FAO/RC/COP.11/INF/17–UNEP/POPS/COP.11/INF/25.

74. The representative of the Secretariat thanked the Governments of Belgium, Canada, Denmark, France, Germany, Japan, Norway, Sweden, Switzerland and the United States, and the European Union and FAO for their voluntary contributions for the financing of technical assistance. She also thanked GEF and the Special Programme to support institutional strengthening at the national level for implementation of the Basel, Rotterdam and Stockholm Conventions, the Minamata Convention and the Strategic Approach for their support during the period 2022–2023.

75. On the topic of the regional centres of the Basel and Stockholm conventions, the representative of the Secretariat introduced documents UNEP/CHW.16/18 and UNEP/POPS/COP.11/16, outlining the activities undertaken by the regional centres, the Secretariat and others in response to the requests made by the conferences of the Parties to the Basel and Stockholm conventions, respectively, in their decisions on regional centres. Document UNEP/CHW.16/INF/30–UNEP/POPS/COP.11/INF/27 provided further information pertaining to the activities of the centres.

76. As outlined in document UNEP/POPS/COP.11/16, the Secretariat had received a nomination from the Latin American and the Caribbean States for the Basel Convention regional centre for the Caribbean located in Trinidad and Tobago also to serve as a Stockholm Convention regional centre. The Secretariat, in consultation with the Bureau, had verified that the nominated centre met the criteria as stipulated in the terms of reference for the selection of regional centres under the Stockholm Convention.

77. A draft performance evaluation report of all 14 regional centres of the Basel Convention and 16 regional centres of the Stockholm Convention (UNEP/CHW.16/INF/29–UNEP/POPS/COP.11/INF/26) had been prepared on the basis of the criteria and methodology adopted by both conferences of the Parties.

78. In the ensuing discussion, many representatives, including one speaking on behalf of a group of countries, underlined the importance of technical assistance, capacity-building and technology transfer. Several thanked the Secretariat for the implementation of the technical assistance plan for the period 2022–2025 in the biennium 2022–2023. The continued monitoring and evaluation of the projects undertaken was important to enable the further assessment of the impact of implementation of the plan.

79. Many representatives expressed their gratitude to the Secretariat, donors and the regional centres for the technical assistance and other support they had received. Such support included involvement in the GEF project for the development and implementation of a sustainable management

mechanism for persistent organic pollutants in one region and the GEF project on implementing sustainable low- and non-chemical development in small island developing States, known as the "ISLANDS" project; online and face-to-face workshops and seminars on the implementation of the conventions; support for the revision and updating of national implementation plans; the development of policies, strategies and legislation; efforts to deal with waste electrical and electronic equipment; the destruction of PCB; the establishment or equipping of laboratories; the conduct of a study for the establishment of a national health–environment observatory; and the improvement of data collection and reporting.

80. Despite the work that had been undertaken, several representatives considered that developing countries and countries with economies in transition were still ill-equipped to deal with the challenges that they faced, including emerging issues and new obligations stemming from the listing of new chemicals. As well as the support related to the newly listed persistent organic pollutants, additional technical assistance was required in relation to a number of issues, including e-wastes; plastic wastes; the management of hazardous pesticides and the disposal of obsolete pesticides and pesticide containers; the management and elimination of stocks of persistent organic pollutants; PCB; contaminated oil; used tyres and batteries; illegal dumping; illegal trade and trafficking; the development of inventories; the development of laboratory and analysis capacities, including regional accreditation; the training of customs officials; and the management of fly ash and slurry.

81. A number of representatives, including some speaking on behalf of groups of countries, stressed the important role played by the regional centres of the Basel and Stockholm conventions in providing developing countries and those with economies in transition with technical assistance and capacity-building. Some of them noted specifically the evaluation reports prepared by the Secretariat and welcomed the good work carried out by many of the centres. One representative said that the recommendations of the draft evaluation report should be acted on in earnest.

82. Many representatives acknowledged the excellent support provided by the Basel Convention regional centre for the Caribbean and endorsed the proposal to invite the centre also to function as a regional centre for the Stockholm Convention. One of them also encouraged Parties to support Stockholm Convention regional centres seeking to become Basel Convention regional centres.

83. One representative said that less technical assistance was provided under the Rotterdam Convention than for the other two conventions. Another representative, recalling that some Parties were not eligible for certain types of support, urged the Secretariat to make sure that there was enough technical assistance available for their needs. A third representative stressed the importance of the technical assistance plan reflecting the needs of Parties and thus encouraged Parties to submit their technical assistance and technology transfer needs through the online questionnaire, encouraging the regional centres to use the information in developing their plans.

84. A representative of a donor country outlined the support provided by that donor, through its contribution to GEF and through its membership of the Executive Board of the Special Programme. She highlighted some of the innovative activities undertaken.

85. A representative of an observer organization outlined the technical assistance work that his organization had undertaken in support of the implementation of Rotterdam Convention, including workshops and webinars on risk evaluation, the reporting of problems related to severely hazardous pesticide formulations, gender and pesticides, import responses, trade aspects and hazardous child labour in agriculture with pesticide exposure.

86. In relation to the taking of decision on the matter of technical assistance, one representative, speaking on behalf of a group of countries, expressed the view that an omnibus decision should be adopted by each Conference of the Parties in order to give a proper overview of the various interrelated matters and enable each Conference of the Parties to focus on relevant priorities.

87. Some representatives, including one speaking on behalf of a group of countries, requested the addition of "small island States" to the mention of "developing-country Parties and Parties with economies in transition" in paragraph 2 of the draft decision in section III of document UNEP/CHW.16/17–UNEP/FAO/RC/COP.11/15–UNEP/POPS/COP.11/15, in view of their special characteristics and circumstances without reference to their level of development.

88. Following the discussion, the conferences of the Parties to the Basel, Rotterdam and Stockholm conventions established a joint contact group on technical assistance and financial resources, to be co-chaired by Toks Akinseye (United Kingdom) and David Kapindula (Zambia). The contact group was mandated to prepare draft decisions on technical assistance for each of the conventions based on the draft text set out in documents UNEP/CHW.16/17–UNEP/FAO/RC/COP.11/15–UNEP/POPS/COP.11/15, taking into account the discussion in plenary;

and draft decisions on the regional centres of the Basel and Stockholm conventions using the draft decisions in documents UNEP/CHW.16/18 and UNEP/POPS/COP.11/16 as starting points and taking into account the discussion in plenary. The draft decision for the agenda item would be in omnibus form, with a section I on technical assistance (for the Basel, Rotterdam and Stockholm conventions) and a section II on regional centres (for the Basel and Stockholm conventions).

89. [to be completed]

D. Financial resources

1. Financial mechanism of the Stockholm Convention

90. Introducing the sub-item, the representative of the Secretariat said that, pursuant to decision SC10/16, the Conference of the Parties would consider a number of topics related to the financial mechanism, including a draft decision for the consideration of the Parties, as set out in a note by the Secretariat on the financial mechanism (UNEP/POPS/COP.11/17). Those topics were guidance from the Conference of the Parties to the financial mechanism; monitoring and evaluation; assessment of funding needs; cooperation between secretariats and reciprocal representation; and reporting.

91. The representative of GEF gave a presentation on the financial assistance provided by GEF to support the implementation of the Stockholm Convention within the wider context of the chemicals and waste focal area during the period 1 July 2021 to 30 June 2022, which corresponded to the final year of the seventh replenishment period of GEF (GEF-7). Resources were programmed for four full-sized projects covering four countries, one programmatic approach covering seven countries, one medium-sized project covering one country, and six enabling activities covering thirteen countries. Twenty-three countries had received at least one project to support the implementation of the Stockholm Convention. The resources committed during the reporting period amounted to $81.2 million, which had leveraged $644.8 million in co-financing. Programmes and projects approved in the reporting period would generate results towards the GEF-7 targets, including reducing 52,288 metric tons of persistent organic pollutants.

92. Funding in the amount of $599 million had been allocated to the chemicals and waste focal area in GEF-7, of which $359 million had been allocated to support the implementation of the Stockholm Convention. Programmes and projects approved in GEF-7 were expected to reduce 126,165 metric tons of persistent organic pollutants and 3,067 grams of toxic equivalent of unintentionally produced persistent organic pollutants, exceeding the targets set for GEF-7 and generating additional environmental co-benefits. With regard to the eighth replenishment period of GEF (GEF-8), 29 countries had jointly pledged more than $5.3 billion towards programming for the period 1 July 2022 to 30 June 2026. Of that amount, $800 million had been allocated to the chemicals and waste focal area, representing 15 per cent of the total GEF-8 resource envelope. A total of $413 million had been allocated to activities under the Stockholm Convention. GEF would continue to support countries as the financial mechanism of that important Convention.

93. In the ensuing discussion, one representative, speaking on behalf of a group of countries, expressed appreciation to the GEF secretariat and the secretariat of the Special Programme for their work in supporting implementation of the Convention. The implementation of the integrated approach to financing the sound management of chemicals and waste remained essential, with all three mutually supportive elements contributing to meeting the funding needs of Parties. Regarding the support offered by GEF as the financial mechanism of the Stockholm Convention, it was gratifying to note that both the share and volume of the chemicals and waste focal area had increased in GEF-8. With regard to funding needs, it was important to allocate sufficient resources to developing countries to help them fulfil their commitments related to the elimination of PCBs, including attaining the 2025 and 2028 targets. Adopting an integrated approach to financing PCB management and disposal was of particular importance.

94. One representative said that it was a matter of concern that GEF continued to adopt a discriminatory and politicized approach towards his country and some other developing countries, which were thus denied the financial resources that would assist them in fulfilling their obligations under the Convention. Some representatives expressed disappointment at the lack of funding from GEF to assist them in eliminating persistent organic pollutants, including PCB. One representative said that many countries with developing and transitional economies were faced with pollution and contamination challenges that required the allocation of additional specific financing for managing chemicals and waste. One representative commended GEF on the financial assistance allocated to his country to implement projects on environment, health, pollution management, PCB and open burning.

95. The Conference of the Parties decided to request the joint contact group on technical assistance and financial resources to prepare a draft decision based on the proposed action set out in paragraph 17 of document UNEP/POPS/COP.11/17, taking into account the discussion in plenary; and, with regard to the guidance to the financial mechanism, to compile any such guidance being considered by the Conference of the Parties at the present meeting.

96. [to be completed]

2. Financial resources under the Basel, Rotterdam and Stockholm conventions

97. Introducing the sub-item, the representative of the Secretariat said that, in line with decisions BC-12/18, RC-7/8 and SC-7/22, the Secretariat had continued to take the integrated approach to financing the sound management of chemicals and waste as a reference in its mandated activities and its support for the Parties to the three conventions. The Secretariat had also continued to participate in the internal task team of the Special Programme to support institutional strengthening at the national level for implementation of the Basel, Rotterdam and Stockholm conventions, the Minamata Convention and the Strategic Approach and had attended the meetings of the Executive Board of the Special Programme as an observer. He drew attention to a report submitted by UNEP on the implementation of the Special Programme, which was set out in document UNEP/CHW.16/INF/35–UNEP/FAO/RC/COP.11/INF/18–UNEP/POPS/COP.1l/INF/35.

98. The representative of UNEP provided an update on the activities under the Special Programme, as more fully described in the UNEP report. She informed the Parties that the seventh round of funding was currently open, with a closing date of 11 August 2023, and that the secretariat of the Special Programme would be holding drop-in clinics in the margins of the present meeting on how to apply for funding under the Programme. She also drew attention to a recent decision by the Executive Board of the Special Programme to revise the application packages for the seventh round, in particular related to eligibility for funding. In that regard, the application package now referred to the *World Economic Situation and Prospects* report, whose annex contained lists of developing economies, economies in transition, least developed countries and small island developing States. At the same time, the package emphasized that some of the donors to the Special Programme had a strict policy of only funding applicants that met the eligibility requirements for the Development Assistance Committee list of official development assistance recipients at the time of application, a limitation that could affect the funds available for countries not on that list.

99. Following the presentation, several representatives voiced their appreciation for the Special Programme, with some describing how their country had benefited from the programme. One representative noted that some countries, including his, had faced difficulties in accessing programme funds and would appreciate more information on the eligibility criteria.

100. One representative, speaking on behalf of a group of countries, said that while the countries of her region had hoped that the establishment of the Special Programme would bring about significant resources for effective implementation, considerable challenges remained with respect to the lack of funding provided to some countries, even though those countries had submitted their applications to the Programme.

101. The representative of Ghana introduced a conference room paper submitted by his country on behalf of the group of African States, on a framework to develop a resource mobilization strategy. The countries of the region wished to capitalize on the Secretariat's assessment of the relevance for the Basel, Rotterdam and Stockholm conventions of existing guidelines developed by the United Nations system on the mobilization of resources from non-State actors (UNEP/CHW.15/INF/37–UNEP/FAO/RC/COP.10/INF/20–UNEP/POPS/COP.10/INF/37) through the development of the road map for mobilizing funding from non-State actors, to assist developing countries and countries with economies in transition in fulfilling their obligations under the conventions.

102. The Conference of the Parties took note of the information provided by the Secretariat and the representative of UNEP and agreed to refer the conference room paper submitted by Ghana on behalf of the group of African States to the joint contact group on technical assistance and financial resources for further consideration.

103. [to be completed]

E. Compliance

1. Committee Administering the Mechanism for Promoting Implementation and Compliance of the Basel Convention

104. Introducing the sub-item, the representative of the Secretariat drew attention to the relevant documents, noting that sections A, B and C of part II of document UNEP/CHW.16/13 provided information on the activities carried out by the Committee during the biennium 2022–2023, and that due to the short intersessional period, the Committee had needed to prioritize certain activities within its work programme. The draft decision set out in part III of the document included recommendations the Committee had developed under its specific submissions mandate and its general review mandate, as well as a proposed work programme for the biennium 2024–2025, which built on its work programme for the previous biennium. To facilitate consideration by the Conference of the Parties, the new activities had been indicated in tracked changes. Comments received from Parties on the proposed work programme for the biennium 2024–2025 were available on the website of the Basel Convention. Section II.D of document UNEP/CHW.16/13 and the draft decision also pertained to the needed election of ten new members of the Committee. The annex to document UNEP/CHW.16/INF/22 provided a list of members of the Committee since its establishment.

105. Drawing attention to five additional documents, she noted that document UNEP/CHW.16/INF/20 set out information on the activities of Committee to improve timely and complete national reporting under paragraph 3 of Article 13 of the Convention. Document UNEP/CHW.16/INF/21 set out information on the activities of the Committee to improve implementation and compliance with Article 9 of the Convention on preventing and combating illegal traffic. Document UNEP/CHW.16/INF/23 set out information on the activities of the Committee to improve implementation and compliance with paragraph 4 of Article 4 and paragraph 5 of Article 9 of the Basel Convention on national legislation. Document UNEP/CHW.16/INF/24 set out information on the activities of the Committee to enhance coordination with the Compliance Committee of the Rotterdam Convention. Document UNEP/CHW.16/INF/25 set out information on the activities of the Committee to improve the implementation of and compliance with Article 5 of the Convention. The work of the Committee in those areas had benefited from financial support provided by the Governments of Japan, Norway and Switzerland.

106. In his report, Florisvindo Furtado (Cabo Verde), Chair of the Implementation and Compliance Committee of the Basel Convention, highlighted activities undertaken by the Committee since the conclusion of the fifteenth meeting of the Conference of the Parties to the Basel Convention. In accordance with its mandate to review general issues of compliance, the Implementation and Compliance Committee had worked towards improving national reporting by undertaking a draft classification of Parties' individual compliance with national reporting for the years 2018 and 2019 against the three targets set by the Conference of the Parties to the Basel Convention at its fifteenth meeting. Among the preliminary outcomes were that 20 per cent of the 2018 reports and 25 per cent of the 2019 reports were both complete and on time, against the set target of 25 per cent, representing the first time that Parties had reached a reporting target set by the Conference of the Parties.

107. The Committee had also prioritized work to prevent and combat illegal traffic. In that regard the Committee had developed a report scoping the extent of illegal traffic on the basis of information provided by Parties in table 9 of their 2018 and 2019 national reports. Among the Committee's recommendations was that the Conference of the Parties to the Basel Convention at its sixteenth meeting consider revising table 9.

108. A third area of focus had been improving implementation of and compliance with paragraph 4 of Article 4 and paragraph 5 of Article 9 of the Convention on national legislation. A total of 49 Parties had completed a self-review of their legislation relevant to implementing the Convention, using a specific checklist to guide responses. Following an initial synthesis of the self-reviews, the Committee was recommending that the Conference of the Parties amend the checklist in order to gather improved information.

109. Other activities prioritized by the Committee during the short intersessional period pertained to enhancing coordination with the Compliance Committee of the Rotterdam Convention and improving the implementation of and compliance with Article 5 of the Convention on the designation of country contacts. The Committee was also pleased to report that the matter of concern regarding Liberia's difficulties with the transmission of national reports had been resolved.

2. Compliance Committee of the Rotterdam Convention

110. Introducing the sub-item, the representative of the Secretariat outlined the information in document UNEP/FAO/RC/COP.11/14, including on the activities of the Rotterdam Convention Compliance Committee since the tenth meeting of the Conference of the Parties, the conclusions and recommendations of the Compliance Committee at its first meeting, a draft programme of work for the biennium 2024–2025 and a proposed draft decision. To facilitate consideration by the Conference of the Parties, the new activities in the draft programme of work for the biennium 2024–2025 had been indicated in tracked changes in the annex to document UNEP/FAO/RC/COP.11/14. The work of the Committee had benefitted from financial support provided by the Governments of Germany and Switzerland. Section II.D of document UNEP/FAO/RC/COP.11/14 and the proposed draft decision also pertained to the election of eight new members of the Committee. The annex to document UNEP/FAO/RC/COP.11/INF/16 set out a list of members of the Committee and identified those whose terms would expire at the closure of the eleventh meeting of the Conference of the Parties.

111. Osvaldo Patricio Álvarez-Pérez, Chair of the Compliance Committee, reported on the first meeting of the Committee and subsequent work, noting that the Committee had initiated work under its specific submissions mandate, both from a substantive and from a procedural perspective, with members very conscious of their role to assist Parties within the scope of the Committee's mandate. He invited Parties that might find themselves unable to comply with certain obligations under the Convention to consider making a submission to the Committee so that potential avenues to provide assistance could be explored.

112. He added that although the intersessional period had been notably short, financial support provided by the Governments of Germany and Switzerland had enabled the Committee to begin work on a compilation of options for information exchange and a review of laws, regulations, policies, procedures and other measures to implement the Convention, among other activities. The Committee had also taken advantage of the opportunity to hold a joint session with the Basel Convention Implementation and Compliance Committee on issues of common interest. A fruitful exchange of views had ensued between the two Committees, and members of the Rotterdam Convention Compliance Committee members had expressed an interest in exploring lessons from the implementation and compliance bodies associated with other multilateral environmental agreements.

113. The documents before the Conference of the Parties included a draft programme of work for the upcoming biennium, which built on work initiated during the current biennium. There were also recommendations to the Conference of the Parties that the Committee members believed would strengthen their future work. In closing, he invited representatives to engage in bilateral discussion with Committee members at the present meeting to share information about the work and activities of the Committee.

3. Compliance under the Stockholm Convention

114. Introducing the sub-item, the representative of the Secretariat recalled that the issue of compliance had been considered at all ten of the previous meetings of the Conference of the Parties to the Stockholm Convention and that, at the ninth meeting, given the continued lack of consensus, the Conference of the Parties had decided to defer further consideration of the issue to its eleventh meeting. She drew attention to document UNEP/POPS/COP.11/21, which set out in its annex two draft texts on compliance from annexes to compliance-related decisions adopted at the seventh and sixth meetings, and noted that, should the Conference of the Parties adopt the procedures and mechanisms on compliance at the present meeting, it might need to elect the members of the compliance committee at that same meeting.

115. [to be completed]

V. International cooperation and coordination (item 5 of the agenda for the Basel Convention, item 6 of the agendas for the Rotterdam and Stockholm conventions)

A. Cooperation and coordination with the Minamata Convention on Mercury

116. Introducing the sub-item, the representative of the Secretariat outlined the information set out in document UNEP/CHW.16/21-UNEP/FAO/RC/COP.11/16-UNEP/POPS/COP.11/22, presenting the activities undertaken in response to the decisions on cooperation adopted in 2022 by the conferences of the Parties to the four conventions. Cooperation between the two secretariats had continued on

relevant administrative, programmatic, technical and technical assistance issues. The secretariats had also implemented the sharing and the purchase of relevant services from one another, on a cost recovery basis, in accordance with the programme of work and budget of each respective convention for the biennium 2022–2023. Further information on that cooperation was set out in joint document UNEP/CHW.16/INF/36–UNEP/FAO/RC/COP.11/INF/19–UNEP/POPS/COP.11/INF/40.

117. The Executive Secretary of the Minamata Convention, Monika Stankiewicz, delivered a statement on cooperation between the secretariats of the Basel, Rotterdam and Stockholm conventions and of the Minamata Convention. She said that cooperation between the two secretariats had flourished on a broad array of programmatic issues, such as mercury wastes and their environmentally sound management, the provision of technical assistance and financial resources, compliance, legal issues and effectiveness evaluation, and administrative issues, as well as outreach and awareness-raising efforts and knowledge and information management. Important areas of collaboration were or had been mercury waste, in particular efforts to establish thresholds for mercury waste; the identification of funding needs in a successful GEF replenishment, which had resulted in increased funding for both Minamata and Stockholm conventions; the opening up of training events for chairs of bodies and negotiators under the Basel, Rotterdam and Stockholm conventions to the chairs of bodies and negotiators under the Minamata Convention. Looking to the future, she said the mandates of the four conventions converged in the implementation of United Nations Environment Assembly resolutions 5/7, on the sound management of chemicals and waste, and 5/8, on a science-policy panel to contribute further to the sound management of chemicals and waste and to prevent pollution and in their contributions to the Strategic Approach and the sound management of chemicals and waste beyond 2020 and efforts to ensure stronger linkages with the Kunming-Montreal Global Biodiversity Framework.

118. In the ensuing discussion, many representatives, including one speaking on behalf of a group of countries, said that cooperation and coordination with the Minamata Secretariat was extremely important and beneficial to all involved. Several representatives, including one speaking on behalf of a group of countries, welcomed the report on cooperation. The representative speaking on behalf of the group of countries also thanked the Secretariat for the outline of future activities, considering that the planned activities would provide for the effective implementation of the relevant elements of the programme of work. She nevertheless encouraged the conduct of further activities in the area of outreach and communication, knowledge management and trade control.

119. Several representatives, including one speaking on behalf of a group of countries, expressed their appreciation of the shared services arrangement and the purchase of services on a cost recovery basis in accordance with the programme of work and budget for each biennium, while some highlighted the value of the cooperation with the Basel Convention for the setting of mercury thresholds. One representative said that it was important to harmonize the definitions of “mercury wastes” in Article 11 of the Minamata Convention and “hazardous waste” in Article 1 of the Basel Convention to enable Parties to comply with their obligations under both conventions. He expressed the hope that, in the meantime, the Secretariat would continue to track the consequences of the differences in definition for the implementation of the Basel Convention.

120. One representative expressed the view that there was a need to crystallize the means of cooperation between the two secretariats, advocating a systematic, effective and transparent tool that addressed the principle of common but differentiated responsibilities. One representative thanked the Government of Japan for assistance to his country in addressing mercury emissions from open burning, stressing the need for enhanced cooperation to address the problem of mercury and unintentionally produced persistent organic pollutants, while another representative highlighted the need for assistance to Africa in dealing with mercury contamination in mining sites.

121. Following the discussion, the conferences of the Parties adopted the draft decisions set out in document UNEP/CHW.16/21–UNEP/FAO/RC/COP.11/16–UNEP/POPS/COP.11/22.

B. Cooperation and coordination with other organizations

122. Introducing the sub-item, the representative of the Secretariat outlined the information set out document UNEP/CHW.16/22/Rev.1–UNEP/FAO/RC/COP.11/17/Rev.1–UNEP/POPS/COP.11/23/Rev.1, presenting the activities undertaken in response to the requests set out in 2022 decisions on international cooperation and coordination and the related information documents, and a draft decision on the matter.

123. She highlighted three major developments that had occurred after the issuance of the note by the Secretariat on international cooperation and coordination with other organizations that the conferences of the Parties might wish to consider. First, following the approval by FAO for the

Rotterdam Convention to become a participating organization of the Inter-Organization Programme for the Sound Management of Chemicals (IOMC), the two executive secretaries of the Basel, Rotterdam and Stockholm conventions had received a letter, dated 18 April 2023, from the Director-General of WHO stating that all nine executive heads of the current participating organizations of the IOMC had confirmed their agreement to the Basel, Rotterdam and Stockholm conventions becoming a single participating organization of IOMC through their joint Secretariat. In the light of those letters, the proposed draft decision would need to be revised.

124. Second, the General Assembly had adopted resolution 77/161 on promoting zero-waste initiatives to advance the 2030 Agenda for Sustainable Development. In the resolution, the General Assembly, had, among other things, decided to proclaim 30 March as International Day of Zero Waste, to be observed annually; and had requested that the Secretary-General set up an advisory board of eminent persons, for a period of three years, to promote local and national zero-waste initiatives.

125. Third, the President of the sixth session of the United Nations Environment Assembly, on behalf of the Bureau of the United Nations Environment Assembly, had requested the inclusion in the provisional agenda of the sixth session of the Environment Assembly of a supplementary item, on cooperation with multilateral environmental agreements, which mirrored in some respects the agenda items of the present meetings on international cooperation and coordination.

126. In the ensuing discussion, a number of representatives, including one speaking on behalf of a group of countries, expressed their appreciation for the large number of cooperation and coordination activities carried out with other international organizations and processes. One representative, noting the importance of such efforts as a move away from a silo approach while respecting the mandate of individual agreements, requested that the Secretariat organize webinars to communicate objectively the results of such cooperative activities.

127. Some representatives, including one speaking on behalf of a group of countries, noting that pollution and waste was the least visible element of the triple planetary crisis, said that cooperation and coordination activities with other international organizations and processes were vital in helping to raise awareness of the Basel, Rotterdam and Stockholm conventions. The representative of the European Union introduced a conference room paper setting out proposed additions to the draft decision regarding suggestions for increasing the visibility and raising the profile of the three conventions.

128. One representative highlighted the success of the training programmes run by the Secretariat for potential chairs of, and negotiators at, meetings under the three conventions and noted that recent workshops had also included participants from the Minamata Convention; the Montreal Protocol; the intergovernmental negotiating committee to develop an international legally binding instrument on plastic pollution, including in the marine environment; and the Strategic Approach to International Chemicals Management. He expressed his thanks to donors, in particular Germany and Switzerland, for contributions that had made the programmes possible. Many representatives supported the proposal of that representative to add a paragraph to the draft decision to welcome cooperation on such training and to request the Secretariat, subject to the availability of resources, to continue implementing such training.

129. A number of representatives, including one speaking on behalf of a group of countries, welcomed, in particular, the cooperation with the intergovernmental negotiating committee to develop an international legally binding instrument on plastic pollution, including in the marine environment. Several representatives drew attention to the report prepared by the Secretariat of the Basel, Rotterdam and Stockholm Conventions for the negotiating committee that contained information on several essential elements that could be replicated in the instrument, such as technical assistance and compliance mechanisms. One representative, speaking on behalf of a group of countries, noted the need to promote complementarity and avoid duplication of work or governance structures with the new legally binding instrument, while another said that it was important for the Secretariat to be proactive in relation to the process of the development of the international legally binding instrument on plastic pollution.

130. One representative said that the creation of a science–policy panel to contribute further to the sound management of chemicals and waste and to prevent pollution envisaged under Environment Assembly resolution 5/8 would ensure the flow of information between the various conventions under the framework of the international chemicals and waste agenda. Several representatives, including one speaking on behalf of a group of countries, underlined the need for the Secretariat to continue participating in the work of the ad hoc open-ended working group on a science–policy panel to contribute further to the sound management of chemicals and waste and to prevent pollution in order to promote complementarity and avoid duplication of work or governance structures.

131. The coordination of customs codes carried out with the World Customs Organization was identified by some representatives as having been a particularly beneficial area of cooperation, as harmonized codes would greatly improve cross-border control traceability and allow for improved inventories. Other representatives, including one speaking on behalf of a group of countries, welcomed, in particular, the invitation for the Basel, Rotterdam and Stockholm conventions to become members of IOMC.

132. Some representatives noted the need to adopt a human rights approach and a gender perspective in the work with other international organizations, and for cooperation with human rights rapporteurs.

133. Regarding the focus for future cooperation activities, several representatives noted the importance of strengthened synergy with the Strategic Approach and the Montreal Protocol. One representative said that exchanging experiences in relation to illicit substances with the Montreal Protocol would be particularly beneficial, while others identified the importance of the proposed framework under the Strategic Approach to International Chemicals Management and the sound management of chemicals and waste beyond 2020 that was due to be adopted in September 2023. One representative encouraged closer cooperation between the conventions and the International Atomic Energy Agency, noting the value of the latter’s technical cooperation programme to developing countries in relation to chemicals and waste in particular. Other representatives encouraged direct cooperation with WHO, in particular in the light of the One Health approach and the worryingly high number of deaths caused each year by chemicals. One representative drew attention to the General Assembly resolution on zero-waste initiatives and asked for the support of all Parties and the Secretariat in implementing the initiative, in particular in the light of the strong links with Sustainable Development Goals 11 and 12.

134. Some representatives encouraged closer coordination with the United Nations Framework Convention on Climate Change. A representative of Jordan introduced a conference room paper proposing additional paragraphs for the draft decision regarding closer coordination on issues of common interest, subject to the availability of resources. Another representative noted that waste management was a vast domain and coordination between the conventions would be particularly beneficial for developing countries. Some representatives did not, however, support the proposal, noting a risk of duplication of effort between the Basel Convention and the Framework Convention on Climate Change, and the importance of keeping the processes separate to allow them to maintain specialization, efficiency, clarity and flexibility.

135. On the topic of waste management, some representatives requested capacity-building support from the Secretariat for developing countries regarding the traceability of waste and the management of end-of-life-cycle products, in particular those sent to them from the global North. Some representatives noted that the illegal dumping of waste remained a significant issue in Africa and, in that regard, some representatives requested strengthened cooperation with the Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa. One representative noted that, in particular for countries in Africa, discussion of chemicals should always include discussion of waste, as the two areas were inextricably linked.

136. Following the discussion, a number of observer organizations made statements.

137. The representative of UNEP presented the report of the Executive Director of UNEP to the conferences of the Parties on programmatic cooperation (UNEP/CHW.16/INF/38–UNEP/FAO/RC/COP.10/INF/21–UNEP/POPS/COP.10/INF/43). She drew attention to the collaboration between the conventions and UNEP at the programmatic level, particularly in relation to DDT, PCB and the persistent organic pollutants global monitoring programme (UNEP/POPS/COP.11/INF/11 and UNEP/POPS/COP.11/INF/14); in terms of UNEP support for the execution of GEF-funded projects; through information sharing, for example through the Green Customs Initiative and the United Nations Information Portal on Multilateral Environmental Agreements (InforMEA) hosted by UNEP; during other international processes on chemicals and waste management, such as the preparations for the fifth session of the International Conference on Chemicals Management, which was expected to adopt a new framework for the sound management of chemicals and waste (UNEP/POPS/COP.11/INF/35); implementation of the outcomes of the fifth session of the United Nations Environment Assembly, including the establishment of the science-policy panel to contribute further to the sound management of chemicals and waste and to prevent pollution; during preparations for the sixth session of the Environmental Assembly where an additional item on cooperation with multilateral environmental agreements had been added to the provisional agenda; and in relation to the work of the intergovernmental negotiating committee to

develop an international legally binding instrument on plastic pollution, including in the marine environment, in support of which UNEP and the Secretariat had produced a publication entitled "Chemicals in Plastics – A Technical Report" (UNEP/CHW.16/INF/60–UNEP/FAO/RC/COP.11/INF/44–UNEP/POPS/COP.11/INF/61). She also highlighted the collaboration within the joint task force on programmatic cooperation between the UNEP Chemicals and Health Branch, the Secretariat of the Basel, Rotterdam and Stockholm Conventions and the secretariats of the Minamata Convention and of the Strategic Approach, which had proposed new initiatives to strengthen cooperation to improve the delivery of the respective programmes of work and to enhance efficiencies.

138. The representative of the Strategic Approach to Chemicals Management presented an update on the intersessional process considering the Strategic Approach and the sound management of chemicals and waste beyond 2020 (UNEP/CHW.16/INF/39–UNEP/FAO/RC/COP.11/INF/22–UNEP/POPS/COP.11/INF/44). Two sessions of the fourth meeting of the intersessional process had already taken place and a third was due to be held on the two days preceding the fifth session of the International Conference on Chemicals Management, which was to be held from 25 to 29 September 2023. The fifth session of the Conference was expected to lead to a new enabling global framework for chemicals and waste, supported by a high-level declaration. The Basel, Rotterdam and Stockholm conventions community had actively participated in the discussions on the new framework, which aimed to enhance engagement with key economic and industry sectors that used chemicals and introduce circular and life cycle approaches and other benefits valuable to chemical-related multilateral environmental agreements.

139. The representative of FAO said that cooperation and coordination was key in achieving FAO objectives. The part of the Rotterdam Secretariat that was hosted by FAO cooperated with all the entities within the organization's headquarters and its field offices, which had enabled the leveraging of resources, increased the impact of activities and enhanced the coherence of the implementation of both the FAO Strategic Framework and the Rotterdam Convention. The Secretariat had cooperated closely with the FAO pest and pesticide management team, including in the development, with WHO, of a global action plan on highly hazardous pesticides and the facilitation of training activities on the FAO pesticide registration toolkit. The Secretariat had also continued to support technical assistance and training activities such as the FAO-led activities related to biodiversity and chemicals management under the third phase of the programme on strengthening environmental governance and supporting multilateral environmental agreements in the Africa, Caribbean and the Pacific regions. The Secretariat had also participated as an observer in the FAO task force on the reduction of plastic use in agriculture.

140. The representative of the World Trade Organization (WTO) outlined the increasing emphasis that the organization was now placing on the environment and sustainable development. Since 2021, it had developed new initiatives, including a dialogue on plastic pollution, which was exploring how enhanced trade cooperation at WTO could help in supporting deliberations under the Basel, Rotterdam and Stockholm conventions, while avoiding duplication. The representative of WTO thanked the Secretariat for its systematic sharing of technical information with the organization.

141. The representative of the International Union for Conservation of Nature (IUCN) welcomed the continuation of cooperation with the Secretariat. It applauded the study on interlinkages between the chemicals and waste multilateral environmental agreements and biodiversity produced by the secretariats of the Minamata Convention and of the Basel, Rotterdam and Stockholm conventions. IUCN supported efforts to implement the Basel, Rotterdam and Stockholm conventions in numerous ways, including by providing its legal and economic expertise and producing tools such as the IUCN Red List and the Global Standard for Nature-based Solutions.

142. Following the discussion, the conferences of the Parties established a joint contact group on joint issues, to be co-chaired by Ole Thomas Thommesen (Norway) and Jeanelle Kelly (Saint Kitts and Nevis). The group was mandated to prepare a revised draft decision on international cooperation and coordination on the basis of a revised text to be prepared by the Secretariat that would reflect the latest developments related to IOMC, as well as other recent developments highlighted by the Secretariat, and taking into account the proposals by the European Union and Jordan set out in conference room papers and the proposal made during the discussion, and the discussion in plenary. Further mandates on joint issues might be added to the contact group as needed.

143. [to be completed]

VI. Enhancing cooperation and coordination among the Basel, Rotterdam and Stockholm conventions (item 6 of the agenda for the Basel Convention, item 7 of the agendas for the Rotterdam and Stockholm conventions)

144. [to be completed]

A. Clearing-house mechanism for information exchange

145. [to be completed]

B. Mainstreaming gender

146. [to be completed]

C. Synergies in preventing and combating illegal traffic and trade in hazardous chemicals and wastes

147. Introducing the sub-item, the representative of the Secretariat recalled that the conferences of the Parties to the Rotterdam and Stockholm conventions, at their tenth meetings, had requested the Secretariat to review the cooperative arrangements with international organizations or entities with a mandate to prevent and combat illegal trade in hazardous chemicals under the Rotterdam and Stockholm conventions and to make recommendations on strengthening such arrangements. The resulting report, including a draft decision, was set out in document UNEP/FAO/RC/COP.11/INF/26–UNEP/POPS/COP.11/INF/60 and offered three options for the Parties' consideration.

148. The representative of Chile introduced a conference room paper proposing that the Secretariat be requested to design a feasible work plan for synergy in preventing and combating illegal traffic and trade in hazardous chemicals and wastes, for adoption by the conferences of the Parties at their next meetings; to generate a specific cooperation mechanism to support the design of the tariff codes needed to identify products containing substances listed under the Stockholm and Rotterdam conventions and hazardous wastes according to the classifications in the Basel Convention; to promote opportunities to strengthen cooperation aimed at preventing and combating illegal traffic and trade in hazardous chemicals and wastes through the support and with the guidance of the Basel and Stockholm convention regional centres and the FAO regional offices under the Rotterdam Convention; and, if necessary, to establish an intersessional working group to develop a work plan and compile the necessary background information for the intersessional period.

149. Several representatives, including one speaking on behalf of group of countries, welcomed the Secretariat's report and compilation of best practices and thanked the Secretariat for the activities undertaken to assist Parties in combating illegal trade in hazardous waste and chemicals. A number of representatives, including some speaking on behalf of a group of countries, voiced support for the draft decision, and several welcomed the submission by Chile.

150. Many representatives, some speaking on behalf of groups of countries, expressed their strong desire to prevent and combat illegal traffic and trade in hazardous chemicals and wastes. A number said they were in favour of strengthened cooperation, and one, speaking on behalf of a group of countries, supported the option of extending the scope of ENFORCE to also cover efforts aimed at preventing and combating the illegal trade in hazardous chemicals covered by the Rotterdam and Stockholm conventions. Other measures proposed to combat illegal traffic and trade included the provision of technical assistance, in particular to strengthen the capacity of customs and other enforcement agencies; enhanced and adequately funded tools and mechanisms developed by regional centres; stronger consequences for traffickers; and enhanced cooperation and coordination with the Bamako Convention.

151. Several representatives, including one speaking on behalf of a group of countries, noted that developing countries were often the victims of illegal traffic on their territories. Some observed that trade required an importer and an exporter, the latter often being the more powerful and better resourced of the two, and said that the onus should be on the exporting country to ensure that hazardous wastes and chemicals were not being exported. One representative suggested that countries that attempted to export hazardous waste or chemicals illegally be identified to help other countries be better prepared.

152. One representative, speaking on behalf of a group of countries, noted that the toolbox for decision-making in chemicals management would soon include a tool on illegal traffic and trade in hazardous chemicals and wastes, to assist Parties in establishing national legislation and infrastructure to strengthen the fight against illegal trade. She drew attention to the work undertaken by the Organisation for Economic Co-operation and Development (OECD) to fight illegal trade in pesticides, in particular the Network on Illegal Trade of Pesticides (ONIP), and urged the Parties to implement the OECD Council recommendation on countering the illegal trade of pesticides and to use the OECD best practice guidance to identify the illegal trade of pesticides.

153. The conferences of the Parties agreed to refer the matter to the joint contact group on joint issues. The group was mandated to prepare draft decisions based on the proposed action set out in document UNEP/CHW.16/25–UNEP/FAO/RC/COP.11/20–UNEP/POPS/COP.11/26, taking into account the conference room paper submitted by Chile and the discussion in plenary.

154. A representative of FAO informed the Parties that the FAO/WHO Joint Meeting on Pesticide Management was developing a guidance note on addressing the illegal trade in pesticides, which would reference available international guidance and provide practical instructions on addressing the illegal trade in pesticides and was expected to be published in 2024.

155. A representative of the United Nations Office on Drugs and Crimes (UNODC), noting that illegal trafficking in hazardous waste and other wastes remained a lucrative, low-risk crime in many countries owing to weak penalties and inadequate enforcement, informed the Parties that in 2020, the Parties to the United Nations Convention against Transnational Organized Crime had urged States parties to treat environmental crimes such as waste trafficking as a serious offence and had called on UNODC to provide technical support to States. In response, UNODC had created a legislative guide to international trafficking for national lawmakers featuring model provisions and best practices. The Office was also involved in various projects to address waste trafficking, including the Unwaste project, with UNEP and the United Nations Institute for Training and Research (UNITAR), the Container Control Programme, with the World Customs Organization, and the Global Maritime Crime Programme. To coordinate its efforts with other initiatives aimed at preventing waste trafficking, UNODC had joined the ENFORCE network in 2022.

156. [to be completed]

D. From science to action

157. [to be completed]

VII. Programme of work and budget (item 7 of the agenda for the Basel Convention and item 8 of the agendas for the Rotterdam and Stockholm conventions)

158. Introducing the item, the Executive Secretary of the Basel, Rotterdam and Stockholm conventions recalled that in decisions BC-15/30, RC-10/19 and SC-10/26, the conferences of the Parties to the Basel, Rotterdam and Stockholm conventions had requested the executive secretaries to include in the proposed operational budget for the biennium 2024–2025 two alternative funding scenarios: one that was based on the executive secretaries' assessments of the required changes in the operational budgets, which should not exceed a 5 per cent increase over the 2022–2023 level in nominal terms; and one that maintained the operational budget at the 2022–2023 level in nominal terms.

159. Explanations of the two scenarios were presented in document UNEP/CHW.16/27–UNEP/FAO/RC/COP.11/22–UNEP/POPS/COP.11/28. The first scenario represented a continuation of the programmes of work approved for the current biennium and included a budget increase of approximately 5 per cent across the three conventions. Under the second, a zero nominal growth scenario, it would be necessary to reduce activities funded from the general trust fund. Following numerous budget negotiation cycles during which the budgets approved for programme activities had steadily declined in real terms, it had become increasingly unrealistic to prepare a viable scenario of zero nominal growth without such reductions.

160. He said that he was pleased to report that many donors had come forward to support voluntarily funded activities in the programmes of work, especially for activities related to plastic and marine litter, as well as the travel of funded participants. He thanked the Governments of Belgium, China, Denmark, Finland, Germany, Japan, the Kingdom of the Netherlands, Norway, Sweden, Switzerland and the United States as well as the Norwegian Retailers' Environment Fund for their

generous contributions in the biennium 2022–2023. He also thanked the Governments of Germany and Switzerland for their contributions to the regional preparatory meetings and the Governments of China, Denmark, Finland, Germany, Japan, the Kingdom of the Netherlands, Norway, Sweden and Switzerland for their generous contributions to support the participation of approximately 350 delegates from eligible Parties attending the present meetings.

161. Regrettably, both the number of Parties in arrears and the overall amount of arrears had increased during the biennium 2022–2023. The Secretariat had continued its efforts to work with Parties and relevant national authorities to find solutions and settle all outstanding arrears.

162. Information on the allocation and utilization of the contribution provided in the biennium 2022–2023 by FAO was contained in document UNEP/FAO/RC/COP.11/INF/31. Since the entry into force of the Rotterdam Convention in 2004, FAO had supported the part of the Rotterdam Convention Secretariat located at FAO headquarters in Rome with more than $18.2 million, including direct financial support of $1.5 million per biennium. Information on activities to be implemented, funded or co-funded in the biennium 2024–2025 using FAO contributions was set out in annex IV to the proposed operational budgets in document UNEP/CHW.16/INF/45–UNEP/FAO/RC/COP.11/INF/29–UNEP/POPS/COP.11/INF/50.

163. In conclusion, he noted that a detailed presentation on the budget and financial matters would be provided at the start of the deliberations of the contact group, if one was established to consider these issues further.

164. The representative of the Secretariat presented additional information and outlined the relevant documentation. As in previous bienniums, the budget proposals had been developed jointly for the three conventions and presented in a single, harmonized document to facilitate the consideration of joint or complementary activities.

165. During the ensuing discussion, a number of Parties, including some speaking on behalf of groups of countries, expressed support for an increased budget for the biennium 2024–2025, noting that this would ensure no reduction in the Secretariat's activities in support of the conventions. The budgets and programmes of work for the biennium 2024–2025 should enable all elements of the conventions, including all their subsidiary bodies, to operate effectively.

166. Several other representatives expressed support for a zero growth scenario for the budget, citing the continued economic challenges facing many Parties, particularly developing-country Parties and noting that the budgets and programmes of work should reflect the special situation of developing countries. One representative said his Government understood that some Parties faced economic challenges and thus potential savings in the operation of the conventions should be pursued while also not cutting activities and programmes important to their implementation and effectiveness.

167. Several representatives expressed the view that the participation of the members of bureaux from developing countries should be funded in addition to the usual total number of representatives funded from that country. One expressed support for including in the core budget the activities of the Secretariat related to providing technical assistance and capacity-building, particularly those relevant to plastics and hazardous waste.

168. A number of representatives expressed support for efforts to address the problem of arrears, with one noting that failing to do so would negatively impact the budget and could lead to Parties that met their funding obligations contributing more in the future. One representative underscored the importance of seeking additional cost savings and operational advantages from synergies among the Basel, Rotterdam and Stockholm conventions and other relevant agreements and institutions.

169. Speaking on behalf of a group of countries, one representative expressed support for increasing the number of meeting days for the Chemical Review Committee, in order to address the backlog in reviewing notifications of final regulatory actions, and for retaining translation expenses in the core budget. Some representatives, including one speaking on behalf of a group of countries, questioned the proposal from the Secretariat to use surplus funds to cover costs related to the security, safety and staff counsellor services provided by the United Nations Office at Geneva, believing that those expenses should be covered by UNEP in accordance with the memorandum of understanding concluded between UNEP and the conferences of the Parties in 2019. One representative, speaking on behalf of a group of countries, supported, as a general approach, keeping surpluses from particular operations available for the next biennium and using them for the core activities of the three conventions.

170. The conferences of the Parties established a joint contact group on programmes of work and budgets, to be co-chaired by Mr. Álvarez-Pérez (Chile) and Premysl Stepanek (Czechia). The group was mandated to develop the programmes of work and budgets for the three conventions for the

biennium 2024–2025, as well as a draft decision for each of the conferences of the Parties, using the text set out in document UNEP/CHW.16/27–UNEP/FAO/RC/COP.11/22–UNEP/POPS/COP.11/28 as the starting point for its deliberations, and taking into account the discussion in plenary.

171. [to be completed]

VIII. Implementation of the memorandums of understanding between the United Nations Environment Programme and the conferences of the Parties to the Basel, Rotterdam and Stockholm conventions, and, in the case of the Rotterdam Convention, the Food and Agriculture Organization of the United Nations (item 8 of the agenda for the Basel Convention, item 9 of the agendas for the Rotterdam and Stockholm conventions)

172. Introducing the item, the Executive Secretary of the Basel, Rotterdam and Stockholm conventions recalled that the three memorandums of understanding had been adopted by the respective conferences of the Parties during their 2019 meetings. Each memorandum included provisions on staffing, delegation of authority, administrative and programme support costs, financial matters and budgets, performance evaluation and management review, and programmatic relationships, among other things. Pursuant to the respective memorandums of understanding, the Executive Director of UNEP and, in the case of the Rotterdam Convention, the Director-General of FAO were to submit to each ordinary meeting of the conferences of the Parties, 90 days in advance of the meeting, a report on the implementation of the respective memorandums of understanding that would provide Parties with detailed information on administration services provided to the conventions by UNEP or FAO. The report of the Executive Director of UNEP to the respective conferences of the Parties to the Basel, Rotterdam and Stockholm conventions on the implementation of the memorandums of understanding was set out in document UNEP/CHW.16/INF/49–UNEP/FAO/RC/COP.11/INF/33–UNEP/POPS/COP.11/INF/53 and the report of FAO to the Conference of the Parties to the Rotterdam Convention on the implementation of the memorandum of understanding was set out in document UNEP/FAO/RC/COP.11/INF/34.

173. In decisions BC-15/30, RC-10/19 and SC-10/26, which were identical in terms of substance, the Executive Director of UNEP had been requested to comply with the memorandum of understanding between the relevant Conference of the Parties and UNEP regarding service costs to be covered by UNEP pursuant to the annex to the relevant memorandum of understanding.

174. A representative of UNEP said that the Executive Director of UNEP had initiated a review of the memorandums of understanding to clarify the provision of administrative services to the secretariats of the Basel, Rotterdam and Stockholm conventions and the cost-sharing arrangements. The amendments to the memorandums of understanding aimed to clarify which costs were covered by UNEP and which were covered by the conventions' budgets. Mainly, centrally administered services provided by UNEP and the United Nations Office at Nairobi were covered by the UNEP share of the programme support cost income, and common services charges, associated with the location of the secretariats in Geneva, such as medical and counselling services, diplomatic services, mail and diplomatic pouch services, and security and safety, were covered by the conventions' budgets. The letters by the Executive Director of UNEP proposing amendments to the memorandums of understanding between UNEP and the Conference of the Parties to the Basel Convention, between FAO, UNEP and the Conference of the Parties to the Rotterdam Convention, and between UNEP and the Conference of the Parties to the Stockholm Convention were set out in document UNEP/CHW.16/INF/53–UNEP/FAO/RC/COP.11/INF/39–UNEP/POPS/COP.11/INF/57. The proposed amendments would provide the necessary clarifications regarding the provision of services against the coverage of the cost of those services. The amendments aimed to align with standards followed by all the conventions administered by UNEP and by UNEP offices.

175. Following the introduction, several representatives, including some speaking on behalf of groups of countries, took note of the proposal to amend the memorandums of understanding. Some representatives, including one speaking on behalf of a group of countries, expressed their support for the draft decision. One representative, speaking on behalf of a group of countries, expressed her grave concern regarding the proposal by the Secretariat to use savings from the budget retroactively, namely to cover costs of the previous biennium, as was being proposed in relation to the amendments to the memorandums of understanding, and therefore would welcome a discussion on the proposal in the joint contact group on programmes of work and budgets.

176. The conferences of the Parties agreed to refer further discussion of the matter to the joint contact group on programmes of work and budgets. The group was mandated to prepare draft decisions based on the text set out in documents UNEP/CHW.16/28, UNEP/FAO/RC/COP.11/23 and UNEP/POPS/COP.11/29, and taking into account the discussion in plenary.

177. [to be completed]

IX. Venue and dates of the seventeenth meeting of the Conference of the Parties (item 9 of the agenda for the Basel Convention, item 10 of the agendas for the Rotterdam and Stockholm conventions)

178. [to be completed]

X. Other matters (item 10 of the agenda for the Basel Convention, item 11 of the agendas for the Rotterdam and Stockholm conventions)

Admission of observers

179. Introducing the item, the representative of the Secretariat outlined the procedure by which a body or agency applied for admission as an observer to a meeting of a Conference of the Parties. The lists of bodies or agencies making requests to be represented as observers to each meeting of a Conference of the Parties since the last meetings in 2022 and that met the relevant criteria were contained in, for the Basel Convention, document UNEP/CHW.16/INF/51; for the Rotterdam Convention, document UNEP/FAO/RC/COP.11/INF/42; and for the Stockholm Convention, document UNEP/POPS/COP.11/INF/55. Following the issuance of those documents, the Secretariat had received requests from several further bodies and agencies that it had verified met the relevant criteria in relation to the three conventions.

180. The conferences of the Parties took note of the bodies and agencies making requests for admission as observers to each meeting of a Conference of the Parties and requested the Secretariat to continue its current practices in that regard.

XI. Adoption of the report of the meeting (item 11 of the agenda for the Basel Convention, item 12 of the agendas for the Rotterdam and Stockholm conventions)

181. [to be completed]

XII. Closure of the meeting (item 12 of the agenda for the Basel Convention, item 13 of the agendas for the Rotterdam and Stockholm conventions)

182. [to be completed]

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BASEL CONVENTION

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Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal
Sixteenth meeting
Geneva, 1–12 May 2023

Draft report of the Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal on the work of its sixteenth meeting

Addendum

I. Matters related to the implementation of the Convention (agenda item 4)

A. Strategic issues

1. Strategic framework

1. Introducing the sub-item, the representative of the Secretariat outlined the information in document UNEP/CHW.16/6. Pursuant to part I of decision BC-15/3 on the strategic framework, the small intersessional working group had met and, at the online part of its meeting, had considered a draft report of findings and recommendations, developed by Canada as the lead country, to improve the strategic framework for the implementation of the Convention for the period 2012–2021. At a second, face-to-face part of the meeting, it had considered feedback by the Open-ended Working Group at its thirteenth meeting, and had finalized the recommendations for submission to the Conference of the Parties at the present meeting (UNEP/CHW.16/INF/5).

2. Sophie Bernier (Canada) presented the work of the small intersessional working group on behalf of the lead country and the chair of the intersessional working group, Zaghloul Samhan (State of Palestine). She said that the findings and recommendations developed by the group built upon the final evaluation of the strategic framework for the period 2012–2021 presented to the Conference of the Parties at its fifteenth meeting. The recommendations covered some overarching issues, such as the timing of a new strategic framework; ensuring the availability of verifiable baseline data; and defining measurable outcomes and process indicators. Several elements clearly required enhancement in a future framework, for example ensuring that data could be generated throughout the evaluation period; identifying data sources for the baseline and final evaluations at the time the indicators were developed; and selecting appropriate indicators. In addition, for each of the goals, objectives and indicators of the 2012–2021 framework, the report contained findings and recommendations on whether those should be included in a future framework, modified or removed. The group's proposal was that a revised framework should consist of three main goals, related to transboundary movement, to environmentally sound management and to several obligations under the Convention, such as the enactment of national legislation, the development of national definitions of hazardous wastes and reporting. The third goal would be new and overarching in nature. There was

also a chapter in the report on means of implementation, including information on ensuring that a future framework informed the decisions of the Conference of the Parties and the programme of work and that the financial and technological means needed to support Parties' implementation of the Convention were available.

3. The representative of Canada introduced a draft decision set out in a conference room paper submitted by Canada and the United Kingdom, proposing a way forward with regard to the development of a new strategic framework.

4. Many representatives, including one speaking on behalf of a group of countries, thanked the lead country, the Secretariat and the small intersessional working group for their work. Several representatives, including one speaking on behalf of a group of countries, also thanked the proponents of the draft decision, expressing their agreement with both the recommendations of the small intersessional working group and the proposed way forward in the draft decision.

5. Several representatives stressed the importance of a strategic framework in providing a common vision, goals and objectives and the crucial nature of clear indicators for measuring progress in the implementation of the framework. Several of them also supported the recommendation to align the calendar of the new next strategic framework with the cycles of the meetings of the Conference of the Parties. Some proposed that the framework cover a six-year period. Other suggestions related to the new framework included greater synergy with efforts to implement the 2030 Agenda for Sustainable Development; greater institutional strengthening, including the creation and/or strengthening of laboratories to improve analytical capacity, the strengthening of customs and the transfer of technology to reduce the generation and danger of hazardous waste; a special programme on cooperation with the World Customs Organization; making 2025 the baseline year of the new strategic framework; and confirmation of the mandate of the small intersessional working group in terms of further work.

6. Some representatives proposed that the deadline in the draft decision for the nomination of additional experts as members of the working group be postponed by two months, from 31 July to 30 September 2023.

7. Following the discussion, the Conference of the Parties adopted the draft decision proposed by Canada and the United Kingdom, as orally amended.

2. Improving the functioning of the prior informed consent procedure

8. Introducing the sub-item, the representative of the Secretariat outlined the information in document UNEP/CHW.16/4. She recalled that, in part II of decision BC-15/3 on the strategic framework, the Conference of the Parties had decided to initiate work to improve the functioning of the procedure and invited Parties and observers to submit information to the Secretariat on challenges they faced when implementing the procedure, as well as on best practices, possible approaches, initiatives, and views to improve its functioning. The Secretariat was also requested to prepare a compilation of comments received and a synthesis for consideration by the Open-ended Working Group.

9. During its thirteenth meeting, the Open-ended Working Group had considered the matter and agreed to recommend that the Conference of the Parties at its sixteenth meeting establish a small intersessional working group, open to all Parties and inviting balanced representation of the five regional groups of the United Nations, to identify challenges in the implementation of the prior informed consent procedure under the Basel Convention and best practices, possible approaches and initiatives to improve its functioning, taking into account a compilation and synthesis of information received from Parties and observers prepared by the Secretariat, discussion during the thirteenth meeting of the Open-ended Working Group, and ongoing work on electronic approaches to notification and movement documents, as well as to develop recommendations on improving the functioning of the procedure.

10. In the ensuing discussion, representatives underscored the importance of an effective prior informed consent procedure and supported the recommendation of the Open-Ended Working Group that a small intersessional working group be established and tasked with identifying challenges in the implementation of the prior informed consent procedure under the Basel Convention and best practices, possible approaches and initiatives to improve its functioning. The representative of the European Union announced that her delegation had submitted a conference room paper setting out a draft decision supporting the recommendation of the Open-Ended Working Group.

11. Many representatives, including one speaking on behalf of a group of countries, identified problems with the current operation of the prior informed consent procedure. These included the

absence of a unified and robust electronic platform for notifications; significant delays in receiving acknowledgements and decisions from the Parties regarding whether they consented or not to a transboundary movement of waste; challenges in communicating with Parties which had not provided updated contact information for their competent authorities; lack of harmonization between some documents; imprecise or missing definitions for some key terms; difficulty accessing databases for identifying, recording and tracking transboundary waste movements; the absence of effective mechanisms for monitoring that allowed follow-up regarding the final disposal of waste exports; insufficient information and other issues when transboundary movements involved States of transit ; issuance of export permits with time limits that were too short; lack of automatic alignment of transit consents with the consent dates of the States of import; insufficient cooperation and coordination among relevant stakeholders; lack of legal clarity regarding some issues and definitions pertinent to cross-border and transit waste movements; inadequate monitoring and prevention of illegal traffic; situations in which one of the Parties involved classified the waste involved as non-hazardous; the absence of official responses to a request or sufficient explanation when a request was denied; insufficiently harmonized custom codes; and the absence of unified templates for aspects of the information exchange required under the procedure.

12. Considerable support was expressed for the development of a robust, unified, transparent, efficient, practical and effective electronic platform for the prior informed consent procedure. Several representatives stressed the importance of ensuring that any new element of the procedure did not conflict with other trade regimes but instead took advantage of opportunities for effective synergies with other aspects of the Basel Convention and other international agreements or initiatives. While supporting the need for a unified, convention-wide approach, several representatives also outlined activities undertaken in their countries to address specific problems with the current operation of the prior informed consent procedure.

13. Many representatives, including one speaking on behalf of a group of countries, called for increased technical assistance, capacity-building, and sharing of best practices to assist developing countries and countries with economies in transition in addressing the challenges they continued to endure in using the prior informed consent procedure and so that they could fully participate in, and enjoy the benefits of, foreseen improvements to the system. Several representatives of small island developing States highlighted the unique challenges they faced and called for technical assistance and capacity-building for their competent authorities to address issues relevant to their special circumstances.

14. One representative noted the significant challenges faced by his Party from the unwanted import of plastic waste and e-waste due to the non-implementation of the prior informed consent procedure by other Parties. Another noted that work under the Basel Convention to improve the prior informed consent procedure could be informed by and help improve processes in related regional agreements such as the Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Transboundary Movement and Management of Hazardous Wastes within the South Pacific Region (Waigani Convention). One representative reminded Parties to cease exporting any waste listed under Basel Convention without explicit prior informed consent from the State of import.

15. One representative noted that the Agreement on Trade Facilitation, adopted at the ninth Ministerial Conference of the World Trade Organization (WTO), in 2013, called for all signatories to develop a single window technological system through which participants in foreign trade would be able to forward documents or data required by their Government. Given that transboundary waste movements occurred within the scope of international trade, developing and using an electronic approach for the prior informed consent procedure under the Basel Convention could use the single window system of each country and benefit from all the advances already achieved by countries, such as the identification of operators, prior control by customs authorities, and the creation of electronic processes for all documentation. He suggested that the Secretariat consult with WTO so that the further development of an electronic approach for the prior informed consent procedure under the Basel Convention could benefit from lessons learned in that regime and operate in harmony with the Agreement on Trade Facilitation.

16. Following the discussion, the Conference of the Parties to the Basel Convention established a contact group on strategic matters to be chaired by Ann de Jonghe (Belgium) and Yaser Abu Shanab (State of Palestine). The group was mandated to prepare a draft decision on the way forward to improve the functioning of the prior informed consent procedure, using as a basis for its discussions the recommendation of the Open-ended Working Group at its thirteenth meeting set out in the annex to document UNEP/CHW.16/20/Add.1 and taking into account the discussion in plenary as well as the relevant conference room paper.

17. [to be completed]

3. Development of guidelines for environmentally sound management

18. Introducing the sub-item, the representative of the Secretariat outlined the information set out in document UNEP/CHW.16/5. She recalled that, in decision BC-15/5, the Conference of the Parties had invited Parties and others to provide the Secretariat with information on the environmentally sound management of hazardous wastes and other wastes, in particular, activities, initiatives and case studies that might promote implementation and complement the toolkit on environmentally sound management. The Secretariat had not received any information in response to that invitation nor to the invitation for comments on good practices and examples with regard to waste prevention and minimization. A dedicated workstream on prevention and minimization did exist under the Partnership on Plastic Waste. The Secretariat had also been requested, subject to the availability of resources, to undertake activities to promote and disseminate the toolkit on environmentally sound management. In response, an enhanced toolkit had been made available on the website of the Convention, training on which was embedded in the training and capacity-building activities under the Convention.

19. All the representatives who spoke welcomed the work of the Secretariat in developing and updating guidelines for environmentally sound management. One expressed commitment to providing information in accordance with decision BC-15/5 and called on Parties and others to do so as well. Another representative reported on activities in her country to create a comprehensive system for the environmentally sound management of hazardous waste.

20. The Conference of the Parties took note of the information provided by the Secretariat and invited Parties and others to continue to provide information to the Secretariat in accordance with decision BC-15/5.

B. Scientific and technical matters

1. Technical guidelines

(a) Technical guidelines on persistent organic pollutants

21. [to be completed]

(b) Technical guidelines on the environmentally sound management of plastic wastes

22. Introducing the sub-item, the representative of the Secretariat drew attention to section III, on technical guidelines on the environmentally sound management of plastic wastes, of the note by the Secretariat on technical guidelines (UNEP/CHW.16/6). She recalled that, pursuant to decision BC-15/10, China, Japan and the United Kingdom had continued to lead the work on updating the technical guidelines on the environmentally sound management of plastic wastes in consultation with the small intersessional working group on plastic wastes. The version of the draft updated technical guidelines prepared by the co-leads, in consultation with the small intersessional working group, was set out in document UNEP/CHW.16/6/Add.3; a revision of that text prepared by the Open-ended Working Group at its thirteenth meeting, in February 2023, was set out in document UNEP/CHW.16/INF/11; and a further revision undertaken by the small intersessional working group at an online meeting in March 2023 was set out in document UNEP/CHW.16/INF/11/Rev.1. A draft decision for the consideration of the Parties was set out in paragraph 35 of document UNEP/CHW.16/6.

23. The representatives of Japan and the United Kingdom, as co-leads of the work on the technical guidelines, urged Parties to engage collaboratively to finalize the work on updating the current guidelines, which had been in place for over 20 years, in order to adopt them at the present meeting.

24. In the ensuing discussion, many of those who spoke commended the co-leads and the small intersessional working group for their work thus far in updating the technical guidelines on the environmentally sound management of plastic wastes. A number of representatives, including two speaking on behalf of groups of countries, said that it was important to integrate the concerns of all the Parties and resolve remaining differences in order to hasten finalization of the work. One representative welcomed the proposal for the inclusion of additional experts to support the work of the small intersessional working group, and called for greater participation of experts from Africa.

25. One representative said that the guidelines should avoid the creation of new terms and concepts, taking into account the possible overlap with other existing manuals and guidelines, and should provide guidance rather than any interpretation of the scope of the Convention. Of particular importance in that regard was clear differentiation between hazardous and non-hazardous plastic

wastes, which was essential to determining the correct disposal methods. One representative said that the guidelines, when completed, would assist countries in improving their national regulatory frameworks on plastic wastes and carrying out inventories.

26. A number of representatives said the management of plastic wastes should adopt a life cycle approach, taking account of the whole chain of plastic production, use and disposal. One representative said that there had been a significant improvement in the section of the guidelines on waste prevention and minimization.

27. One representative expressed concern at the inclusion of chemical recycling as an option for the environmentally sound management of plastics, which could have negative impacts on human health and the environment in developing countries, specifically in Africa. Another representative said that the guidelines should contain the provision that the information obtained from surveillance was used to verify compliance with regulations related to reducing plastic pollution and should specify who would deal with waste leaks.

28. Following the discussion, the Conference of the Parties agreed to request the contact group on technical matters to prepare a revised version of the technical guidelines on the environmentally sound management of plastic wastes, based on the version set out in document UNEP/CHW.16/INF/11/Rev.1, as well as a draft decision based on the text set out in paragraph 35 of document UNEP/CHW.16/6, taking into account the discussion in plenary.

29. [to be completed]

(c) Technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention

30. Introducing the sub-item, the representative of the Secretariat drew attention to section II, on technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention, of the note by the Secretariat on technical guidelines (UNEP/CHW.16/6). She recalled that by decision BC-14/5 the Conference of the Parties had adopted, on an interim basis, a revised version of the technical guidelines on e-waste and acknowledged the need to look further into paragraph 32 (a) and (b) of the guidelines to advance the work towards their finalization. By decision BC-15/7, the Conference of the Parties had extended the mandate of the expert working group established by decision BC-13/5 to further update the technical guidelines. The outcome of the intersessional work by the expert working group was set out in document UNEP/CHW.16/INF/10 and a draft decision on the matter was set out in paragraph 23 of document UNEP/CHW.16/6.

31. During the ensuing discussion, a number of representatives, including one speaking on behalf of a group of countries, expressed the view that the revised guidelines were ready for adoption and suggested that the draft decision be amended accordingly. Some others, including one speaking on behalf of a group of countries, said that a lack of clarity remained in the distinction between waste and non-waste materials that would hamper the application of the guidelines and required additional discussion in a contact group.

32. One representative said that it was important not to include scrap in the amendment to the guidelines because it could be recycled, contributing to circularity in some countries. Another requested enhanced capacity-building and technical transfer to assist developing countries in managing e-waste.

33. Following the discussion, the Conference of the Parties agreed to request the contact group on technical matters to prepare a revised version of the technical guidelines based on document UNEP/CHW.16/INF/10, as well as a draft decision using the text set out in paragraph 23 of document UNEP/CHW.16/6 as the starting point for its deliberations, and taking into account the discussion in plenary.

34. Subsequently, the Conference of the Parties considered conference room papers submitted by the contact group on technical matters containing, respectively, a draft decision and related draft technical guidelines.

35. The Conference of the Parties adopted the draft decision submitted by the contact group on technical matters, in which they adopted the general technical guidelines on transboundary movements of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention.

(d) Technical guidelines on the environmentally sound management of waste lead-acid batteries and on other waste batteries

36. The President introduced the sub-item, the documentation for which included notes by the Secretariat on technical guidelines (UNEP/CHW.16/6), technical guidelines on the environmentally sound management of waste lead-acid batteries (UNEP/CHW.16/INF/12), technical guidelines on the environmentally sound management of waste batteries other than waste lead-acid batteries (UNEP/CHW.16/INF/13), and outcomes of and follow-up to the thirteenth meeting of the Open-ended Working Group (UNEP/CHW.16/20/Add.1).

37. The Conference of the Parties agreed to request the contact group on technical matters to prepare a revised version of the technical guidelines on the environmentally sound management of waste lead-acid batteries based on document UNEP/CHW.16/INF/12, and a revised version of the technical guidelines on the environmentally sound management of waste batteries other than waste lead-acid batteries based on document UNEP/CHW.16/INF/13, with a proposal for the table of contents of the technical guidelines on other waste batteries, as well as a draft decision using the text set out in paragraph 46 of document UNEP/CHW.16/6 as the starting point for its deliberations.

38. Subsequently, the Conference of the Parties considered a conference room paper submitted by the contact group on technical matters containing a draft decision and draft technical guidelines on the environmentally sound management of waste lead-acid batteries and draft technical guidelines on the environmentally sound management of waste batteries other than waste lead-acid batteries.

39. The Conference of the Parties adopted the draft decision submitted by the contact group on technical matters, in which they adopted the general technical guidelines on the environmentally sound management of lead-acid batteries and on other waste batteries.

(e) Technical guidelines on the environmentally sound management of used and waste pneumatic tyres

40. Introducing the sub-item, the representative of the Secretariat outlined the information in section V of document UNEP/CHW.16/6, on technical guidelines. She recalled that, pursuant to decision BC-15/15 on developing guidelines for environmentally sound management, the small intersessional working group had initiated its work by inviting comments from members on the scope of the work (UNEP/CHW.16/6/INF/14). The Open-ended Working Group had considered the comments at its thirteenth meeting and had invited Parties and others to submit further comments on the scope of the work to update the technical guidelines.

41. In the ensuing discussion, several representatives, including one speaking on behalf of a group of countries, welcomed the work done by the small intersessional working group and the Secretariat with a view to updating the technical guidelines. Some representatives noted the comments and observations by the group, Parties and others with regard to the aspects to be reviewed and expressed general agreement with them as a basis for future work.

42. Several representatives said that the updating of the guidelines was necessary given the developments since their approval in 2011, including in terms of the technologies used for the disposal of waste tyres, the scientific knowledge about the pollution caused by tyres; the leakages of microplastics; and the new diseases related to mosquitoes, such as Zika and Chikungunya. One representative, however, emphasized the need to retain some of the original assumptions in the guidelines, such as the provisions related to the management of used tyres; the control of cross-border movements in order to avoid the spread of vectors of disease; and the focus on minimizing tyre waste generation by sending tyres for retreading. Several representatives thus supported the extension of the group's mandate to continue the work.

43. One representative said that he saw a tangential link with other guidelines related to the spread of materials such as microplastics and stressed the importance of clarifying the level of priority that should be given to the work on each set of guidelines within the small intersessional working group. He was also of the view that the mandate of the group should clearly specify which aspects of the guidelines needed to be reviewed and updated. For example, as entry B3140 of Annex IX to the Convention, waste tyres were not considered to be hazardous according to the definition in Article 1. The guidelines should thus provide guidance on the cases in which waste tyres should be subject to the prior informed consent procedure, i.e., when they contained a constituent listed in Annex I or exhibited hazardous characteristics as listed in Annex III to the Convention. Another representative said that, since 1998, his country had implemented its policy to control the generation and disposal of used and waste tyres, and it could contribute information on best available techniques and best environmental practices for their management.

44. One representative, speaking on behalf of a group of countries, proposed that the deadline in the draft decision in paragraph 53 of document UNEP/CHW.16/6, for Parties and others to nominate additional experts to participate in the small intersessional working group and to inform the Secretariat of their nominations, be postponed by a month, from 31 August to 30 September 2023. Another representative called in particular for the inclusion of additional experts from the Africa region in the small intersessional working group.

45. The Conference of the Parties adopted the draft decision set out in paragraph 53 of document UNEP/CHW.16/6, as orally amended.

(f) Technical guidelines on the environmentally sound management of rubber wastes

46. Introducing the sub-item, the representative of the Secretariat outlined the information in section VI of document UNEP/CHW.16/6. She recalled that, at its fifteenth meeting, the Conference of the Parties had invited Parties and observers to submit comments on whether technical guidelines on the environmentally sound management of rubber wastes, waste parings and scraps of rubber should be developed. The Open-ended Working Group had considered those comments at its thirteenth meeting and had invited Parties and others to submit further comments on whether such technical guidelines should be developed.

47. In the ensuing discussion, several representatives said that it was not necessary to draft technical guidelines at present, either owing to a lack of environmental justification or because of the heavy workload in the subsequent biennium; or doing so was not a priority. Some representatives, including one speaking on behalf of a group of countries, acknowledged the heavy workload, but nevertheless supported the development of new technical guidelines on the environmentally sound management of rubber wastes, waste parings and scraps of rubber, at a time acceptable to the Parties. The reasons cited included the fact that such guidelines could address leakages from those wastes to the environment, such as from artificial grass turf, thereby complementing the technical guidelines on used and waste pneumatic tyres, and that pollution from rubber wastes could have effects similar to those resulting from plastic waste. Some representatives stressed the need for a clearer definition of rubber waste before the task could get under way.

48. Another representative was of the view that the development of the technical guidelines should be postponed until after the finalization of the legally binding instrument on plastic pollution.

49. The Conference of the Parties agreed to discuss whether to develop technical guidelines on the environmentally sound management of rubber wastes, waste parings and scraps of rubber and whether to include the issue in the work programme of the Open-ended Working Group for the biennium 2024–2025 at its seventeenth meeting, and to invite Parties and others to provide further views on the matter by 1 March 2024.

(g) Technical guidelines on hazardous waste physico-chemical treatment (D9) and biological treatment (D8)

50. Introducing the sub-item, the representative of the Secretariat outlined the information in section VII of document UNEP/CHW.16/6. She recalled that, at its fifteenth meeting, the Conference of the Parties had agreed not to include consideration of whether to update the technical guidelines on physico-chemical treatment (D9) and biological treatment (D8) adopted in decision BC-V/26 in the work programme of the Open-ended Working Group for the biennium 2022–2023, but to reconsider the issue at the sixteenth meeting of the Conference of the Parties.

51. Several representatives, including one speaking on behalf of a group of countries, said that the technical guidelines on the physico-chemical treatment (D9) and biological treatment (D8) of hazardous waste should not be updated at present, although some of them were of the view that it was important to do so eventually, because they were already nine years old. They cited as their reasons for not undertaking the work immediately the current heavy workload under the Convention, and upcoming changes that would have an impact on the updating process. The representative speaking on behalf of the group of countries proposed the discussion of whether to include the matter in the work programme of the Open-ended Working Group be held at a future meeting, such as the seventeenth meeting of the Conference of the Parties.

52. The Conference of the Parties agreed to continue its consideration of whether to update the technical guidelines on hazardous waste physico-chemical treatment (D9) and biological treatment (D8) at its seventeenth meeting.

2. Classification and hazard characterization of wastes

53. Introducing the sub-item, the representative of the Secretariat outlined the information in document UNEP/CHW.16/7, including the draft decision set out therein. She reported on the Secretariat's continued cooperation with the World Customs Organization to facilitate the inclusion in the Harmonized Commodity Description and Coding System of types of waste controlled under the Basel Convention. In response to decision BC-14/9, in which the Parties had requested the Secretariat to submit to the World Customs Organization a proposal for amending the Harmonized Commodity Description and Coding System to allow the identification of 10 types of waste, the Secretariat had submitted proposals for amendments to the Harmonized System with respect to waste oils containing PCB at a concentration level of 50 mg/kg or more, for plastic waste, and for waste pneumatic tyres. Progress in the submission of proposals to the World Customs Organization for amendments to the Harmonized System and on the review of such proposals was summarized in document UNEP/CHW.16/INF/15. The Open-ended Working Group at its thirteenth meeting had received an update on the work and made recommendations to the Conference of the Parties, which were reflected in the draft decision.

54. All the representatives who took the floor, including one speaking on behalf of a group of countries, welcomed the cooperative work of the Secretariat with the Harmonized System Committee and the relevant subcommittees of the World Customs Organization in order to facilitate the inclusion of wastes covered by the Basel Convention in the Harmonized Commodity Description and Coding System and supported its continuation. One representative noted that plastic waste and e-wastes should be prioritized in the process. Some other representatives, including one speaking on behalf of a group of countries, proposed amendments to the draft decision.

55. Following the discussion, the Conference of the Parties adopted the draft decision set out in document UNEP/CHW.16/7, as orally amended.

3. National reporting

56. Introducing the sub-item, the representative of the Secretariat outlined the information in document UNEP/CHW.16/8, including the draft decision set out therein. She reported that the Secretariat continued to develop the electronic reporting system of the Convention and that many Parties had successfully used the system to submit their national reports for 2021. In response to decision BC-15/13, in early 2023 the Secretariat had also begun pilot testing of practical guidance on developing inventories of plastic waste, obsolete pesticides and pesticide container waste, and waste batteries containing lithium.

57. In the ensuing discussion, broad support was expressed for accurate and timely national reporting and for Parties to fulfil their reporting obligations under the Basel Convention. Many representatives, including one speaking on behalf of a group of countries, also welcomed the work undertaken by the Secretariat to develop the electronic reporting system, to support Parties and regional centres, or to engage efforts aimed at improving national reporting as outlined in the proposed draft decision.

58. Many representatives expressed support for the provision of adequate financial and technical assistance, capacity-building, pilot projects, workshops, and appropriate technology transfer to assist developing-country Parties to conduct inventories, gather and analyse data, and use the electronic reporting system. In that regard, several representatives expressed appreciation to the Secretariat and donor countries for the support provided to the regional centres of the Basel and Stockholm conventions to conduct workshops and other programmes from which their countries and countries in the region had benefited.

59. Following the discussion, the Conference of the Parties adopted the draft decision set out in document UNEP/CHW.16/8.

4. Electronic approaches to the notification and movement documents

60. Introducing the sub-item, the representative of the Secretariat (f) outlined the information in document UNEP/CHW.16/9, including the draft decision set out therein. She recalled that the small intersessional working group decision established in decision BC-15/14 to look further into electronic approaches to the notification and movement documents had held two online consultations, on 22 September 2022 and 8 February 2023. At its thirteenth meeting, the Open-ended Working Group had invited comments on the report and the comments received were available on the Convention website.

61. In the ensuing discussion, several representatives expressed support for the decision as drafted, with one representative, speaking on behalf of a group of countries, proposing that the decision also

invite Parties to consider serving as lead countries to advance the work and prepare the report on further recommendations on electronic approaches to the notification and movement documents. One representative underlined the need for technical assistance activities and awareness-raising events to help Parties advance the work on electronic approaches to notification and movement documents.

62. Many representatives, including one speaking on behalf of a group of countries, welcomed the work of the small intersessional working group. Several representatives noted various advantages of an electronic system, such as improved overall efficiency, including effective and timely reporting by Parties, better traceability of information, improved information exchange between transit countries and countries of origin and destination, the ease of the transition to a digitized system for Parties already submitting by email, the elimination of documentation-based paper waste, and the development of a future-proof system. One representative said that the system would be especially useful in the light of the challenges faced in applying the latest amendments to the Basel Convention regarding plastic and electrical and electronic equipment waste, and another representative noted that the electronic system could also be beneficial for other United Nations processes related to plastics. One representative, speaking on behalf of a group of countries, stressed the importance of considering the link between the work on electronic approaches and the continuing work to improve the functioning of the prior informed consent procedure.

63. One representative said that any electronic system should, to the extent possible, be flexible enough to work with any national systems already established by Parties. Another representative said that his Party would welcome the opportunity to share information and experience in developing its own national system. One representative underscored the need, when designing an electronic system, of considering issues such as information security, restrictions on information under national legislation, the need to be able to include national waste classification as reference information and to issue notifications in a language accepted by the importing country. Another representative said that information in the system should be available in all six of the official languages of the United Nations and yet another noted that, although any system should be as compatible as possible with existing national systems, it was important to bear in mind that full compatibility was probably not possible.

64. The Conference of the Parties adopted the draft decision set out in document UNEP/CHW.16/9, as orally amended.

5. Further consideration of plastic waste

65. Introducing the sub-item, the representative of the Secretariat outlined the information in document UNEP/CHW.16/10, including the draft decision set out therein. She also drew attention to document UNEP/CHW.16/INF/18, containing an updated version of a draft document considered by the Open-ended Working Group at its thirteenth meeting, on further activities that could be conducted under the Convention.

66. Many representatives, including one speaking on behalf of a group of countries, welcomed the information and the prospect of further work on plastic pollution under the Convention. Several, including one speaking on behalf of a group of countries, indicated that they wished to propose changes to the text of the draft decision.

67. With respect to possible future activities to be conducted under the Convention, many of those who spoke expressed support for the list of activities proposed by the Secretariat, with several identifying support for Parties in quantifying or estimating the quantities of plastic waste generated, managed, exported and imported, recycled and disposed of, and the quantities of plastic leaking into the environment, as being particularly important.

68. A number of representatives said that there should be greater focus on minimizing disposal, such as through developing technologies to process plastics, and called for capacity-building and knowledge-sharing among Parties to that end, as well as technical and financial assistance. Another representative requested institutional-strengthening for customs officials to control the illegal import of plastic waste.

69. Several representatives, including one speaking on behalf of a group of countries, said that future activities should include an evaluation of the effectiveness of the plastic waste amendments. The representative speaking on behalf of a group of countries, supported by a second representative, proposed that certain preparatory activities be initiated at the present meeting, such as the collection of information on how the global plastic waste trade had changed, potential challenges in the implementation of the plastic waste amendments and the extent to which the entries on plastic waste had contributed to addressing plastic pollution.

70. Many of those who spoke noted that it would be essential, in planning future activities, to avoid duplication with activities already under way under the Convention and under other international processes, in particular the negotiation of an international legally binding instrument on plastic pollution, including in the marine environment.

71. Several representatives, including one speaking on behalf of a group of countries, indicated their willingness to continue discussing the possible future activities in a contact group.

72. A number of representatives took the opportunity to describe measures at the national level in their countries to stem plastic pollution.

73. The Conference of the Parties agreed to request the contact group on technical matters to prepare a revised draft decision based on the draft decision set out in document UNEP/CHW.16/10 and taking into account the discussion in plenary and the information contained in document UNEP/CHW.16/INF/18.

74. [to be completed]

6. Amendments to Annexes II, VIII and IX on e-waste

75. Introducing the sub-item, the representative of the Secretariat recalled that, at its fifteenth meeting, the Conference of the Parties had requested the Open-ended Working Group, at its thirteenth meeting, to consider the need to update existing guidance, technical guidelines and fact sheets to reflect adjustments consequential to the adoption of the e-waste amendments. The assessment of the existing guidance and the types of adjustments to be made, and draft recommendations, as prepared by the Secretariat, were set out in annexes I and II, respectively, to document UNEP/CHW.16/INF/19.

76. A number of representatives thanked the Secretariat for the work carried out to identify the documents that required updating in the light of the amendments and one representative thanked the Open-ended Working Group for its consideration of the documents.

77. Several representatives expressed support for the recommendations as drafted, with one representative noting that the recommendations were fully in line with the activities required to generate knowledge and sufficient technical capacity to address the challenges faced by Parties and other stakeholders in implementing the amendments that would come into force in 2025. The same representative requested that additional workshops be held to provide training on the amendments. Another representative said that his country was currently revising national legislation and developing an inventory of e-waste.

78. One representative expressed concern regarding the limited time available before the amendments came into force to gain the required understanding of the definition and classification of hazardous and non-hazardous waste. He noted that Parties with limited capacity to manage prior informed consent procedures would face increased costs; delays in moving waste, in particular non-hazardous waste electrical and electronic equipment, to environmentally sound waste management facilities; an increased likelihood of the mismanagement of waste electrical and electronic equipment; obstacles to the movement of valuable metals and commodities for their recovery; and obstacles to the implementation of a circular economy. One representative requested more detailed scope and definitions that would clarify the distinction between e-waste and used electrical and electronic equipment, while another noted that the national conditions of Parties in relation to implementing the amendments at the national level should be fully taken into account when updating the relevant documents.

79. One representative thanked the Secretariat for having identified existing guidance, technical guidelines and fact sheets which required updating and agreed with the recommendations in document UNEP/CHW.16/INF/19, with the exception of two of the guidance documents identified for updating by PACE II, for which the expert working group on the e-waste technical guidelines was deemed more appropriate for the task, and noted that any revision of the guidance allocated to PACE II should be limited to updates related to the e-waste amendments. Another representative stated that the same restriction should apply to all the documents identified in the draft recommendations and yet another, speaking on behalf of a group of countries, expressed general support for targeted editorial updates on the e-waste amendments only. One representative requested an opportunity to discuss the allocation of the responsibility for updating the documents as, for example, the guidance document on the environmentally sound management of used and end-of-life mobile phones should be assigned to the expert working group on the e-waste technical guidelines rather than to PACE II, as well as the addition of deadlines for completing the update of documents identified in the draft recommendations. One representative, speaking on behalf of a group of countries, requested that the Secretariat provide more detailed information on the extent of possible changes required for the documents identified in

the draft recommendations. Further discussion was required as to whether it would be better to delay updates to documents that required more extensive revision, in particular in older documents where updates on other issues might also be necessary, such as the guidance document on the environmentally sound management of used and end-of-life mobile phones. Another representative noted that the current work was closely linked with that associated with the amendment to Annex IV to the Convention and encouraged all Parties to adopt a proactive approach to the revision of guidelines on e-waste.

80. One representative, speaking on behalf of a group of countries, noted that the current workload of the groups was significant and proposed that the Secretariat prepare draft updated documents, where the required changes to those documents were purely editorial or minor, for consideration by the Open-ended Working Group at its fourteenth meeting, and proposed that the Open-ended Working Group be mandated by the Conference of the Parties to agree on updates to the relevant documents on behalf of the Conference of the Parties.

81. As there was general agreement on the need to update guidance documents, technical guidelines and fact sheets identified in the recommendations listed in annex II to document UNEP/CHW.16/INF/19 but some diverging views on how to update documents developed by the Mobile Phone Partnership Initiative (MPPI) to reflect adjustments consequential to the adoption of the e-waste amendments, and the responsibilities for carrying out those updates, the Conference of the Parties decided to request the Secretariat, in consultation with the Parties that had commented on the matter, to prepare a draft decision based on the recommendations listed in the annex, taking into account the discussion in plenary.

82. [to be completed]

7. Waste containing nanomaterials

83. Introducing the sub-item, the representative of the Secretariat outlined the information in document UNEP/CHW.16/12, including the draft decision set out therein. She informed the Parties that new information on activities aimed at addressing issues related to waste containing nanomaterials had been received pursuant to decision BC-15/16 and posted on the Convention website.

84. Several representatives, including one speaking on behalf of a group of countries, thanked the Secretariat for preparing the document and indicated their support for the draft decision.

85. The representative of the United Nations Institute for Training and Research (UNITAR) provided a brief description of the information contained in the document submitted by UNITAR in response to decision BC-15/16, and indicated the institute’s willingness to cooperate in the implementation of the proposed action described in document UNEP/CHW.16/12. The Conference of the Parties noted the submission by UNITAR with appreciation.

86. The Conference of the Parties adopted the draft decision set out in document UNEP/CHW.16/12.

C. Legal, compliance and governance matters

1. Committee Administering the Mechanism for Promoting Implementation and Compliance

87. [to be completed]

2. Providing further legal clarity

88. Introducing the sub-item, the representative of the Secretariat drew attention to a note by the Secretariat on providing further legal clarity (UNEP/CHW.16/14), which set out information on the work undertaken by the expert working group on the review of the annexes pursuant to decision BC-15/19 on providing further legal clarity and part IV of decision BC-14/13 on further actions to address plastic waste under the Basel Convention; a note by the Secretariat on outcomes of and follow-up to the thirteenth meeting of the Open-ended Working Group (UNEP/CHW.16/20/Add.1), the annex to which contained a decision on providing further legal clarity recommending action for consideration by the Conference of the Parties; and the report of the thirteenth meeting of the Open-ended Working Group (UNEP/CHW/OEWG.13/11), paragraphs 79 to 82 of which provided information on the substantive discussion that had taken place during that meeting, as summarized to plenary by the co-chairs of the contact group on legal matters. In addition, document UNEP/CHW.16/INF/26 set out the proposals by the European Union to amend Annex IV and certain entries in Annexes II and IX to the Basel Convention, and the recommendations and findings of the expert working group regarding the review of Annex IV; and document UNEP/CHW.16/INF/27 set

out draft recommendations by the expert working group pertaining to Annexes I and III. A draft decision for the consideration of the Parties was set out in paragraph 12 of document UNEP/CHW.16/14.

89. Perine Kasonde (Zambia), co-chair of the contact group on legal matters established by the Open-ended Working Group at its thirteenth meeting, speaking also on behalf of her fellow co-chair, Magda Gosk (Poland), provided a summary of the outcomes of the work of the expert working group on the review of the annexes, as discussed by the contact group on legal matters at the thirteenth meeting of the Open-ended Working Group. The summary was set out in paragraphs 79 to 82 of the report of that meeting (UNEP/CHW/OEWG.13/11).

90. In the ensuing discussion, there was agreement that the annexes under discussion were in need of updating, given the advances in knowledge that had occurred since their formulation. One representative expressed the view that more time was required to achieve consensus on how they should be updated, and said that the focus of discussion at the present meeting should be on exchanging information on the issue in order to assist the expert working group in formulating clear recommendations on amendments to the annexes. Some representatives said that it was important to ensure linkage between the proposals put forward by the European Union and the review of the expert working group.

91. The representative of the European Union said that amendment of Annex IV would help to achieve further legal clarity in the implementation of the Convention. The European Union was aware of the work needed to clarify many aspects of the issue, and stood ready to present the main aims and expected benefits of its proposals and engage in discussion on the best way forward on the matter.

92. Regarding Annex IV, one representative said that further discussion was needed on disposal operations listed in section A of the annex and the options for inclusion of new operations, adding that the circumstances of developing countries should be taken into consideration in building their capacity and resources to meet new obligations arising from potential amendments to the annexes. Another representative expressed concern over the proposed addition of the R20 operation on preparing for reuse to section B of Annex IV, as that expansion of the scope of wastes covered by the Convention would create unintended barriers to repair, refurbishment and reuse of products and undermine circular economy objectives. Another representative said that it was important that any amendments demonstrate environmental gain in identifying operations for the environmentally sound management of wastes and for their notification before a transboundary movement. Another representative expressed concern that edits to some definitions in the European Union proposal had unintentionally introduced ambiguity or confusion. Another representative said that it was important to retain well-defined concepts such as “recovery and recycling operations” and “final disposal operations”, since those terminologies had long been employed in national regulations and legislative measures.

93. Regarding amendments to Annexes I and III, some representatives, including one speaking on behalf of a group of countries, said that more technical work was needed following the present meeting to further develop the recommendations of the expert working group. One representative said that it would be beneficial to undertake further work on the identification and categorization of hazardous waste to enable greater precision and clarity in placing wastes in the categories listed in Annex I. The review of Annex I should be carried out with due consideration of Annexes II, VIII and IX to ensure that all the annexes to the Convention functioned in a harmonious and complementary manner.

94. Following the discussion, the Conference of the Parties established a contact group on legal matters, to be co-chaired by Florisvindo Furtado (Cabo Verde) and Katrin Kaar (Estonia). The contact group was mandated to prepare a revised draft decision based on the recommendation of the Open-ended Working Group at its thirteenth meeting set out in the annex to document UNEP/CHW.16/20/Add.1, and to advance the work on the European Union’s amendment proposal and the recommendations and findings of the expert working group regarding the review of Annex IV set out in document UNEP/CHW.16/INF/26 and the draft recommendations and findings of the expert working group regarding the review of Annexes I and III set out in document UNEP/CHW.16/INF/27, taking into account the discussion in plenary, in particular the point that discussion on the review of Annexes I and III should be limited.

95. [to be completed]

3. National legislation, notifications, enforcement of the Convention and efforts to combat illegal traffic

96. Introducing the sub-item, the representative of the Secretariat outlined the information in document UNEP/CHW.16/15, including the draft decision set out therein. Since the fifteenth meeting of the Conference of the Parties, the Secretariat had continued to maintain the collection of texts of national legislation and other measures transmitted by Parties; the collection and publication of notifications of national definitions of hazardous wastes and import/export notifications and prohibitions; cooperation with enforcement organizations and networks and organizations of enforcement training activities; the provision of advice and assistance on matters pertaining to the implementation and enforcement of the Convention; and the provision of assistance to Parties upon request in their identification of cases of illegal traffic.

97. In the ensuing discussion, several representatives welcomed the ongoing work on a subset of matters undertaken by the Committee Administering the Mechanism for Promoting Implementation and Compliance with the Basel Convention and by the Secretariat.

98. Several representatives also highlighted the measures undertaken or under way at the national level in their Parties, such as the enactment and enforcement of national legislation, including definitions of hazardous waste or the implementation of the polluter pays principle; the production of guidelines; the development of a system for managing hazardous waste and approval of inventories; the development of a national plan; the setting up of a technical committee; and the introduction of a ban on single-use plastics. Nevertheless, challenges continued to be faced in relation to enforcement efforts, controlling transboundary movements and detecting hazardous waste at entry points; a lack of equipment; inadequate storage areas, holding bays and port reception facilities; limited manpower; the costly nature of systematic monitoring and checks; inadequate infrastructure for the disposal of hazardous waste; and a need to ensure that penalties for illegal trafficking were included in legislation.

99. Several representatives therefore said that they required additional capacity-building, training, equipment and financial assistance for the effective enforcement of Basel Convention control measures, with one highlighting, in particular, the importance of information exchange on best practices and enhanced cooperation with the regional centres.

100. One representative cited a recent increase in such traffic, which he understood showed that decision BC-3/1, on the amendment to the Basel Convention, known as the “Ban Amendment”, was not being successfully implemented. Another representative spoke of cases of illegal dumping of hazardous and toxic waste on his Party’s territory by another Party. He welcomed measures to deter the practice and urged Parties to fulfil their obligations under the Convention. Exercising his Party’s right of reply, the representative of the other Party denied that such dumping was taking place and said that the two Parties should discuss the matter bilaterally.

101. Several representatives took the floor to support the proposed draft decision, with one highlighting the need for deeper analysis of illegal transboundary movements of hazardous waste to identify efficient ways of preventing and combating the problem.

102. One representative encouraged Parties to update the information held by the Secretariat on the contact details of their competent authorities for the notification of the prior informed consent procedure so the process could be expedited.

103. The representative of the Basel Convention/Stockholm Convention Regional Centre for Capacity-building and the Transfer of Technology in Panama (BCRC/SCRC-Panama) said that, at the end of March, together with the Basel Convention Regional Centre for Training and Technology Transfer for the South American Region (BCRC-Argentina) in Argentina, the Intergovernmental Network on Chemicals and Waste for Latin America and the Caribbean, the Executive Secretariat of the Central American Commission for Environment and Development and the Secretariat of the Basel, Rotterdam and Stockholm Conventions, it had launched a regional training initiative for the prevention and prosecution of the illegal traffic and trade of chemicals and hazardous waste in Latin America and the Caribbean.

104. Following the discussion, the Conference of the Parties adopted the draft decision set out in document UNEP/CHW.16/15.

4. Proposal by the Russian Federation to amend paragraph 2 of Article 6 of the Convention

105. Introducing the sub-item, the representative of the Secretariat outlined the information in document UNEP/CHW.16/16, including the proposal by the Russian Federation to amend paragraph 2 of Article 6 of the Convention. She recalled that, at its fifteenth meeting, the Conference of the Parties

had decided to defer consideration of the proposal to the following meeting of the Conference of the Parties. She also noted that, in part II of decision BC-15/3 on the strategic framework, the Conference of the Parties had decided to initiate work to improve the functioning of the prior informed consent procedure.

106. In the ensuing discussion, the representative of the Russian Federation provided further information on the Party's current thinking about its proposal. The Russian Federation aimed to instigate the creation of a mechanism that removed any legal gaps in the prior informed consent procedure, especially in the light of new global challenges in waste management relating to waste electrical and electronic equipment and plastics. The representative reminded the Parties that the proposed amendment of paragraph 2 of Article 6 of the Basel Convention aimed to establish a 30-day deadline for the State of import to send, on receipt of a notification of a proposed transboundary movement, a written response to the notifier. The representative explained that his Party had given further thought to the matter since the fifteenth meeting of the Conference of the Parties and that, bearing in mind the need to take into account the technical capacities of Parties to comply with the deadline, it proposed that, in the event no reply was received within the 30-day deadline, this would be considered to be a refusal of the proposed movement. Given the comprehensive work being undertaken to improve the prior informed consent procedure, she proposed that the Russian Federation undertake further work in the intersessional period and submit, as appropriate, an updated proposal to the Conference of the Parties at its seventeenth meeting.

107. Several representatives, including one speaking on behalf of a group of countries, thanked the Russian Federation for its proposal.

108. All the representatives who spoke agreed that the implementation of the prior informed consent procedure needed to be improved. Several representatives, including one speaking on behalf of a group of countries, said they did not support the proposal. Several other representatives supported establishing a deadline for a response in paragraph 2 of Article 6, but said that 30 days was too short a period. Such a short deadline did not reflect how the process worked in practice and would create an additional technical burden for developing counties, in particular in cases where transit States were also involved, including in terms of ensuring that verification and due diligence processes had been carried out. One representative suggested a deadline of two to three months. Numerous other challenges with the prior informed consent procedure had also been enumerated during the discussion under agenda item 4 (a) (ii), on improving the functioning of the prior informed consent procedure. Another representative stressed the importance of providing technical support to Parties to ensure the smooth implementation of the prior informed consent procedure.

109. While some representatives were in favour of further discussions in a contact group, several representatives, including some speaking on behalf of groups of countries, considered the proposed process under agenda item 4 (a) (ii) to establish a small intersessional working group to look at ways of improving the functioning of the prior informed consent procedure to be the best approach for addressing Parties' concerns. Some representatives said that a decision should be reached on that process before any decision on amendment of the Convention was made. Several representatives, including one speaking on behalf of a group of countries, said that it was not proportionate to change the wording of the Convention in order to improve the PIC procedure and that the proposed changes would not address the root causes of the delays in response by importing countries. They did not therefore support the establishment of a contact group to further discuss the proposal.

110. Several representatives made suggestions on the way forward. One said that if a definitive time frame were to be included in the Convention, Parties should be asked to provide feedback on their experiences so that a more representative and practical time frame could be chosen. Another representative urged Parties to send updated information to the Secretariat about the designated competent authorities so that information reached the right person.

111. Following the discussion, the Conference of the Parties agreed that consideration of the proposal by the Russian Federation to amend paragraph 2 of Article 6 of the Convention would be included in the provisional agenda of the seventeenth meeting of the Conference of the Parties.

D. Technical assistance

112. Subsequently, the Conference of the Parties adopted the draft decision prepared by the contact group on technical assistance and financial resources.

E. Basel Convention Partnership Programme

1. Partnership for Action on Challenges Relating to E-waste (PACE II)

113. Introducing the sub-item, the representative of the Secretariat outlined the information in section II.A of document UNEP/CHW.16/19, and part I of the draft decision set out in the same document. She recalled that, in section I of decision BC-15/22, the Conference of the Parties had requested the working group of the Partnership to implement the activities in the programme of work for the biennium 2022–2023. That included the development of a draft programme of work of the working group of PACE II for the biennium 2024–2025, as set out in document UNEP/CHW.16/19/Add.1, and the development of general guidance on environmentally sound repair and refurbishment of used and waste equipment and on environmentally sound management of waste on each of the new e-waste streams added to the scope of the partnership.

114. Leila Devia (Argentina), co-chair of PACE II, gave a report on the progress of the partnership. The enlarged scope of the partnership included television screens, audio and video equipment, refrigerators, cooling and heating equipment, in addition to used and waste mobile phones and computing equipment. In consequence, membership of the partnership working group had increased substantially. Activities had included dissemination of guidance documents, organizing workshops and webinars in all United Nations regions, awareness-raising activities, educational initiatives and implementation of pilot projects. The proposed programme of work of the partnership for the biennium 2024–2025, similarly to the previous biennium, included dissemination activities, pilot projects, the development of guidance documents on the environmentally sound management of the new e-waste categories, and the preparation of a draft programme of work for the biennium 2025–2026.

115. In the ensuing discussion, a number of representatives, including some speaking on behalf of groups of countries, acknowledged the value of the partnership and expressed their appreciation for the activities conducted under the partnership. The extension of the scope of the partnership was welcomed, as was the development of the draft guidance documents on the environmentally sound refurbishment and repair of used and waste equipment and on the environmentally sound management of waste equipment added to the scope of PACE II, by the Conference of the Parties at its fifteenth meeting. One representative highlighted the role of the Basel Convention regional centres in supporting related activities. One representative, speaking on behalf of a group of countries, proposed an addition to the draft decision of a new paragraph requesting the working group of the partnership to prepare draft guidance documents for consideration by the Open-ended Working Group at its fourteenth meeting. The Conference of the Parties adopted part I of the draft decision set out in document UNEP/CHW.16/19, as orally amended.

2. Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic (ENFORCE)

116. Introducing the sub-item, the representative of the Secretariat outlined the information in section II.B of document UNEP/CHW.16/19, and part II of the draft decision set out in the same document. She recalled that, in section II of decision BC-15/22, the Conference of the Parties had encouraged the members of the Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic (ENFORCE) to continue collaborating on relevant activities; and that in decision BC-15/17, the Conference of the Parties had amended the terms of reference of ENFORCE and made a number of requests for action by the network's members and the Secretariat.

117. Katherine Olley (United Kingdom), chair of ENFORCE, gave a statement on progress in the work of the network. During the seventh meeting of ENFORCE, held in Paris on 26 and 27 January 2023, members had discussed organizational matters, presented the latest trends on illegal traffic of hazardous wastes, exchanged information on and identified opportunities for cooperation with regard to the network-related activities of members, and agreed to a road map of activities to be undertaken by the members and observers of ENFORCE with a view to making it more action oriented for the period 2023–2025. Members had also discussed the amended terms of reference and requests made in decision BC-15/17, including the creation of a network of expertise on the enforcement of the Convention. She also provided information on cooperation between ENFORCE and the Partnership on Plastic Waste, and on the membership of the network.

118. The representative of the World Customs Organization said that the Organization was a member of ENFORCE and, as such, the Organization informed the network regarding customs enforcement efforts related to waste and the protection of the environment. In the framework of the Basel Convention, customs authorities played a crucial role in facilitating legal trade and detecting

illegal trade in waste. Joint customs operations also provided opportunities for awareness-raising and capacity-building. Since 2009, the World Customs Organization enforcement operations, code-named DEMETER, had been striving to enforce requirements pertaining to waste under the Basel Convention, and the number of seizures had significantly increased. The DEMETER operation had been supported by various partners, including the secretariat of the Basel Convention. The 2022 operation – DEMETER VIII – had included 90 customs administrations which had reported 126 waste seizures within a 30-day operation. The Organization had been refining its instruments and tools to improve its enforcement capabilities, including the Harmonized System nomenclature for the classification of goods, and had been carrying out capacity-building activities in cooperation with the Basel Convention Secretariat. The World Customs Organization reiterated its readiness to cooperate with the Secretariat of the Basel, Rotterdam and Stockholm Conventions in preventing and combating illegal traffic in waste, promoting communication and coordination between the relevant customs authorities and enforcement entities, and disseminating guidance and training tools.

119. The Conference of the Parties adopted part II of the draft decision set out in document UNEP/CHW.16/19.

3. Household Waste Partnership

120. Introducing the sub-item, the representative of the Secretariat outlined the information in section II.C of document UNEP/CHW.16/19, and part III of the draft decision set out in the same document. He recalled that, in part III of decision BC-15/22, the Conference of the Parties had initiated a further round of commenting on the draft overall guidance document on the environmentally sound management of household waste. The Secretariat and the working group of the Household Waste Partnership had subsequently developed a revised version of the guidance document, as set out in document UNEP/CHW.16/19/Add.2. Comments had been invited on the revised version and the comments received had been made available on the website of the Convention.

121. Gabriela Medina (Uruguay), co-chair of the Household Waste Partnership working group, reported on the implementation of the workplan of the working group for the biennium 2022–2023. The development of the draft overall guidance document on the environmentally sound management of household waste had been a multi-stakeholder effort, and the version before the Parties at the present meeting represented a significant revision. Reference had been made in the document to existing tools and guidance to remove duplication, and additional case studies had been added. An electronic tool had been developed in support of the guidance and would be updated and released following its adoption. The Household Waste Partnership working group had held an informal consultation on 30 January 2023 and was ready to move forward with awareness-raising activities and cooperation with other entities, should its mandate be renewed by the Conference of the Parties. The activities discussed by the working group included the development of an awareness-raising toolkit on the environmentally sound management of household waste, additional pilot projects, and collaboration with other entities, such as the Zero Waste Cities initiative.

122. In the ensuing discussion, a number of representatives, including some speaking on behalf of groups of countries, expressed support and appreciation for the work undertaken on the environmentally sound management of household waste. Several representatives noted that household waste presented unique management challenges, given the high volume and variety of the waste generated; the guidance would thus be of significant help to Parties in their management of household waste.

123. A number of representatives, including one speaking on behalf of a group of countries, said that while the guidance had undergone significant revision and improvement, it was still in need of further work. One representative suggested the revision of the draft decision to invite further comments and to request the working group to prepare a revised draft for consideration by the Open-ended Working Group at its fourteenth meeting. Another representative suggested the issuance of the guidance as an interim document while further work was being undertaken by the working group to improve its content.

124. The Conference of the Parties agreed to request the Secretariat to prepare a revised version of part III of the draft decision set out in document UNEP/CHW.16/19, in consultation with the Parties that had commented on the matter, for further consideration by the Conference of the Parties at the present meeting.

125. [to be completed]

4. Partnership on Plastic Waste

126. Introducing the sub-item, the representative of the Secretariat outlined the information in section II.D of document UNEP/CHW.16/19, and part IV of the draft decision set out in the same document. She recalled that in section IV of decision BC-15/22 the Conference of the Parties had requested the Partnership on Plastic Waste to continue to implement its workplan for the biennium 2020–2021 during the biennium 2022–2023. The working group of the Partnership on Plastic Waste had held its third meeting in Punta del Este, Uruguay, in November 2022, back to back with the first session of the intergovernmental negotiating committee to develop an international legally binding instrument on plastic pollution, including in the marine environment. At that meeting, the working group had developed a draft workplan for the biennium 2024–2025, as set out in document UNEP/CHW.16/19/Add.3.

127. Ross Bartley (Bureau of International Recycling), co-chair of the Partnership on Plastic Waste, gave a report on progress in the implementation of the workplan of the partnership. At its third meeting, the working group had considered progress made in the implementation of the project group workplans and the pilot project programme, as well as proposed activities under the workplan of the Partnership on Plastic Waste for the biennium 2024–2025. At its third meeting, participants had also approved a report on best practices and lessons learned on the measures taken by key stakeholders to prevent and reduce single-use plastic waste and packaging waste, and a compilation of national and international specifications related to the Basel Convention plastic waste amendments. The Partnership on Plastic Waste was keeping the intergovernmental negotiating committee informed of its activities and products. Under the pilot project programme, a second round of projects would be in progress in early 2024, supporting partners in, among other things, developing strategies, policies and legislation, and piloting new technologies for the prevention, minimization and environmentally sound management of plastic waste. Regarding cooperation with other partners, the Partnership on Plastic Waste would be hosting a series of forums on extended producer responsibility in the period following the second session of the intergovernmental negotiating committee that would take place in May 2023.

128. The Conference of the Parties expressed appreciation for the commitment to the work of the Basel Convention and the Partnership on Plastic Waste of Mr. Bartley, who would be retiring in the near future.

129. In the ensuing discussion, a number of representatives, including some speaking on behalf of groups of countries, expressed appreciation for the work of the Partnership on Plastic Waste, in particular the activities that had been implemented under its workplan, which had contributed significantly to combating plastic waste at the national and regional levels. One representative, speaking on behalf of a group of countries, expressed concern at the high workload for the biennium 2024–2025, and sought clarification regarding which outputs in the workplan for the biennium 2022–2023 would be finalized by the end of 2023, and what arrangements might be made to carry any uncompleted outputs over into the workplan for the biennium 2024–2025.

130. The representative of the Secretariat responded that discussions had taken place on which activities should be prioritized for the biennium 2024–2025, and the work would continue in line with that prioritization. The working group would endeavour, however, to implement the entirety of its workplan, subject to the availability of resources. Regarding activities under the workplan for the biennium 2022–2023, efforts had been made to ensure that any follow-up work needed was reflected in the workplan for the following biennium, as discussed by the working group at its third meeting.

131. The Conference of the Parties adopted part IV of the draft decision set out in document UNEP/CHW.16/19.

5. Subscription fees

132. The Executive Secretary of the Basel, Rotterdam and Stockholm conventions informed the Conference of the Parties that certain developments internal to the United Nations had implications for the way the Secretariat exercised its functions to operationalize the financial arrangements set out in the respective terms of reference of PACE II, the Household Waste Partnership, and the Partnership on Plastic Waste. He recalled that those terms of reference, which had been adopted by the Conference of the Parties in decisions BC-13/14, BC-15/22 and BC-14/13, respectively, each included a section entitled “Financial arrangements”, which provided for annual subscriptions by members of the working groups that were categorized as business or industry, non-governmental organizations or academia. While the Secretariat had initiated the process to implement that aspect of the financial arrangements of the partnerships, changes in the way the United Nations was required to manage financial resources entailed a significant increase in time dedicated by staff. Based on the Secretariat’s calculations, the maximum estimated annual income of subscriptions paid by eligible members of the

three partnerships would amount to $97,000, while a conservative estimate of the staff costs required to initiate the collection of the subscription fees would amount to $81,000. At the time of the preparation of the budget fact sheets for the activities in the programme of work for 2024–2025, the Secretariat staff costs associated with managing the annual subscriptions of eligible members to the relevant partnerships had not been identified.

133. The Conference of the Parties agreed to refer further discussion of the matter to the contact group on programmes of work and budgets.

134. [to be completed]

E. Work programme of the Open-ended Working Group for the period 2024–2025

135. Introducing the item, the representative of the Secretariat said that the draft work programme of the Open-ended Working Group for the biennium 2024–2025 was set out in the annex to the draft decision in paragraph 5 of document UNEP/CHW.16/20. It had been prepared on the basis of progress in the work carried out intersessionally since the fifteenth meeting of the Conference of the Parties. It was expected that the draft work programme would be revised further to take into account the decisions adopted by the Conference of the Parties at the present meeting.

136. As no Party had offered to host the fourteenth meeting of the Open-ended Working Group, the meeting was scheduled to be held at the International Conference Centre Geneva, in the week commencing 24 June 2024.

137. In the ensuing discussion, one representative expressed support for the draft work programme, while another, speaking on behalf of a group of countries and expressing support for the work programme in general, said that she would submit suggestions to the Secretariat regarding the priority level of activities therein.

138. The Conference of the Parties requested the Secretariat to prepare for its consideration a revised version of the draft work programme set out in document UNEP/CHW.16/20, taking into account the discussion in plenary and any further developments during the present meeting.

139. [to be completed]

II. Other matters (agenda item 10)

140. There were no further matters.