出國報告（出國類別：會議）

出席亞太經濟合作組織
加速廢棄物處理以減少海洋垃圾會議

服務機關：行政院環境保護署
姓名職稱：宋欣真簡任技正
派赴國家：印尼峇里島
出國期間：106 年 9 月 4 日至 9 月 6 日
報告日期：106 年 11 月 7 日

摘要

這次會議目的在加速亞太地區海洋垃圾的減少，加速制定廢棄物管理的解決方案，以阻止塑膠和其他垃圾進入海洋。會議促進合作與夥伴關係，推動落實亞太經濟合作組織（Asia-Pacific Economic Cooperation，下稱 APEC）部長於 2016 年通過的政策和實務建議，並回應 APEC 各經濟體之領導人對廢棄物管理基礎設施進一步工作的鼓勵。特別是會議也概述 APEC 各經濟體當前的海洋塑膠廢棄物污染情況、採取的政策措施等。會議藉由 APEC 海洋垃圾虛擬工作組，貿易投資委員會和亞太基礎設施夥伴關係的既有努力基礎上，加強並支持由印尼和紐西蘭在 9 月 6 日至 7 日主辦之消除海洋塑膠垃圾東亞峰會。

目次

壹、 緣起及目的

有鑑於海洋垃圾除造成海洋污染外，也會對各會員體之海洋生態、漁業及社會經濟環境造成鉅大之影響，處理亞太經合組織海洋廢棄物問題是相當重要。尋找以科學為基礎的解決方案，以減少對我們海洋的最大威脅。

本會議促進合作與夥伴關係，推動落實亞太經濟合作組織（APEC）部長於 2016 年通過的政策和實務建議，並回應 APEC 各經濟體之領導人對廢棄物管理基礎設施進一步工作的鼓勵。特別是會議也概述 APEC 各經濟體當前的海洋塑膠廢棄物污染情況、採取的政策措施等。藉由 APEC 海洋垃圾虛擬工作組，貿易投資委員會和亞太基礎設施夥伴關係的既有努力基礎上，加強並支持由印尼和紐西蘭在 9 月 6 日至 7 日主辦之消除海洋塑膠垃圾東亞峰會。

本會議的目的包括推動亞太經合組織政策和實踐建議促進創新融資機制，以解決資助海洋廢棄物管理的新機制。支持國家的策略設計和實施方式，為東亞峰會（the East Asia Summit EAS）打擊海洋塑膠垃圾會議，和其他國際努力促進合作和夥伴關係。說明如下：

一、進一步執行 APEC 政策和建議的實施 - 為 APEC 經濟體提供指導，鼓勵在廢棄物管理解決方案的投資。建議包括：在市政和經濟層面訂定廢棄物管理目標、制定和衡量廢棄物管理績效指標、精簡和釐清政府在廢棄物管理方面的責任、開發創新型融資模式;發展回收獎勵、並實施強有力的環保標準。也討論推動執行建議的最新進展以及 APEC 經濟體提供的額外政策選擇，以激勵私部門投資，鼓勵發展創新解決方案和保護公眾所需的政治，經濟和法律，以維護健康和環境。

二、開發創新的融資機制，以解決資助廢棄物管理的新機制的必要性。也討論激勵措施和其他可以增加收入或降低成本的機制，使廢棄物管理投資的風險更小，更具吸引力。會議也討論現有的各種融資方式，並為投資者提供機會，與政府官員進行溝通，以促進對廢棄物管理部門的投資。

三、設計和實施國家策略 - 分享 APEC 經濟體如何制定策略以滿足自身特殊情況的例子。本次會議強調 APEC 各經濟體制定廢棄物管理策略時可採用的一些最佳作法和原則。

貳、 出席代表

會議由美國國務院(U.S. Department of State)，印尼海事部(Ministry of Foreign Affairs)與外交部(Coordinating Ministry for Maritime Affairs)和無國界海洋聯盟(Trash Free Seas Alliance)辦理。舉辦地點在印尼峇里島帕德瑪度假村(Pamda Hotel)，會議主席Ms. Heather Variava 為美國駐印尼泗水總領事，領導總領事館與印尼東部進行外交，該地區涵蓋印尼12個省份和1/3以上的人口。

會議參加者共計60餘人，包括各經濟體之政府廢棄物管理部門、負責基礎建設、海洋議題及國際合作等專家也應邀參加。另包括多邊開發銀行，投資者和國際金融機構、相關的國際組織和非政府組織及業界代表，回收和處理技術提供者以及其他利益相關者也在此廣泛而交叉的問題被邀請出席。

本署水保處宋欣真簡任技正指名受邀出席本會議（全程機票及住宿費用由海洋保護海洋無垃圾聯盟(Ocean Conservancy's Trash Free Seas Alliance)支應），除積極和與會者分享我國海洋垃圾治理經驗，也把握開放對話機會，主動說明我國推動限塑政策，塑膠微粒管制禁用的規劃時程。環保署擬定之「海漂垃圾處理方案」，涵蓋了各個面向的推動政策與措施，從海面、海灘到陸地，從國內源頭減量到外來的海漂垃圾處理所擬定之執行策略，包括海灘認養計畫、環保艦隊、海底垃圾清除、海洋環境教育等，以面對海洋垃圾的挑戰。

說明過程中，特別提到今年更結合世界海洋日，串連19個臨海地方政府，推動成立環保艦隊。已900艘漁船或各類船舶加入，宣導將海上作業的廢棄物攜回岸上，並訂定兌換獎勵機制，提高參與誘因。在淨灘工作上，推動海岸淨灘認養，改變以往一次性之淨灘活動作法，持續性的推動志工協助海灘清理工作。對於外來海洋垃圾的問題，政府也是積極面對，進行清理工作。

本署水保處宋欣真簡任技正與各國出席人員、本會議主席U.S. Consul General Ms. Heather Variav、印尼外交部副部長Dr. Ir. Safri Burhanuddin, Dea合影情形，如圖1至圖3。

圖1 與會人員合影

圖2 與會議主席U.S. Consul General Ms. Heather Variava

圖3 與印尼外交部副部長Dr. Ir. Safri Burhanuddin, Dea合影

參、 會議概要

一、議程 1：開幕致詞

由會議主席美國駐印尼泗水總領事 Ms. Heather Variava 及印尼外交部副部長 Dr. Ir. Safri Burhanuddin 致歡迎詞。

二、議程 2：亞太經濟合作組織分析與政策基金支持工作

簡要介紹管理不善的廢棄物與海洋垃圾之間的關係，問題的規模，特別是亞太經合組織地區的情況，以及迄今為止通過的一些經驗教訓，下一波和 TruCost 報告以及亞太基礎設施夥伴關係。會議還將貫徹"亞太經合組織政策和實踐建議"，以及迄今在制定政策工具以促進執行方面取得的進展。

來自 Ocean Conservancy的國際部門經理 Ms. Susan Ruffo簡報提到海洋垃圾中，以塑膠垃圾危害最大，如果未有效處理到 2025 年，海洋塑膠廢棄物將達到 2.5 億噸，而其中全世界前五大產生海洋垃圾的國家分別是中國大陸、印尼、菲律賓、越南及斯里蘭卡，塑膠垃圾量占全世界的 57%。而廢棄物問題未妥善治理，不僅造成海洋垃圾問題，海洋生態危害，還包括人類健康、氣候變遷、城市和郊區環境嚴重問題。也談到2017年3月在印尼第一屆亞太基礎設施夥伴關係會議的重點是廢棄物管理，召集政府官員，私部門、基礎建設專家，多邊開發銀行代表等，就這些區域一些主要挑戰包括制度、資金不足、數據不足、立法和監管的不確定性及有限的可用的工具等問題進行討論。

三、議程 3：建立有利的政策環境

正確的政策環境是激勵私營部門投資，鼓勵發展創新解決方案，保護公共衛生和環境的必要條件。會議將討論一些可用的政策選擇，例如使用補貼，上網電價，擔保和稅收。會議也討論各國如何制定有效的立法，包括設定收集，處理和處置的最低要求目標;明確界定國家，地方，行業，運營商和消費者層面的角色和責任;並確保在製定法規或立法之前，為其產品提供終身解決方案的基礎設施。

W2Worth Innovations 的董事長兼 CEO，Ms. Jill Boughton 談到從廢棄物到資源，如何收集廢棄物到轉換廢棄物成為有價值的物質。將廢棄物轉化為資源的障礙分 3 個部分。障礙 1—經濟投資能力，包括要考慮商品價格的訂定要參考一般行業商品價值、法規訂定要符合財務以及相關補貼與減免措施。障礙 2—外商投資與政治環境，包括廢棄物是天然資源嗎？外資所有權的限制等。障礙 3—非正式部門，通常也是投資風險。

日本環境省 Ms. Hiroko Yokota 談到日本海洋垃圾清理行動計畫在 2016 年補助地方政府約 2700 萬美元，執行包括海洋垃圾清理、海灘、海漂及海底垃圾調查、塑膠微粒研究與資源循環回收再利用的補助原則。

四、議程 4：開放對話

包括中國大陸、巴布亞紐幾內亞及我國發言說明對抗海洋垃圾具體作法。中國大陸代表說明在廈門有垃圾打撈清潔隊，訂有海洋垃圾清理行動計畫，以減少陸源垃圾由河川進入海洋。也說明對於塑膠微粒已經開始進行研究分析。

五、議程 5：發展新的融資機制

需要資助廢棄物管理的新機制。這些可以包括混合集合的資金實體，並支付績效交付模型。將解決諸如對沖和貨幣減免，政治風險保險和信貸增值，擔保設施，與發展組織的合資等機制等問題。會議還將討論激勵措施和其他機制，以增加收入或降低成本，使廢物管理投資的風險更小，更具吸引力。

Closed Loop Fund 的 Rob Kaplan 談到開發中市場的廢棄物循環之創新技術及基礎設施的融資。也提到塑膠回收的市場有限，如何激勵回收系統，需要開發更多的塑膠廢棄料終端市場。 例如 Integrico 購買廢舊塑料和薄膜塑料，並用它們製造高價值的鐵路連接鈕。

來自 ADM Capital 管理 14 億美元資產的全球投資經理的首席投資員 Christopher Botsford 介紹熱帶區域融資設施（The Tropical Landscapes Finance Facility, TLFF）提到因應減緩氣候變遷的項目，TLFF 是一個創新的金融平台，通過

長期的熱帶風景債券（Tropical Landscapes Bonds, TLB）從資本市場融資超過 10 億美元，以對印尼具有重大環境和社會影響的商業項目投資，由聯合國環境規劃署促成。

六、議程 6：設計和實施國家策略

世界城市每年產生超過 13 億噸的固體廢物。人口增長，經濟發展，結合生活方式和消費模式正在增加世界各地的浪費。廢物相關的問題往往以不協調的方式處理，主要側重於"管道末端"解決方案，而不是預防和垂直整合的方法。為了實現聯合國永續發展大會（Rio + 20）宣言所要求的經濟，環境和社會目標，減少，再利用，回收和回收的轉變至關重要。本屆會議將探討亞太經合組織成員如何制定戰略來滿足自己的特殊情況，以及製定策略時可以使用的一些最佳做法和原則。會議還包括根據最佳可用訊息建立遠大及實際目標以及如何收集和策劃訊息的討論。

分別由印尼、菲律賓及越南的代表報告其廢棄物處理現況。並由世界銀行 Dr. Anjali Acharya 介紹加速廢棄物管理解決方案，以減少海洋垃圾之實施策略。需要有區域性的思維及政府間的合作聯盟計畫，共同解決海洋垃圾議題。

七、議程 7：總結

海洋垃圾解決方案共同列出以下 4 個面向：

(一) 研究/分析/創新

在區域級的分析研究（例如，水體塑膠微粒及魚體中的塑膠微粒分析），引進私部門的創新想法與作為，包括融資及適應各國國情的作法；在整個供應鏈中實施創新解決方案的試點與展示技術。

(二) 法規/政策/獎勵/融資

詳細審視國家有關塑膠的法規，以解決塑膠所致垃圾問題的策略，以及生產可生物分解（木薯類塑料）的鼓勵措施及可持續融資。

(三) 整合永續物料管理(SWM)投資

確定 SWM 上游投資（產品創新、可降解替代品、減少包裝等）以及下游（收集，回收，源頭分類，垃圾填埋）的潛力。具有成本效益和可行性的減少廢棄物產生的的創新技術。

(四) 通訊/知識/交換/培訓

舉辦展示創新，經驗和技術的全球和區域性會議，及提供培訓與考察機會。與已開發國家的城市合作，提供有效的知識和創新轉移，並建立區域公眾意識運動。

肆、 心得及建議事項

一、出席本次會議，分享我國處理海洋垃圾之經驗，讓與會人員了解我國海洋垃圾治理成效經驗，實屬相當難得機會。建議未來應更積極主動參與國際活動與會議，延伸觸角，擴展視野，藉由類似經驗交流活動，讓國際間了解我國環境保護成效，且藉由建立之國際網絡，更有助於我國海洋環境保護。

伍、 附件

Asia-Pacific
Economic Cooperation

APEC High-Level Meeting on Accelerating Waste Management Solutions to Reduce Marine Litter

Padma Hotel
Bali, Indonesia
September 5, 2017

5 September, 2017	
8:30 – 9:00	Registration and arrival
Session 1: Introductions & Welcome	
9:00 – 9:30	Opening remarks and welcome - **Heather Variava**, U.S. Consul General, Surabaya, Indonesia - **Dr. Ir. Safri Burhanuddin,** Deputy Coordinating Minister for Human Resources, Science and Technology, and Maritime Culture, Republic of Indonesia
Session 2: Setting the Scene: The Analytical and Policy Foundation Supporting Work Within APEC	
9:30 – 10:15	This session will provide a brief introduction to the relationship between mismanaged waste and marine litter, the scale of the problem, particularly in the APEC region, and some of the lessons learned thus far through the development of the Stemming the Tide, Next Wave, and TruCost reports, and the Asia-Pacific Infrastructure Partnership. The session will also go over the APEC Policy and Practice Recommendations and the progress that has been made to date in developing policy tools to promote their implementation. Finally, the session will address the objectives and expected outcomes for the meeting. **Moderator: Dr. Andreas Hutahaean,** Coordinating Ministry for Maritime Affairs, Republic of Indonesia (TBC) **Speakers:** • **Susan Ruffo,** Managing Director, International Initiatives, Ocean Conservancy • **Steve Russell,** Vice President, Plastics Division, American Chemistry Council ***Question and Answer Session***
10:15 – 10:45	**Coffee Break and Group Photo**
Session 3: Establishing an Enabling Policy Environment	

10:45 – 12:00	The right policy environment is necessary to incentivize private sector investment, encourage the development of innovative solutions, and protect public health and the environment. The session will address some of policy options available such as the use of subsidies, feed-in tariffs, guarantees, and taxes. The session will also address how countries can develop effective legislation including by setting minimal requirement targets for collection, treatment, and disposal; clearly defining roles and responsibilities at the national, local, industry, operator, and consumer level; and ensuring that the infrastructure for the end of life solutions for their products is in place before enacting regulations or legislation. **Moderator: Mr. Medrilzam**, Director for Environment, Bappenas (TBC) **Speakers:** • **Jill Boughton**, Waste 2 Worth • **Mignonne Maramis**, Spokesperson, PRAISE (TBC) • **Hiroko Yokota**, Ministry of Environment Japan • **Pak Sudirman**, Director of Solid Waste Management (TBC) ***Question and Answer Session***
12:00 – 13:30	**Lunch**
Session 4: Open Dialogue	
13:30 – 14:30	During this session a moderator will ask pre-assigned discussants a question relevant to the day's discussion. Audience members will have an opportunity to follow-up on any outstanding questions at the end of the session. **Moderator: Heather Variava**, U.S. Consul General, Surabaya, Indonesia (TBC)
Session 5: Developing New Financing Mechanisms	
14:30 – 15:45	New mechanisms for funding waste management are required. These could include blended pooled funding entities and pay for performance delivery models. Issues such as hedging and currency mitigation, political risk insurance and credit enhancement, guarantee facilities, joint ventures with development organizations and other mechanisms will be addressed. The session will also include a discussion of incentives and other mechanisms that can increase revenues or decrease costs to make waste management investments less risky and more attractive. **Moderator: Andrew Bassford**, CEO Marine Change **Speakers:** • **Rob Kaplan**, Managing Director, Closed Loop Fund • **Christopher Botsford**, Chief Investment Officer, ADM Capital • **Mathy Stanislaus**, (title) World Economic Forum

	• **Carlos Monreal,** Plastic Energy (TBC) ***Question and Answer Session***
15:45 – 16:00	**Coffee Break**
Session 6: Designing and Implementing National Strategies	
16:00 – 17:15	World cities generate over 1.3 billion tons of solid waste per year. Population growth, economic development, combined with lifestyle and consumption patterns are increasing the amount of waste generated worldwide. Waste-related problems are often handled in an uncoordinated manner, mainly focusing on "end-of-pipe" solutions as opposed to preventive and vertically integrated approaches. A shift to reduce, reuse, recycle, and recover is essential to achieve the economic, environmental and social objectives of as called for in the UN Conference on Sustainable Development (Rio+20) declaration. This session will look at how APEC members are developing strategies to meet their own particular circumstances as well as some of the best practices and principles that can be used when developing a strategy. The session will also include a discussion on establishing ambitious yet realistic targets based on the best available information as well as how that information can be collected and curated. **Moderator: Anjali Acharya,** World Bank **Speakers:** **Indonesia** **Pak Sudirman,** Director of Solid Waste Management **Philippines** • **Crispian Lao,** National Solid Waste Management Commission, Philippines **Vietnam** • **Luu Duc Cuong,** Ministry of Construction, Vietnam **Setting targets and measuring performance** • **Hermann Koller,** International Solid Waste Management Association ***Question and Answer Session***
Session 7: Summary and wrap-up	
17:15 – 17:30	This session will summarize some of the key findings of the day and provide an opportunity for participants to discuss issues that should be brought forward to the East Asia Summit conference on eradicating marine plastic debris the following day.

	• **Ryan MacFarlane,** Director, C&M International
17:30 – 19:00	**Cocktail Reception, Padma Resort**

Participants in APEC High Level Meeting on Marine Litter

Organization	First	Last	Title	Status
United States	Heather	Variava	Consul General	Yes
Department of State (Embassy)	Sarah	Mathur	ESTH Officer	Yes
GIZ (German Development Agency)	Johannes	Paul	Advisor	Yes
China	Danfeng	Weng	APEC Marine Sustainable Development Center	Yes
Chinese Taipei	Hsin-Chen	Sung		Yes
Indonesia - Bappenas	Medrilzam		Director for Environment	Yes
Indonesia - Marine Spatial Mgmt	Stay Amur	Till	DG for Marine Spatial Mgmt	Yes
Indonesia - Maritime and Fisheries	Rita	Octafini	Deputy Director for Maritime and Fisheries	Yes
Republic of Korea – KOEM	YN	Kim		Yes
New Zealand	Stephen	Harris	Div Manager, SEA Div, MOFAT	Yes
New Zealand	Steph	Lee	Ambassador to ASEAN	Yes
New Zealand	Tim	Wang	Second Secretary, NZASEAN	Yes
New Zealand	Melissa	Hayden-Clarke	Sen. Policy Officer, Asia Pacific Regional Integration Division, MOFAT	Yes
Viet Nam - Ministry of Construction	Luu Duc	Cuong	Director General	Yes
Department of State (DC)	Min	Kang	Officer, OES	Yes
Japan - Ministry of Environment	Hiroko	Yokota	Sector Chief, Office of Sound Material-Cycle Society, Waste Management and Recycling Department	Yes
Business Council for Sustainable Development Singapore	Constant	Van Aerschot	Executive Director	Yes
Indonesian Platform for Prevention and Management of Waste	Nina	van Toulon	Initiative Manager	Yes
Indonesian Waste Management team - strengthening the stakeholder network from Jakarta	Ibu Fenti	Susanti		Yes
Indonesian Waste Platform stakeholder coordinator on Bali	Ibu Muriel	Ydo		Yes
Indonesian Waste Platform	Marta	Muslin	Representative	Yes
Merah Putih Hijau	Sara	Soulier		Yes
Enviroplaz International Ltd	Alister	Lawrence	Director and Chief Executive	Yes
Enviroplaz International	Neil	Kennedy	Facilitator	Yes

Participants in APEC High Level Meeting on Marine Litter

Ltd				
Sea Cleaners	Hayden	Smith	Captain	Yes
5 gyres	Markus	Eriksen		Yes
Ocean Conservancy	Susan	Ruffo	Managing Director, International Initiatives	Yes
Maui's Ark	Ruth	Wilkie	NGO Representative	Yes
World Bank	Anjali	Acharya	Environment Sector Coordinator for Vietnam and Regional Leader of the Bank's Ocean Plastics Pollution Program in East Asia	Yes
International Solid Waste Association (ISWA)	Hermann	Koller	Managing Director	Yes
Secretariat of the Pacific Regional Environment Programme	Ma Bella (Bel)	Guinto	Solid Waste Management Adviser	Yes
Amcor	David	Clark	Vice President, Safety & Environmental Sustainability	Yes
Chevron Phillips Chemical Company LP	Jay	Bickett	Managing Director, Chevron Phillips Chemicals Asia	Yes
Danone	Karyanto	Wibowo	Sustainable Development	Yes
Dow	Han	Zhang	Global Sustainability	Yes
Unilever Indonesia Foundation	Sinta	Kaniawati	General Manager	Yes
ExxonMobil	David	Hergenrether	ExxonMobil Singapore Chemical Global Polyethylene Marketing Manager	Yes
ExxonMobil	Erwin	Maryoto	Indonesia Public and Government Affairs Manager	Yes
Dell Technologies	Rebecca	Karnak	Director, Global Public Policy Government Affairs	Yes
H&M Production, Indonesia	Jessica	Wilhelmsson	Country Head	Yes
Danone AQUA	Corine	Tap	President, Director	Yes
Marine Change	Andrew	Bassford	CEO	Yes
Plastic Energy	Carlos	Monreal	CEO	Yes
World Economic Forum	Mathy	Stanislaus	Senior Policy Advisor	Yes
PRAISE	Mignonne	Maramis	Spokesperson	Yes
American Chemistry Council	Steven	Russell	Vice President, Plastics	Yes
Closed Loop Fund	Rob	Kaplan	Co-Founder and Managing Director	Yes
National Solid Waste Management Commission	Crispian	Lao	Commissioner, Private Sector Representative for Recycling	Yes
Waste to Worth	Jill	Boughton	President & CEO	Yes

Participants in APEC High Level Meeting on Marine Litter

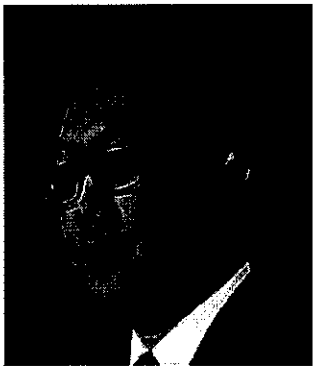
Innovations				
Tetra Pak	Reza	Andreanto	Environment Manager (PRAISE Stakeholder)	Yes
ADM Capital	Chris	Botsford	CEO	Yes
Merah Putih Hijau	Sean	Nino Lotze	Community Supporter	Yes
ExxonMobil	Leslie	Hushka	Senior Advisor, Sustainability and Marketing Communications	Yes
Dell Technologies	Piyush	Bhargava	Vice President, Global Operations	Yes
Papua New Guinea	Joshua Robert	Tamanabae		Yes
Thailand	Chaiya	Boonchit		Yes
Eco Bali	Paola	Cannucciari	Representative	Yes
The Commonwealth Scientific and Industrial Research Organisation, Australia	Chris	Wilcox	Principal Research Scientist	Yes
Unilever	Hoai	Tran-Vu	Head of Public Affairs in S.E. Asia	Yes
C&M International	Ryan	MacFarlane	Director	Yes
Indonesian Plastic Recycling Association (ADUPI)	Christine	Halim		Unconfirmed
Ministry of Environment and Forestry	Pak	Sudirman	Director of Solid Waste Management	Yes

Speaker Biographies **Draft 9/1/2017**

Heather Variava
U.S. Consul General
Surabaya, Indonesia

Heather Variava serves as the U.S. Consul General in Surabaya, Indonesia, where she leads the Consulate General in diplomatic engagement with eastern Indonesia, a region covering 12 provinces and over a third of Indonesia's population. Previously, Ms. Variava served as the Director of the Office of Nepal, Sri Lanka, Bangladesh, Maldives and Bhutan in the Bureau of South and Central Asian Affairs at the U.S. Department of State. A member of the U.S. Foreign Service since 1996, Ms. Variava has worked overseas in Mumbai, India; Port Louis, Mauritius; Ho Chi Minh City, Vietnam; and Dhaka, Bangladesh. In Washington, she also has served at the State Department Operations Center and on the Thailand desk.

Prior to joining the Foreign Service, Ms. Variava worked as a newspaper reporter in Waterville, Maine. Raised in Cedar Rapids, Iowa, she received an undergraduate degree in international relations from Georgetown University's School of Foreign Service. She has a master's degree in journalism from the University of Missouri, and, with a Rotary Graduate Scholarship, received a master's degree in European Studies from the University of Sussex in the United Kingdom. In 2012, Ms. Variava received a master's degree in national security strategy from the National War College in Washington, DC, and in 2014 she completed a fellowship in executive leadership with the International Women's Forum (IWF). Her husband also works for the State Department, and the couple has two sons.



Ambassador Arif Havas Oegroseno
Deputy Coordinating Minister for Maritime Affairs,
Republic of Indonesia

Dr. Arif Havas Oegroseno is currently Deputy Minister of the Coordinating Ministry of Maritime Affairs of the Republic of Indonesia. He was the President of the 20th Meeting of the 162 State Parties to the UN Convention of the Law of the Sea (SPLOS). He was the Indonesian Ambassador to Belgium, Luxembourg, the European Union and the World Custom Union from September 2010 to January 2015.

Ambassador Oegroseno graduated LLM from Harvard Law School in 1992 and SH (Bachelor of Law) from the Faculty of Law, Diponegoro University, Indonesia in 1986. He majored in international public law. He attended junior (1987), mid-level (1999), senior (2003) foreign service training at the Center for Education and Training of the Ministry of Foreign Affairs, Indonesia; the Australian Foreign Service Course (1988); and the international trade course of the World Bank-Harvard Institute for International Development in Colorado (1990).

In 2008, he was appointed by the President of Indonesia as DirectorGeneral for Law and International Treatises at the Ministry of Foreign Affairs. The position of Director-General is a first-echelon assignment with the most senior rank in the Indonesian public service system. In this capacity, he was assigned as Chief Negotiator for a number of strategic matters, such as maritime boundaries; extradition and mutual legal assistance; security, defense and counter-terrorism; trade and bilateral investment agreements; intellectual property rights; drafting of the ASEAN Charter, the Privileges and Immunities of the ASEAN Secretariat and Protocol to the Dispute Settlement Mechanism of the ASEAN Charter. In 2003, he was appointed by the Minister of Foreign Affairs as Director for Security, Political and Territorial Treatises. His responsibilities included overseeing all negotiations toward bilateral, regional and multilateral agreements in which Indonesian interests on security, political and territorial affairs are directly involved.

In March 2010, he was nominated by the President of Indonesia as the Indonesian Ambassador to Belgium, Luxembourg, the European Union and the World Customs Union. His nomination was confirmed by the Indonesian House of Representatives during a Foreign Affairs Committee.

Steve Russell
Vice President, Plastics Department
American Chemistry Council

As Vice President of American Chemistry Council's Plastics Department, Mr. Russell is responsible for promoting the benefits and innovations of plastics to consumers, policy makers, and in key end use markets. Working with CEOs and member company executives, he leads the development and implementation of proactive programs and partnerships to promote sustainable solutions, and works with stakeholders to address unwarranted bans/taxes of plastic products.

Most recently, Mr. Russell was Managing Director of ACC's Plastics Division. Since joining ACC in 1995, he has served as Senior Legal Counsel and Senior Director for Health, Products and Science Policy. In that capacity he led the development of innovative programs and approaches to advocacy and chemical management policies at the state, federal and international levels. Mr. Russell also negotiated ACC's program to make safety information publicly available for high production volume (HPV) chemicals. Additionally, he was actively involved in the development and implementation of the European Union's Registration, Evaluation and Authorization of Chemicals (REACH) legislation, and has represented the voice of the business community on a wide range of environmental programs at the Organization for Economic Cooperation and Development.

Mr. Russell received his bachelor's degree from the University of Kansas, and his law degree from California Western School of Law.

Speaker Biographies **Draft 9/1/2017**

Rob Kaplan
Co-Founder and Managing Director
Closed Loop Fund

Rob Kaplan proves that creating business value and passion for protecting the environment can peacefully co-exist. As Managing Director of Closed Loop Partners, an innovative platform for impact investing, sustainability, and the circular economy, Rob oversees strategy and new business model development, as well as day-to-day operations. The Fund aims to scale recycling through zero interest loans to cities and investments in waste companies.

Prior to joining the Fund, Rob served as Director of Sustainability for Walmart Stores, Inc. where he was responsible for packaging, customer engagement, and integration with the Consumables business, including personal care and household cleaning. Rob led the creation of the Sustainability Leaders shop on Walmart.com to help consumers make responsible purchasing decisions online, built a unique collaborative initiative with competitors called the Beauty & Personal Care Innovation Accelerator, and cofounded The Closed Loop Fund. Rob previously led Walmart's cross-functional efforts to eliminate 20 million metric tons of greenhouse gas from the supply chain.

Rob's career has always been fueled by his passion for sustainability and social issues. Before joining Walmart, he helped lead corporate responsibility and brand strategy for Brown-Forman Corporation, which produces and markets spirit brands such as Jack Daniel's. Rob developed marketing strategies to engage consumers, improve social and environmental performance, and advance business objectives.

Rob received his MBA from the Haas School where he studied marketing, corporate responsibility, and social entrepreneurship. Prior to graduate school, Rob was State Communications Director for Fight Crime: Invest in Kids California and a political consultant for M&R Strategic Services in Washington, DC. Rob received his undergraduate degree in political communication from the George Washington University where he learned that perception is reality. He lives in Brooklyn with his wife and two children.

Jill Boughton
President and CEO
Waste to Worth Innovations

Jill is the Founder and President of W2Worth Innovations – an organization that seeks to catalyze the use of solid waste as a resource as a means for mitigating the larger social, economic and environmental impacts caused by solid waste. She began this recent adventure upon retirement from a successful 24 year career at Procter and Gamble (P&G). Over her career at P&G, Jill managed Product Development activities for

several of P&G's businesses, in categories ranging from Personal Health Care to Paper Products. Her time with P&G included a seven year stint in Caracas, Venezuela, giving Jill firsthand knowledge of social/economic issues important to emerging regions.

Jill was well known within P&G for her specialty in developing and managing Disruptive Innovation portfolios. One of the projects emerging from this work was P&G's "Waste to Worth" program. This program supported P&G's long term environmental sustainability vision of having zero consumer waste entering landfills. It specifically focused on addressing the growing issue of solid waste management in emerging markets through economic development and innovation. Through this project, Jill has emerged as a leader in the field, specializing in objective evaluation of emerging technology and managing integration of technologies in this space. She has a BS in Chemical Engineering from Ohio State University. Board of Directors: Ocean Recovery Alliance Inc.

Mignonne Maramis
Spokesperson
Packaging and Recycling Alliance for Indonesia Sustainable Environment (PRAISE)

Mignonne N.B. Maramis Akiyama is the Communications Senior Advisor for Tetra Pak Indonesia. She has worked at Tetra Pak Indonesia since 2000, overseeing communications first as a Manager at the local Indonesia level, then as a Director and Cluster Leader at the South and Southeast Asia regional level.

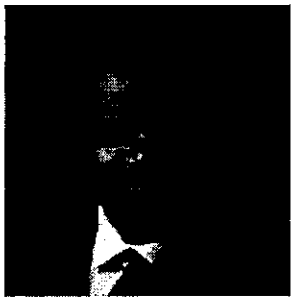
In addition, Mignonne helped to establish the Environment division at Tetra Pak Indonesia, first as Environment Manager and later concurrently as Communications and Environment Director. She helped to set up Indonesia's first beverage carton recycling and environmental education program, working in cooperation with a government research institute, the Center for Pulp and Paper, local paper mills and Tetra Pak Indonesia's customers. In recognition of the company's role in minimizing packaging waste through recycling, Tetra Pak Indonesia received the first Sustainable Producer award from the Indonesia Ministry of Environment and Forestry in 2016. Mignonne helped to initiate the launch of Tetra Pak Indonesia's first customer to use FSC labelling in Indonesia, which guarantees that the paperboard used for Tetra Pak packages comes from independently certified and verified controlled sources.

Christopher Botsford
CEO
ADM Capital

Christopher Botsford is a Co-Founder of ADM Capital, Chief Executive Officer and member of ADM Capital's Investment Committee. Prior to establishing ADM Capital, Christopher ran the Asia-Pacific regional debt and derivatives operation for Republic National Bank of New York. In 1995, he was a founding board

member of the Asian arm of the International Swaps and Derivatives Association, the self-governing body for the derivatives industry.

Christopher has a Masters' degree in Engineering from Cambridge University, England.



Mathy Stanislaus
Senior Advisor for Accelerating Circular Economy Policies
World Economic Forum

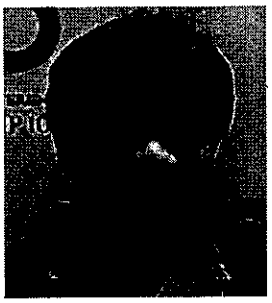
Mr. Stanislaus serves as Senior Advisor for Accelerating Circular Economy Policies at the World Economic Forum. Previously he was Assistant Administrator in the U.S. EPA Office of Land and Emergency Management from 2009 to 2016. Among his many initiatives, Mr. Stanislaus led an effort to advance the transition to a circular economy through a life-cycle based sustainable materials management approach. He represented the U.S. in the G7 Alliance for Resource Efficiency, which seeks to promote best practices and foster innovation by providing a forum for stakeholder dialogue. He led the finalization of the Definition of Solid Waste rule to enhance protection of vulnerable communities from the mismanagement of recycling facilities and increase the recycling of recovered materials, and also led the finalization of the first national rule to safely manage coal ash disposal. Mr. Stanislaus is a chemical engineer and environmental lawyer with over 20 years of experience in the environmental field in the private and public sectors. He served as senior environmental counsel at a law firm, and director of environmental compliance for an environmental consulting firm. He also served as an advisor to other federal government agencies, Congress, and the United Nations on a variety of environmental issues. He received his law degree from Chicago Kent Law School and Chemical Engineering Degree from City College of New York.

Andrew Bassford
Chief Executive Officer
Marine Change

Andrew Bassford has a 17-year track record at the intersection of seafood and marine sustainability. His experience spans both commercial and policy-making settings in Europe and Southeast Asia. As Director of Operations for Fishes, Europe's first certified sustainable seafood products company, he managed all sourcing and market development for this pioneering European fish brand that specialized in MSC certified fish.

Over the past 10 years, Andrew has been at the forefront of a range of public and private sector efforts to drive the development of sustainable seafood supply chains. He has undertaken projects for development finance institutions (World Bank, Asian Development Bank, FAO), Asian Governments (Indonesia), and multi-stakeholder initiatives such as the Dutch Sustainable Trade Initiative and Fairtrade. Andrew was part of the founding team involved in creating International Pole and Line Foundation, which encourages low-impact fishing strategies that benefit ecosystems and local communities. Andrew is the CEO and co-founder of Marine Change and leads the commercial and business strategy development. Marine Change is focused

on finding solutions and see disciplined long-term investment support innovative efforts to renew fisheries and marine ecosystems, permitting them to recover from overexploitation and to support prosperity, food security and livelihoods in Asia.



Dr. Medrilzam,
Director for Environmental Affairs
National Development Planning Board (BAPPENAS)

Dr. Medrilzam has been serving BAPPENAS since 1993 and had been appointed in various structural and functional positions since then. Besides those positions, Medrilzam as the BAPPENAS representative, had chaired the Indonesian delegation in Financial Climate Change Negotiations under the UNFCCC from 2005-2008, and also followed several International loan and grant negotiations between Indonesia and several bilateral countries and multilateral bodies.

Susan Ruffo
Managing Director, International Initiatives
Ocean Conservancy

Susan Ruffo serves as the managing director of international initiatives at Ocean Conservancy, where she is focused on stopping the flow of plastics into the oceans. Previously, Susan led the Vibrant Oceans portfolio for Bloomberg Philanthropies, supporting simultaneous reform of local and industrial-scale fisheries and development of financial strategies to ease transition to sustainable fishing.

Susan came to Ocean Conservancy with considerable international and government experience, having served as the associate director for climate preparedness at the White House Council on Environmental Quality. There she led implementation of the climate preparedness pillar of President Obama's Climate Action Plan and worked with state, local, and tribal leaders to better prepare the United States for the impacts of climate change. Susan has also worked at The Nature Conservancy and as a Foreign Service Officer with the U.S. Department of State, serving in China, Argentina and Nigeria and in Washington, D.C. Susan holds degrees in Economics and Political Science from the Massachusetts Institute of Technology.

Hermann Koller
Managing Director
International Solid Waste Association (ISWA)

Hermann Koller has been engaged in the waste management sector for 25 years, including both private and public sector positions. Currently he serves as Managing Director for the International Solid Waste Association (ISWA), he has been a CEO for a waste operating company and a Vice President of the Austrian compliance scheme for packaging waste. He holds a Master degree in Environmental Science.

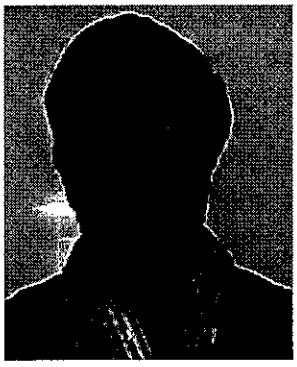
The main thematic areas he is working are: Integrated Waste Management, Producer Responsibility, Waste & Climate Change, Financing of Waste Management, Green economy.

Tuti Hendrawati Mintarsih
Directorate General for Solid Waste, Hazardous Waste, and Hazardous Substance Management
Ministry of Environment and Forestry

Ms. Tuti Hendrawati is Director General of Solid Waste, Hazardous Waste and Hazardous Substance Management, Ministry of Environment and Forestry, Republic of Indonesia. The task of this Directorate General is to maintain the quality of the environment to improve the environmental capacity, water resistance and public health. By undertaking the Law on Waste Management No. 18 of 2008 and the Law on Environmental Management and Protection No. 32 of 2009, it must be ensured that setting and implementation of waste management policy, hazardous waste and hazardous substance management prioritizing reduction principles and the principle of 3 R as a source of new energy occurs. Solid waste and hazardous waste could be used again as raw material as long as it has been processed and gets permitted for the environment and human health.

One excellent innovation is the creation of "Waste Bank (Trash Bank)" with the motto "from trash to cash". Even though, the management of Waste Bank predominantly by 51% male, the majority of the member and its movement led by women. Further, the MoEF will continue to enhance the role and involvement of women in decision making so that women benefit equally with men. This program is quite strategic to reduce waste generation which is one of the mitigation and adaptation to climate change.

Tuti H. Mintarsih was a chairman of gender working group in the Ministry of Environment, Republic of Indonesia in 2002. A variety of partnership activities with other agencies and international donors institution have made such gender mainstreaming's training, women's and environmental activities, publications such as introduction to gender and environmental analysis, the impact of pollution on women's health, gender and environment.



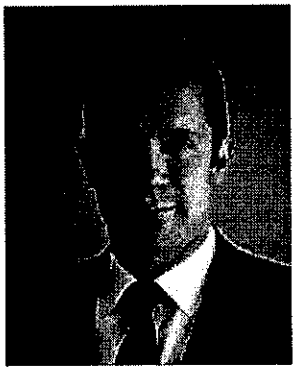
Luu Duc Cuong
Director General
Viet Nam Institute for Urban-Rural Planning (VIUP)
Ministry of Construction (MOC)

Luu Duc Cuong has 21 years of experience with urban planning. He gained a Bachelor of Architecture-Urban Planning, Master of Environmental Engineering and PhD of Urban Planning. He has managed more than 10 solid waste management plans for provinces throughout Vietnam and 20 studies related to solid waste management. He is one of the main authors of the National Strategy for Integrated Solid Waste Management as well as the Guidelines for Solid Waste Management Planning. He has been a consultant for EC,

ADB, WB, GTZ, CIDA, DANIDA, NDF. He is also involved in academic activities and policy making. He has published more than 50 articles on sustainable urban planning, environmental assessment, solid waste management and climate change-related issues. Dr. Cuong is also involved in teaching and supervising students at a number of universities.

Anjali Acharya
Senior Environment Specialist
World Bank

Crispian Lao
National Solid Waste Management Commission
Philippines



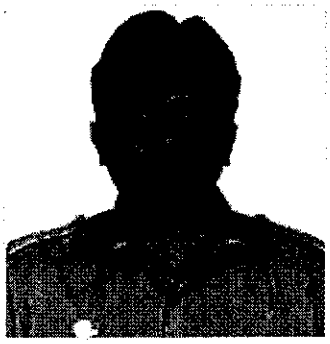
Ryan MacFarlane
Director
C&M International

Ryan MacFarlane, a director at C&M International, helps companies and industry associations navigate political and economic barriers to realize commercial success in international markets and form mutually beneficial partnerships between the public and private sectors. As a former scientist, Ryan has particular experience in the health, environmental, and technology sectors. Prior to joining C&M International, Ryan was the principal Asia-Pacific Economic Cooperation (APEC) coordinator at the U.S. Department of State where he had responsibility and oversight for U.S. government engagement within APEC and worked to develop policies, initiatives, partnerships, and capacity building programs to advance U.S. government objectives in the Asia-Pacific region. While at the Department of State, Ryan led U.S. delegations to numerous APEC meetings and chaired the APEC Life Sciences Innovation Forum Planning Group, the APEC Chemical Dialogue, and the APEC Budget and Management Committee.

Prior to joining the Department of State, Ryan was awarded an American Association for the Advancement of Science (AAAS) Science and Technology Policy Fellowship and served as an international health specialist at the Department of Homeland Security, Office of Health Affairs. Earlier in his career, Ryan worked at the National Oceanic and Atmospheric Administration (NOAA) at the Northeast Fisheries Science Center. Ryan's work within the government has been recognized with multiple meritorious and superior honor awards.

Ryan has also held positions in academia, working as a scientist in Infectious Diseases and Geographic Medicine at Stanford Medical School as well as the Immune Disease Institute at Harvard Medical School, where he published multiple articles in peer reviewed journals.

Ryan earned a B.S. with honors in cellular, molecular and developmental biology from the University of New Hampshire and a Ph.D. in microbiology and immunology from Stanford University School of Medicine where he was awarded the Sidney Raffel Award for Outstanding Accomplishment in Graduate Study.



Andreas Hutahaen
Coordinating Ministry for Maritime Affairs,
Republic of Indonesia

Hiroko Yokota
Sector Chief, Office of Sound Material-Cycle Society
Waste Management and Recycling Department
Ministry of Environment

Piyush Bhargava
Vice President of Global Operations
Dell Inc.

Piyush Bhargava is the Vice President of Global Operations at Dell. Previously he served as Executive Director, Global Materials & Packaging at Dell Inc responsible for material and supply chain needs globally for all Dell and ODM facilities. His team also manages the Packaging Sourcing and engineering strategy development and delivery including support of Dell's Legacy of Good and Vision 2020 for sustainability. He has been with Dell for over 17 years and has managed strategic sourcing of various high spend commodities over the years. He continues to manage global teams and has

lived in the US, China and Singapore with his roles at Dell. He holds a passion for people development and has held various senior leadership positions including Executive Sponsor for Dell's Asians in Motion Employee Resource Group.

Prior to joining Dell, Mr. Bhargava held various management positions at Intel, General Motors and Siemens. He received his Bachelor of Engineering degree in Electrical & Electronics Engineering from Birla Institute of Technology, Masters of Science in Manufacturing Systems Engineering from Lehigh University and an MBA from the University of Michigan, Ross School of Business.

David Clark
Vice President of Safety, Environment & Sustainability
Amcor

David leads Amcor's safety, environmental compliance, and sustainability programs including the EnviroAction program to improve the environmental profile of their plants and products. He is closely involved with integrating sustainable design and social responsibility into Amcor's product development and innovation processes, and with issues related to the collection, processing, and use of recycled containers. David is an active member of several organizations, including the External Advisory Board of the Erb Institute for Global Sustainable Enterprise at the University of Michigan and serves as chairman of the Plastic Recycling Corporation of California. David holds a B.S., Physics, from the University of Michigan and an MBA from Pepperdine University.

Han Zhang
Lead EHS & Sustainability Manager, Global EH&S and Sustainability
The Dow Chemical Company

Han Zhang, is the Lead EHS & Sustainability Manager for Global EH&S and Sustainability and is responsible for:

- Dow's sustainability reporting, including Dow's Annual Sustainability Report, 2015 Sustainability Goals quarterly update, and Dow's annual submission to the Dow Jones Sustainability Index
- Annual evaluation of Dow's Sustainable Chemistry Index, which measures each of Dow's business units and their progress toward the 2015 Sustainable Chemistry Goal
- Development of Dow's 2025 Sustainability Goals

Prior to being named Lead EHS & Sustainability Manager, Zhang served as an engineer for Phillips 66 focusing on biofuel development, strategic implementation of alternative energy

plans, and life cycle assessment. Prior to this, Zhang held various positions at ConocoPhillips and ExxonMobil as life cycle assessment analyst and engineer.

Zhang currently serves as an External Advisory Board member for the Center for Sustainable Systems at the University of Michigan and Industry Committee member for the American Center for Life Cycle Assessment.

Zhang earned his doctorate degree in the School of Natural Resources and the Environment from the University of Michigan in 2009. He received his bachelor's and master's degrees in Thermal Engineering from Tsinghua University. Zhang also received a certificate in MBA Essentials and Entrepreneurship from U-M's Ross School of Business (2009) and a Rackham certificate of graduate studies in Spatial Analysis (2009).

Alexander Ehran
Joint Vice President
Indorama

Ocean Conservancy

Science-based solutions to tackle the biggest threats to our ocean

- ✓ A balanced, working ocean
- ✓ Healthy, sustainable seafood
- ✓ A thriving ocean economy
- ✓ Vibrant marine life
- ✓ **Clean beaches and water**

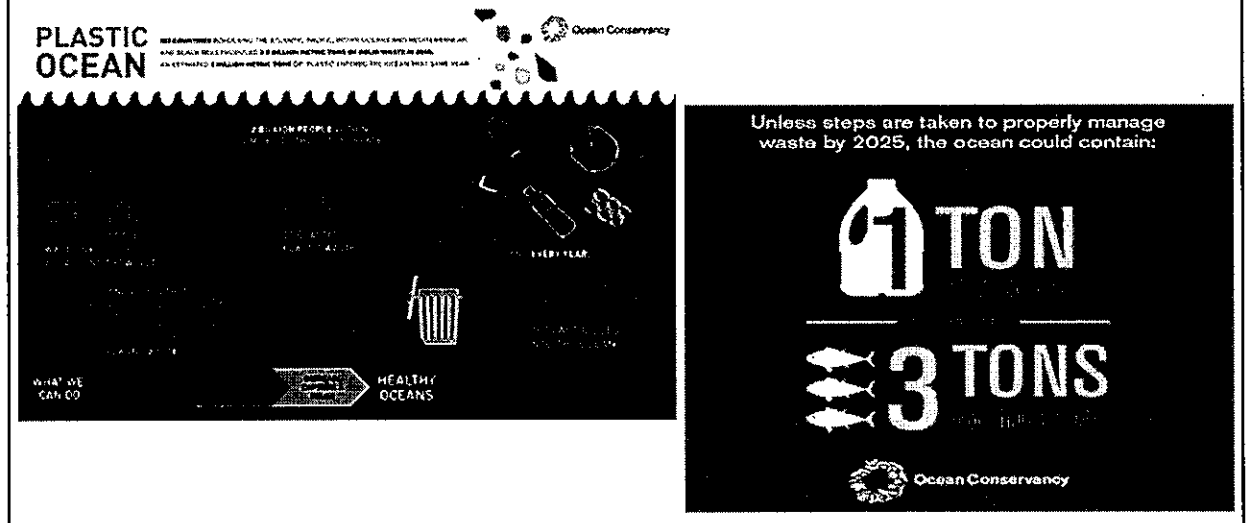
Ocean Conservancy

TRASH FREE SEAS ALLIANCE®

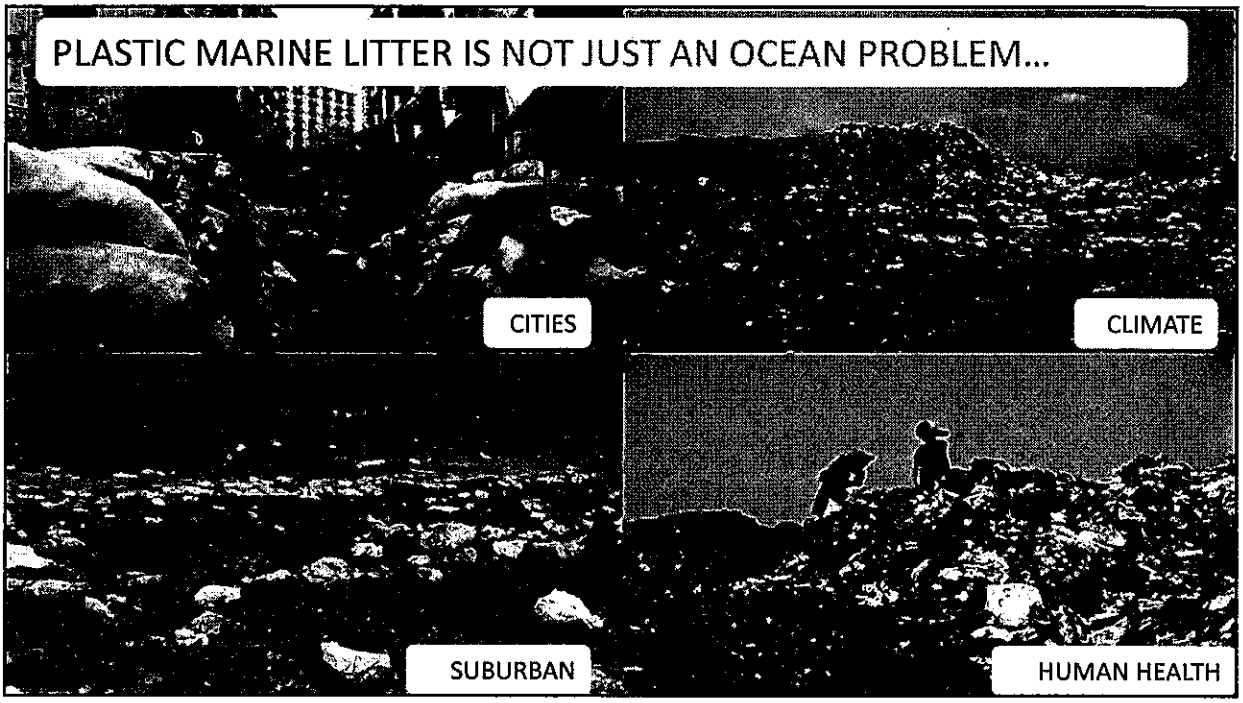
Pragmatic, science based solutions

Ocean Conservancy
WWF
Ocean Recovery Alliance
WORLD PLASTICS COUNCIL
Coca-Cola
DART
DOW
COVANTA ENERGY
The Marine Mammal Center
ALGALITA
P&G Procter&Gamble
Walmart
American Chemistry Council
Nestlé Waters
DANONE
amcor
AWARE
WORLD ANIMAL PROTECTION
rozalia project
vancouver aquarium
The Consumer Goods FORUM
ITW
Bank of America
GEORGIA AQUARIUM
KEEP AMERICA BEAUTIFUL
REDISA

Unabated, ocean plastic will reach 250M tons by 2025



Ocean Conservancy



Agenda

- What we've learned
- APEC work on marine debris
- Our goals today

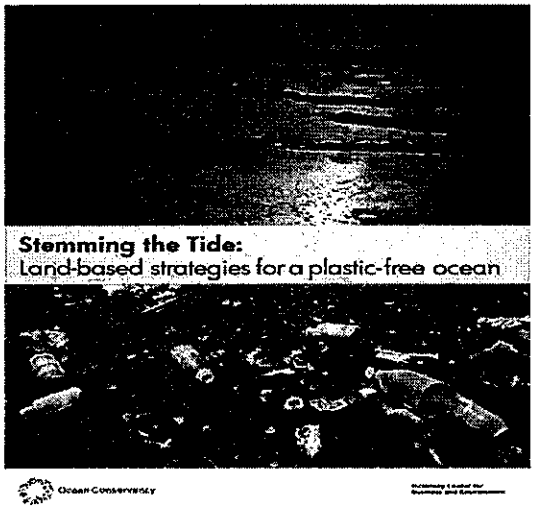
Ocean Conservancy

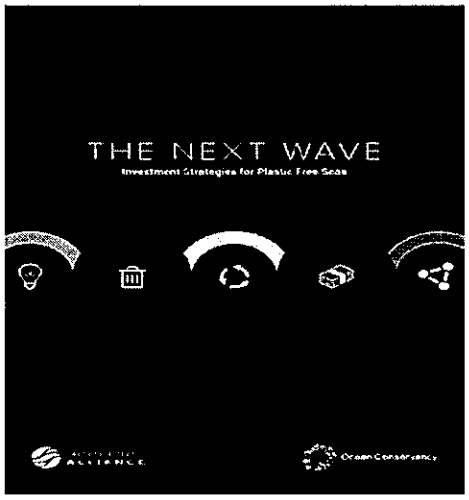
Agenda

- What we've learned
- APEC work on marine debris
- Our goals today

Ocean Conservancy

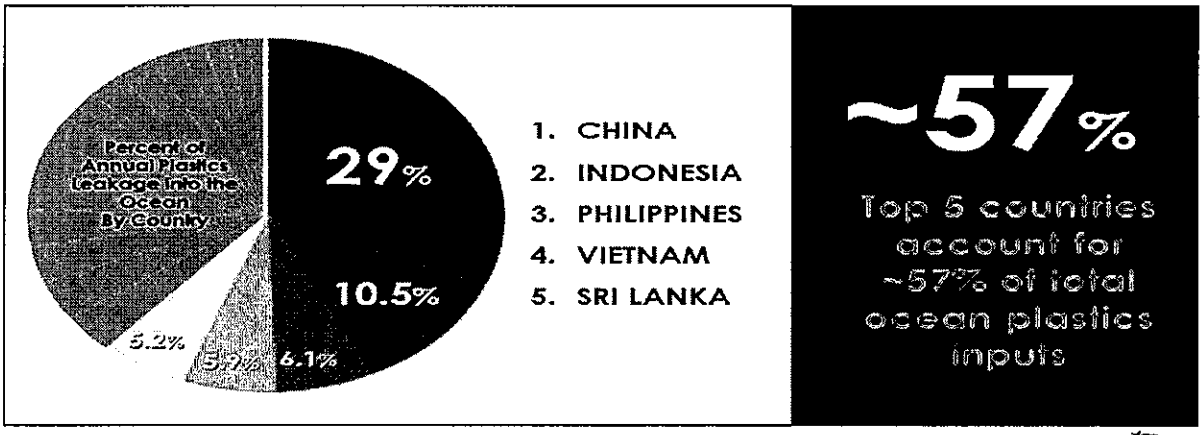
Work based on science





Ocean Conservancy

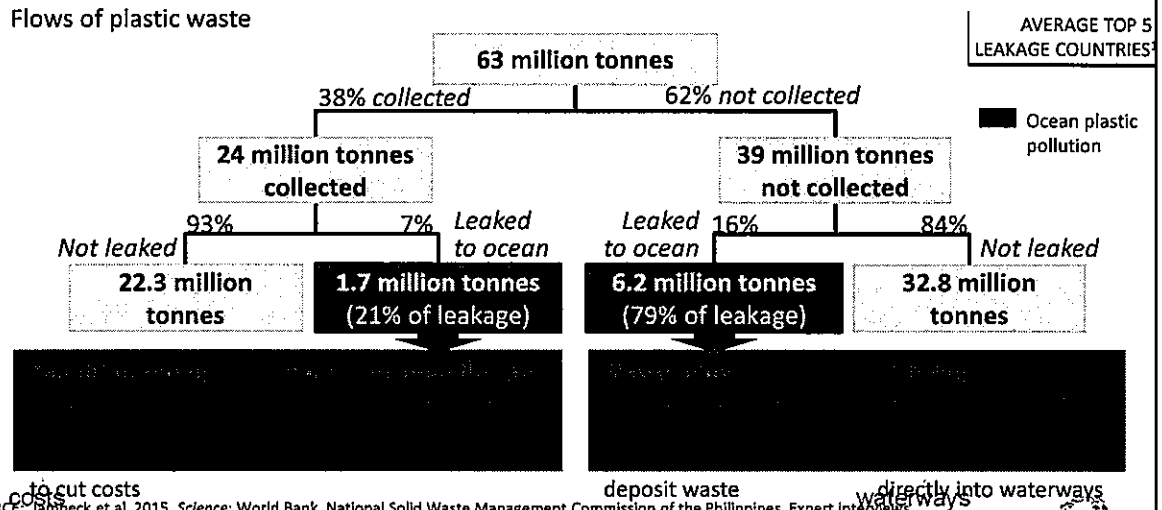
Plastic is geographically concentrated as an unintended consequence of rapid development



SOURCE: Jambeck et al. 2015, *Science*

Ocean Conservancy

Uncollected waste contributes the majority of the problem, but LEAKAGE also happens post-collection

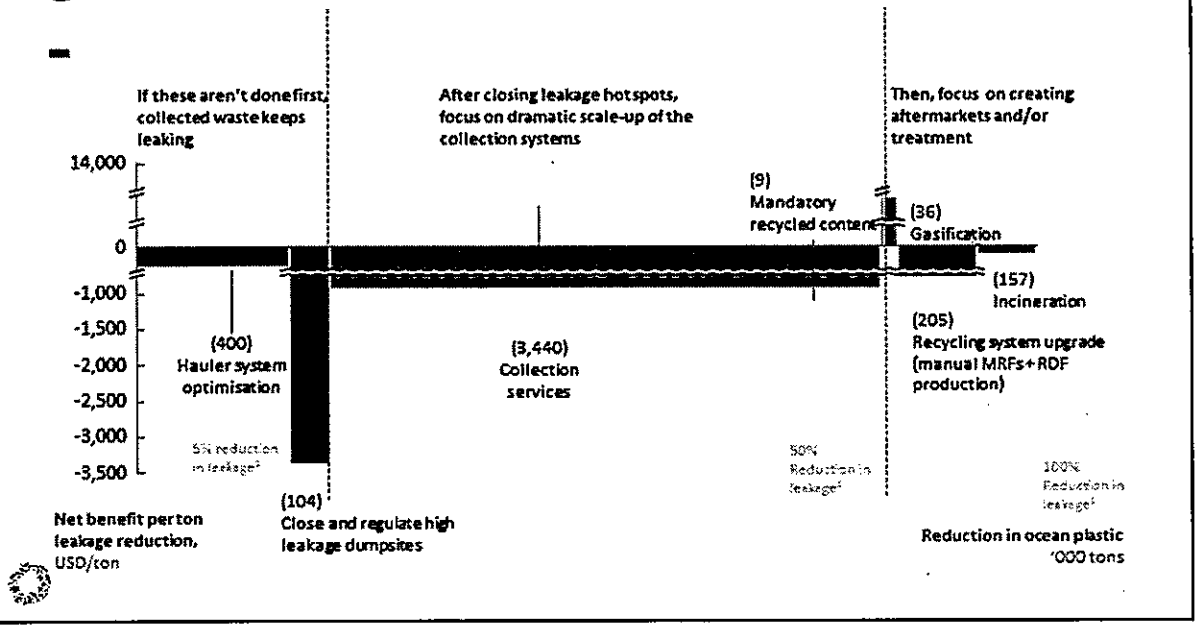


SOURCE: Jambeck et al. 2015, *Science*; World Bank, National Solid Waste Management Commission of the Philippines, Expert interviews, field visits, team analysis

1 China, Indonesia, Philippines, Vietnam, Thailand

Ocean Conservancy

Plug leaks, then increase collection, then improve treatment



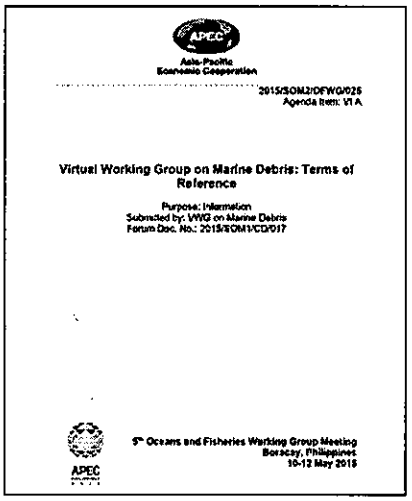
Agenda

- What we've learned
- APEC work on marine debris
- Our goals today

Ocean Conservancy

APEC Virtual Working Group on Marine Debris

- Formed in 2014 by the APEC Chemical Dialogue and Ocean and Fisheries Working Group
- Co-chaired by the United States (Government) and the Philippines (Industry)
- Group involves public and private sectors and focuses on innovative solutions to land-based waste management


Asia-Pacific Economic Cooperation

2015/SOM2/OFWG/025
Agenda Item: VI A

Virtual Working Group on Marine Debris: Terms of Reference

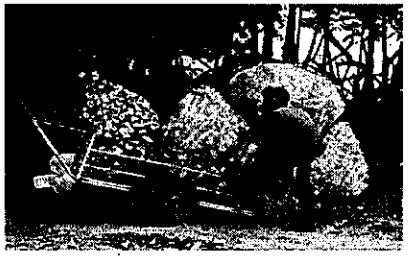
Purpose: Information
Submitted by: VWG on Marine Debris
Forum Doc. No.: 2015/SOM1/CD/017

9th Oceans and Fisheries Working Group Meeting
Boracay, Philippines
10-12 May 2015

Ocean Conservancy

VWG on Marine Debris Progress to Date

- Addressing definitional challenges
- Multiple studies to identify strategies and solution sets
- 2016 High-Level Meeting
- Policy and Practice Recommendations
- Pilot projects to design economically sustainable waste management infrastructure

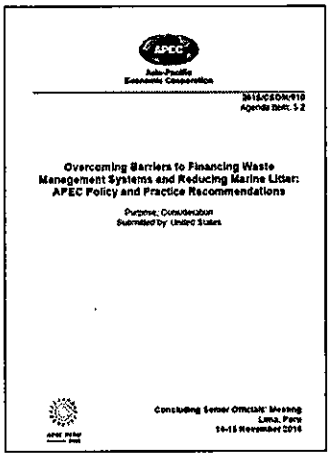


Ocean Conservancy

Creating an enabling policy environment

Ocean Conservancy

Policy and Practice Recommendations



- Setting waste management targets
- Developing waste management performance indicators
- Addressing definitional barriers to trade and investment in sustainable materials management solutions
- Concentrating the majority of solid waste responsibilities within a single government department or agency
- Developing incentive policies
- Working with the informal labor force
- Establishing strong environmental standards

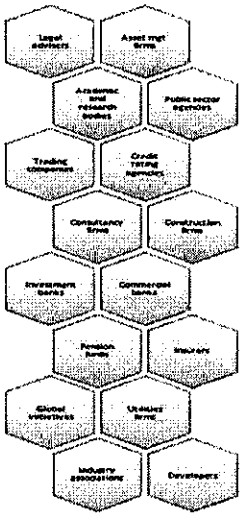
Ocean Conservancy

Funding innovations in waste management

Ocean Conservancy

Asia-Pacific Infrastructure Partnership

- The first Asia-Pacific Infrastructure Partnership meeting focused on waste management (March 2017 in Indonesia)
- The meeting convened government officials, senior private sector infrastructure experts, representatives from multilateral development banks and others
- Some of the key challenges identified during the meeting included:
  1) streamlining institutional arrangements
  2) insufficient funding
  3) inadequate collection
  4) insufficient data
  5) legislative and regulatory uncertainty
  6) limited use of available tools



Ocean Conservancy

Agenda

- What we've learned
- APEC work on marine debris
- Our goals today

Ocean Conservancy

Leveraging Action

G20 GERMANY 2017
HAMBURG

THE OCEAN CONFERENCE

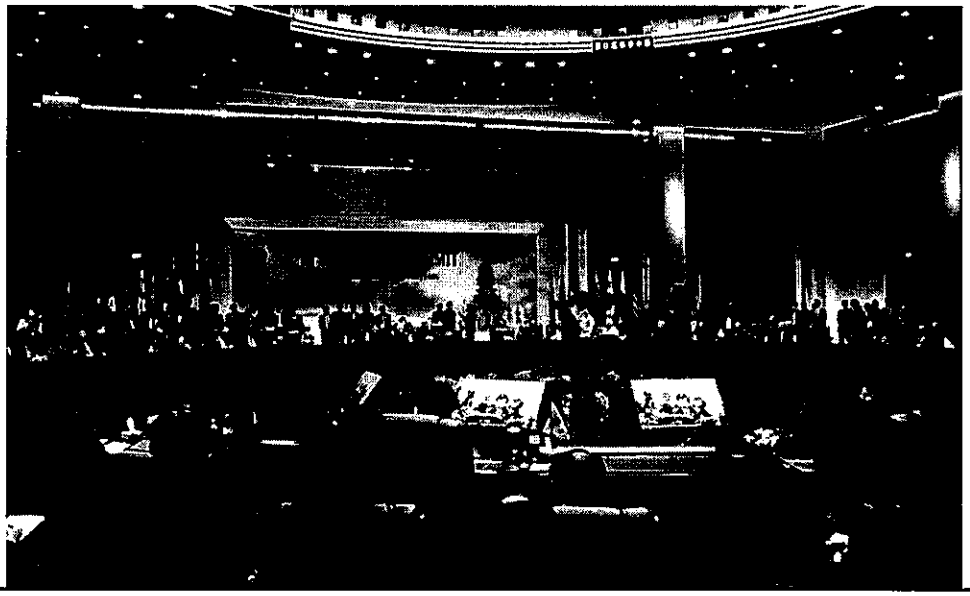
gef GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

G7 GERMANY
2015 | Schloss Elmau

Ocean Conservancy

Leveraging Action



Ocean Conservancy

Our goals today

1. Advance implementation of the APEC Policy and Practice Recommendations
2. Promote innovative financing mechanisms to address the need for new mechanisms for funding waste management.
3. Support the design and implementation of national strategies
4. Provide input to the East Asia Summit (EAS) Conference on Combating Marine Plastic Debris and other international efforts
5. Catalyze collaborations and partnerships,

Ocean Conservancy

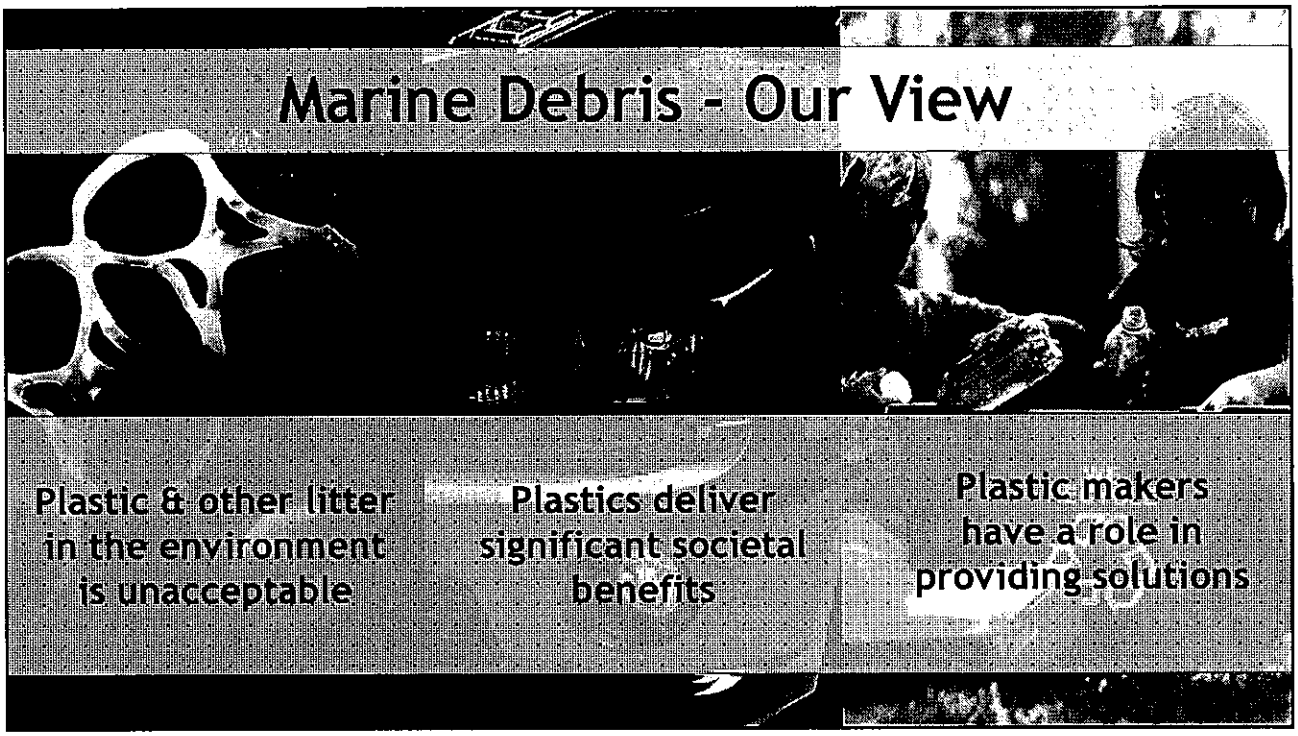

TRASH FREE SEAS
ALLIANCE
Ocean Conservancy

ACC Plastics Division Members

BASF The Chemical Company
Braskem
Chevron Phillips Chemical Company LP
covestro
DOW
DSM ENGINEERING PLASTICS
DUPONT
ExxonMobil
LANXESS Energizing Chemistry
lyondellbasell
NOVA Chemicals
سابك sabic
Shell Chemicals
SOLVAY asking more from chemistry
TRINSEO
TOTAL
The Vinyl Institute

2

Marine Debris - Our View



Plastic & other litter in the environment is unacceptable

Plastics deliver significant societal benefits

Plastic makers have a role in providing solutions

Natural Capital Cost of Plastic

Business as Usual Plastic Use in Consumer Products

Valuing Plastics quantified the environmental costs to society of the current "take-make-dispose" linear economy approach to plastic use in consumer goods

$75bn

The natural capital cost of plastic in the consumer goods sector per year

In the updated study, Trucost extended the *Valuing Plastic* analysis to quantify both the **environmental costs *and benefits*** of plastic

Business as Usual vs. Plastic Alternatives

What are the relative environmental cost advantages of plastics compared to alternative materials that serve the same function?

Business as Usual vs. More Sustainable Plastic Production & Management

What are the environmental benefits of strategies to improve the sustainability of plastic use in consumer goods?

American Chemistry Council

Global Environmental Costs in 2015

The Environmental cost to society of plastic in consumer goods sector: 3.8X less than alternative materials

Business as Usual

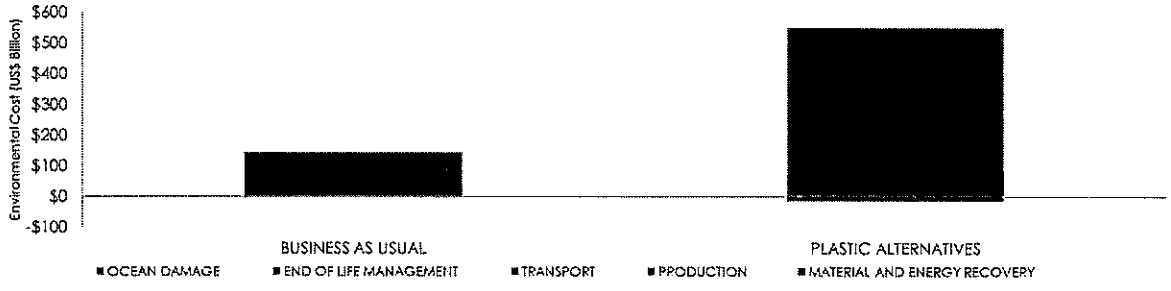
$139 Billion

For every million of Consumer goods sector revenue, $4,886 of environmental costs are created

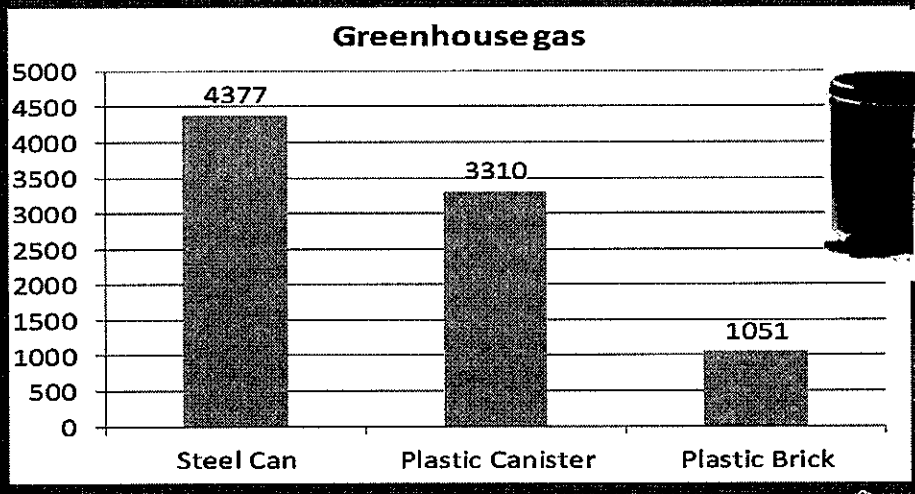
Plastic Alternatives

$533 Billion

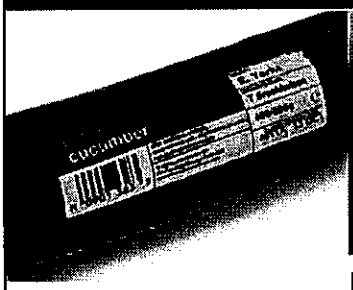
For every million of Consumer goods sector revenue, $18,773 of environmental costs are created



"Reduce" via Plastics Packaging

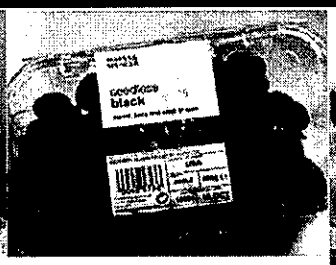


Source: Franklin Associates, September, 2008



Fresh for 14 days

New potatoes
in-store wastage
DOWN to <1%



Grapes in-store wastage
DOWN by 20%

Bunches of identical bananas stored for 7 days loose and in a modified atmosphere bag

Source: Packaging in Perspective, Advisory Committee on Packaging, Supported by INCPEN

Key Conclusions/Recommendations

1. The environmental cost of alternative materials is more than 3.8x greater than plastic, due to the greater material efficiency of plastic.

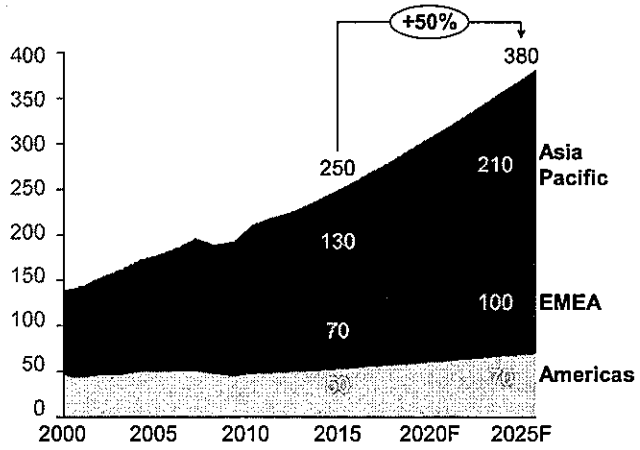
2. Increasing low carbon energy sourcing and improved fleet fuel efficiency represent key short and medium opportunities to reduce environmental costs.

3. More efficient packaging technologies that use less plastic could significantly reduce the environmental cost of plastic.

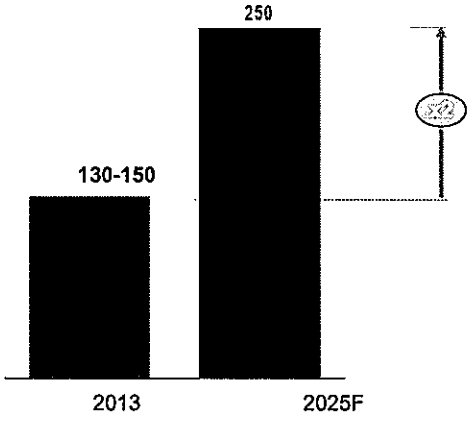
4. Improvements in waste **collection in emerging economies**, and **increased recycling and energy recovery in developed countries** could significantly reduce plastic's impact on the ocean.

Plastic consumption to grow 50% by 2025; plastic debris to reach 250MT by 2025

Global plastics consumption by region
Million tons plastic consumed annually, 2000-2025F

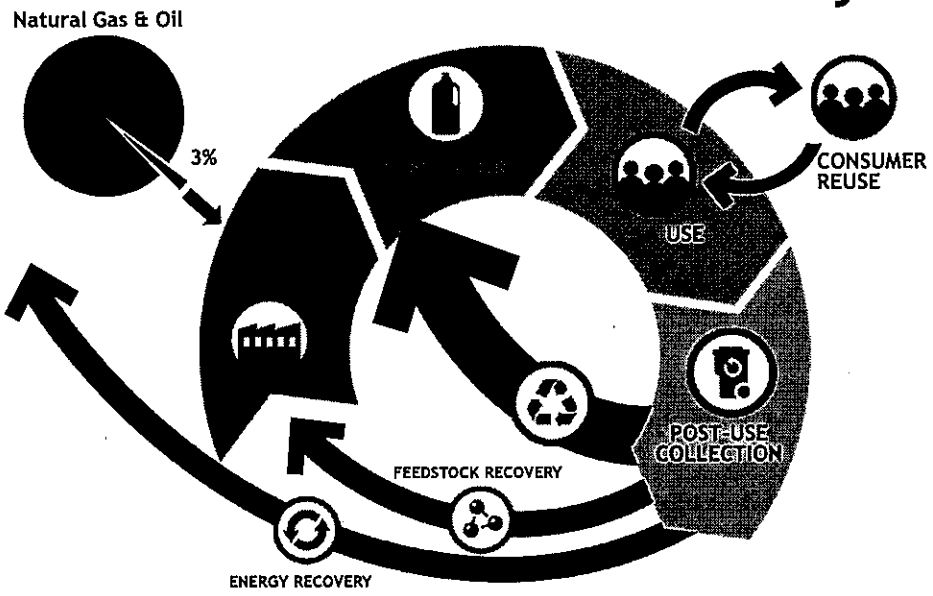


Ocean plastic debris
Million tons estimated to be in the ocean

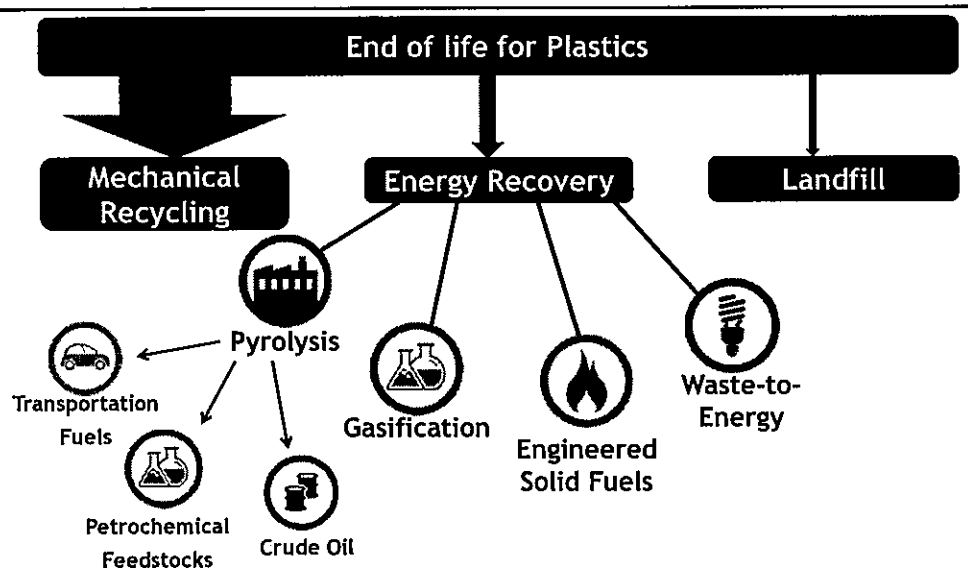


Source: ICIS Supply and Demand database; Jambeck et al.Science, February 2015

Vision for Plastics Recovery

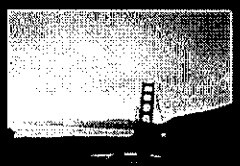


Range of Post-Use Solutions

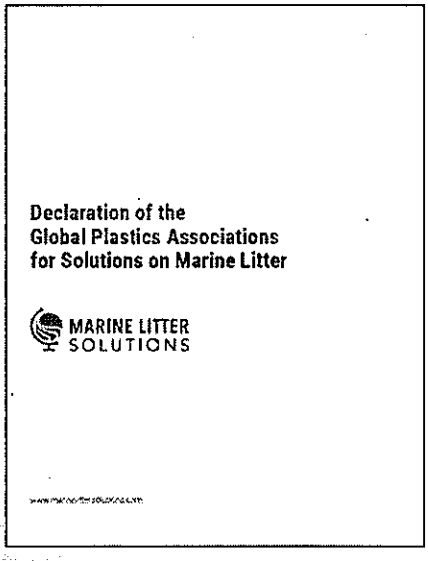


Partnerships for Litter Prevention





Activating our Value Chain



- Announced at UN Marine Debris Conference in 2011
- Signatories committed to action in 6 priority areas
- Encourages stakeholder cooperation to enable solutions
- Transparent progress reports every 2 years
- 69 associations from 35 countries
- 260 projects since launch in 2011

Making Progress ...

2011	
Members	47
Countries	27
Projects	100

2013	
Members	60
Countries	34
Projects	185

Members	65
Countries	34
Projects	260

World Plastics Council

BOREALIS Keep Discovering

Borouge

Braskem

Chevron Phillips Chemical Company

CPCIF

covestro

DAELIM

DOW

EQUATE شركاء في النجاح Partners in Success

ExxonMobil

lyondellbasell

NOVA Chemicals

Reliance Industries Limited

SIBUR

سابك sabic

STYROLUTION

TOTAL

TRINSEO

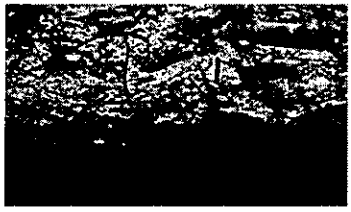
Plastic Makers: Next Steps

- ☑
- ☑
- ☑
- ☑

Waste to Worth

APEC High Level Meeting on Accelerating Waste Management Solutions to Eliminating Marine Debris

Barriers and Policy Enablers to SWM Solutions



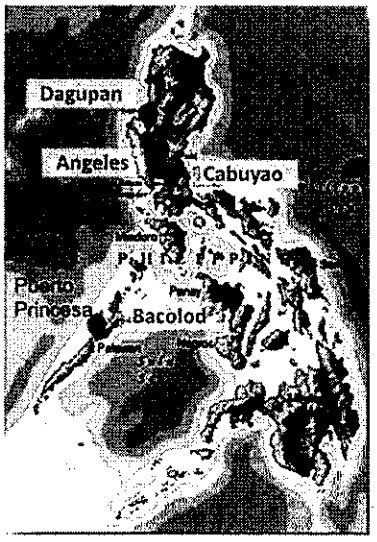
Jill Boughton
W2Worth Innovations

September 5, 2017

Bali, Indonesia

WASTE 2 WORTH
People + Purpose = Power

Waste 2 Worth What are we doing?



In Development

Angeles City Government (LGU)
Cost: US$47M
Inputs: 230 tpd of MSW
Outputs: 8-10MW of Electricity

SB Hain Enterprises (Waste Management Company)
Cost: US$92M
Inputs: 650 tpd of MSW
Outputs: 20-26MW of Electricity

Dagupan City Government (LGU)
Cost: US$11M
Inputs: min 30 tpd of MSW
Outputs: 4000 l Diesel and
2000 m3 Biogas/day

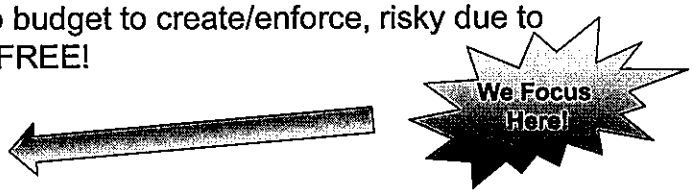
Bacolod City Gov't & District 3 (LGUs)
Cost: US$65M
Inputs: 400tpd of MSW
Outputs: Diesel and Electricity (10-12MW

Waste 2 Worth Stimulating Economically viable infrastructure

Where to drive economic development – Intake or Offtake?

Intake – Classic Developed World Model

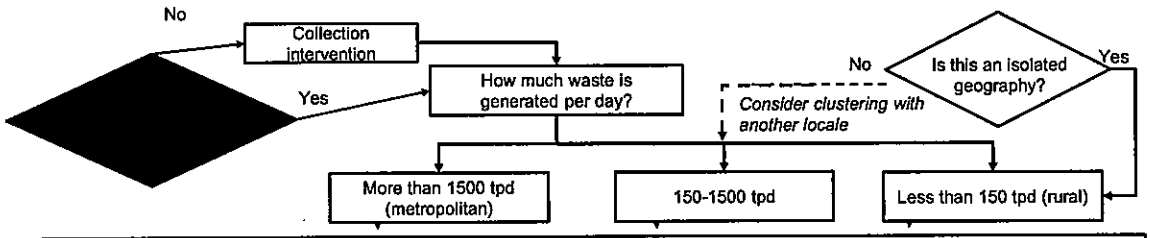
- Typically landfill based; supported via taxation or direct to consumer
- Issues in Emerging regions: No budget to create/enforce, risky due to frequent bidding, alternative is FREE!



Offtake – Waste as a resource

- Technology utilized to extract value from waste unique to the economy; Privatized and limited dependency local government
- Typically requires "economic propping" for off take pricing and/or dedicated off take customers

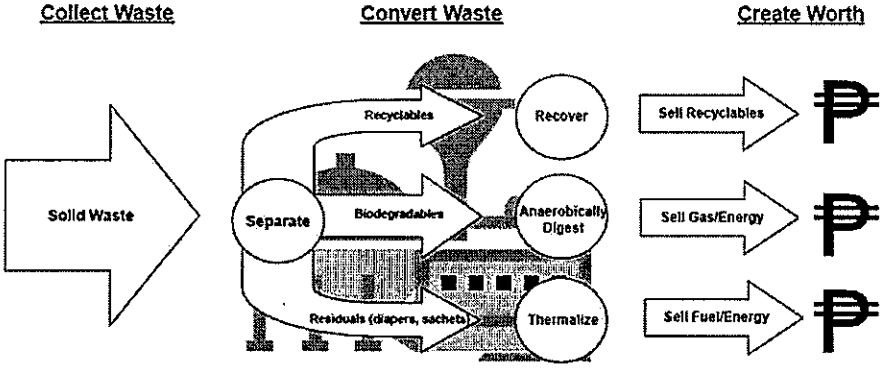
Waste 2 Worth Waste Offtake Algorithm



Economy needs	Outputs from waste treatment		
Localized			
Agriculture	• Fertilizer (AD, compost)	• Fertilizer (AD, compost)	• Fertilizer (AD, compost)
Construction/ roads	• Building materials (repurpose) • Ash (gas)	• Building materials (repurpose) • Ash (gas)	• Building materials (repurpose) • Carbon black (pyrolysis)
Refrigerated goods	• Biogas (AD) • Heat (stacked gas)	• Biogas (AD) • Heat (gas)	• Biogas (AD)
Textile	• Fibers (recycling)	• Fibers (recycling)	• Fibers (recycling)
Transportation/ fuel			• Fuel (pyrolysis) • Biogas (AD)
Generic			
Plastics	• Monomer (chem. recycling)	• Monomer (chem. recycling)	• Monomer (chem. recycling)
Electricity	• Electricity (stacked gas)	• Electricity (gas)	

Waste 2 Worth Angeles City Project

Waste as a Source of Value Creation



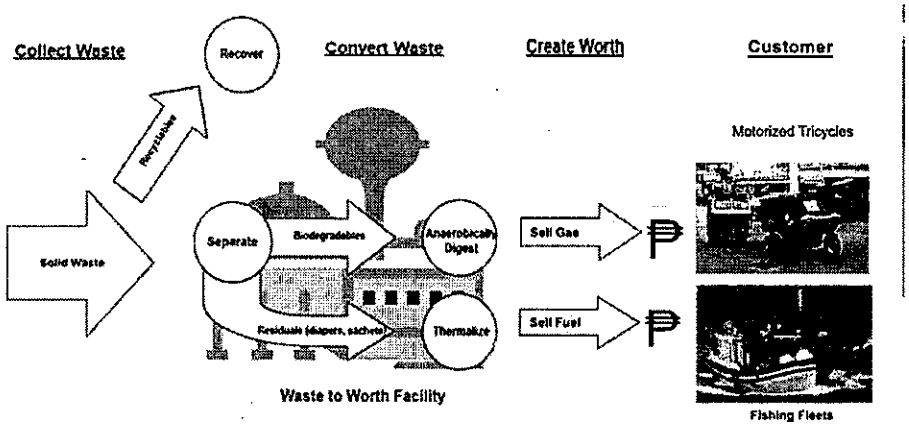
Waste to Worth Facility

Inputs	Output
230 T/day Municipal Solid and commercial waste - 41 % organic - 10 % recyclables - 49% residual	- 10T/day high value recyclate - Approx. 8-10 MW electricity - Less than 1T/day inert ash

Jobs Created - 18 skilled
- 52 unskilled

Waste 2 Worth Dagupan City Project

Waste as a Source of Value Creation



Waste to Worth Facility

Inputs	Output
30 T/day Municipal Solid and commercial waste - 39 % organic - 12 % recyclables - 49% residual	- 7T/day high value recyclate - Approx. 4000 liters diesel/day - Approx. .2100m3 biogas/day

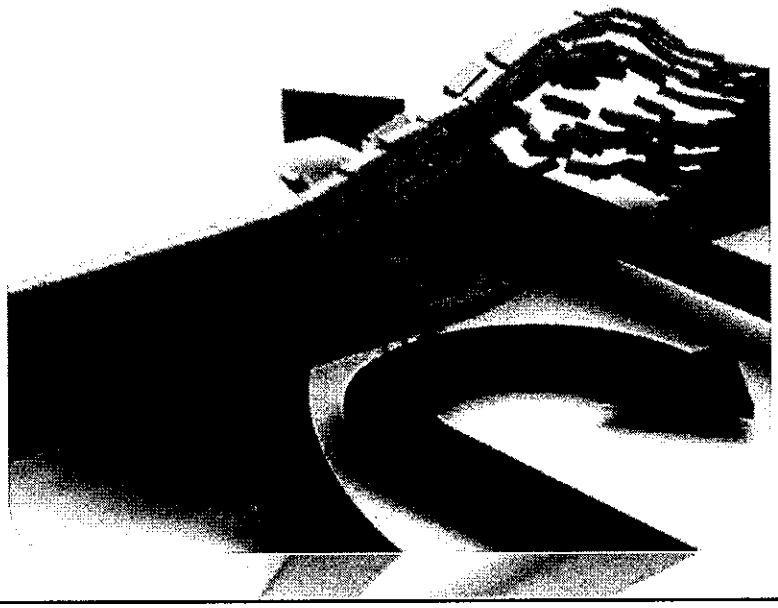
Jobs Created - 15 skilled
- 90 unskilled

Waste 2 Worth

Barriers

&

Enablers



Waste 2 Worth Barrier 1 – Economic Invest ability

- Off take pricing relative to more mature industries
- Tracking with commodity pricing
- Regulatory drains to financials

Enablers

✓Waste as "renewable energy – subsidy eligible
✓ Other off take subsidies – organic fertilizers, recycled material, natural gas, FITs
✓Tax holiday/abatements
✓Waiving of import duties

Waste 2 Worth Barrier 2 – Foreign investment/Politics

- Is waste a "natural resource" – foreign ownership limitations
- Ill defined PPP laws/regulations – and bad guys!
- Local administration succession risks to feedstock

Enablers

- ✓ Consistent definition of waste as "not natural"
- ✓ Incentive laden constructs for local governments
- ✓ Leveraging of municipal lenders
- ✓ Clarification of PPP laws when local governments incur minimal risk (i.e. not one size fits all)
- ✓ Consistent and clear technology guidelines

Waste 2 Worth Barrier 3 – Informal Sector

- Informal sector is often viewed as an investment risk
- Ill defined or misguided labor laws
- Ignoring informal sector will bring consequences

Enablers

- ✓ Resist the urge to "formalize" the sector
- ✓ Enact labor laws to enable leveraging of the sector as a competitive advantage
- ✓ Where applicable, mandate inclusion of informal sector into constructs

Waste 2 Worth In Conclusion – What can APEC do to stimulate this ?

1) Recommend policy to address investment barriers

✓Stimulate offtake pricing and enable construct cost reduction

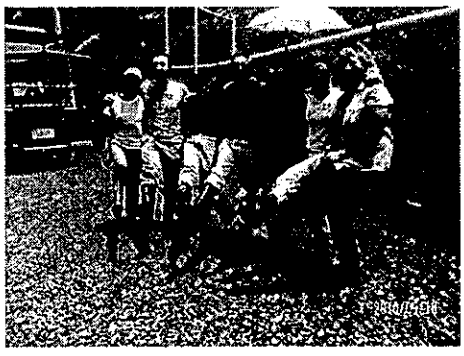
2) Create cross regional policy enablers to drive regulatory cooperation and consistency

✓Consistent definitions and PPP constructs

3) Harmonize technology and regulatory standards

✓Off take guidelines (such as WTE guidelines or recycled material specifications)

Thank You!



WASTE 2 WORTH

People + Purpose = Power

Jill Boughton, President & CEO

W2Worth Innovations

PRAISE

Packaging and Recycling Alliance for Indonesia Sustainable Environment

Coca-Cola · DANONE · Indofood · Nestlé Good Food, Good Life · Tetra Pak · Unilever

Vision & Mission

PRAISE

We are PRAISE

(Packaging and Recycling Alliance for Indonesia Sustainable Environment), an alliance founded by six companies to support a holistic, integrated and sustainable approach to packaging waste management in Indonesia.

OUR V

To be the main reference for best practices in sustainable packaging waste management solutions in Indonesia.

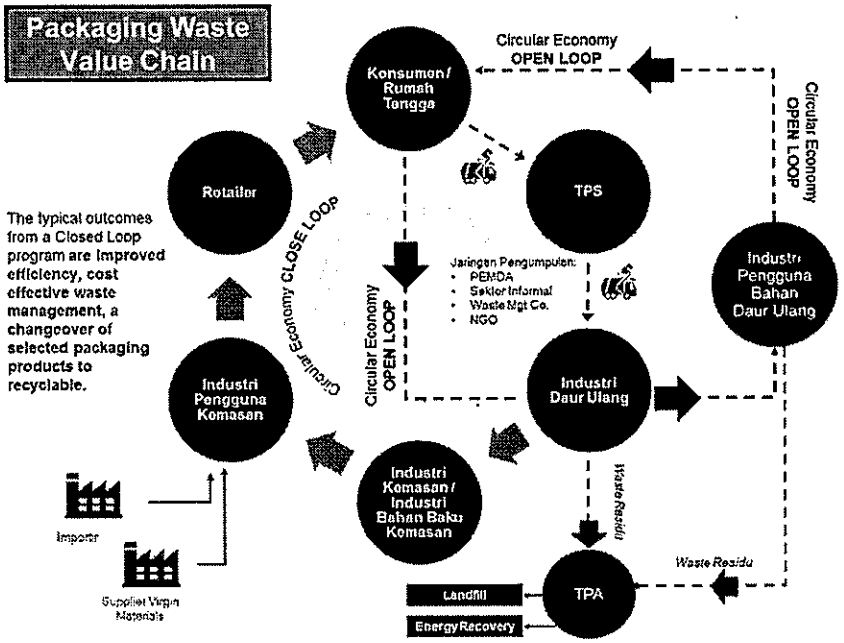
OUR MISSION

1. Create awareness of Extended Stakeholder Responsibility (ESR) as a multi-stakeholder integrated approach to waste management in line with the Circular Economy.
2. Strengthen capacity of members through research, education and collaboration.
3. Enlist participation of all stake-holders in government, private sector and public to actively take part in reducing impacts of packaging waste on the environment.

Coca-Cola · DANONE · Indofood · Nestlé · Tetra Pak · Unilever

Packaging Waste Value Chain as part of the Circular Economy

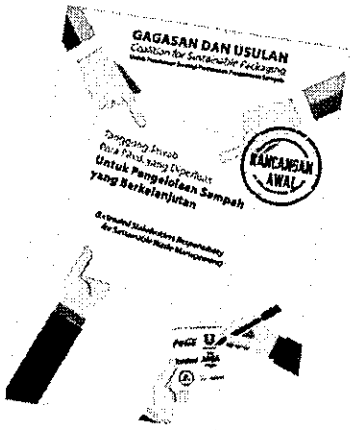
Extended Stakeholder Responsibility (ESR) is a multi-stakeholder framework which involves all parties across the value chain and is aligned with the Circular Economy concept



Policy Paper on ESR, 2015

PRAISE

- Identified challenges in accelerating waste management:
  1. Policy synchronization among relevant sectors
  2. Availability of national waste data
  3. Coordination among relevant parties
  4. Availability of technical implementation guidelines
  5. Suitability of policies in diverse local conditions



Policy Paper on ESR, 2015

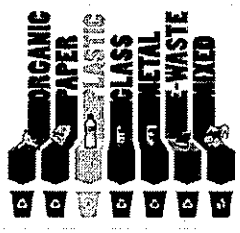
PRAISE

1. **Policy synchronization among relevant sectors**
   - Main stakeholders: Government, private sector and public
   - Current waste legislation based on principles of responsibility; sustainability; benefit; equality; awareness; cooperation; safety; security; economic value
   - Principles should be applied evenly and should not unfairly burden one party
   - Delineate responsibilities of all parties
   - Recognize role of informal sector
   - Promote public education campaigns to change consumer behavior
   - Establish regulations on standardization of TPS, TPA, infrastructure (municipal landfills) and recycling businesses

Policy Paper on ESR, 2015

PRAISE

2. **Availability of an up-to-date national waste database**
   - Types of waste generated, amount of waste based on characteristics such as easily degradable, difficult to degrade and not degradable or recyclable
   - Database is useful to establish waste handling priorities
   - Existence of an integrated and up-to-date national waste database should be a basic requirement before determining the roadmap towards acceleration of waste management.
   - Use as starting point to establish milestones on sustainable waste management

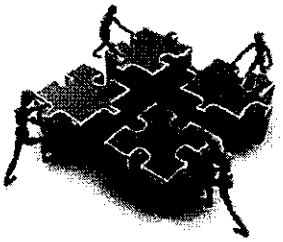


Policy Paper on ESR, 2015

PRAISE

3. Coordination among relevant parties

- Collaborative, institutional approach
- Strengthen coordination among various ministries, agencies and/or institutions at the national and regional level
- PRAISE members voluntarily implement sustainable production and consumption initiatives:
  - Production process:
    Weight reduction, R&D on raw materials, design innovations, new packaging technologies
  - Post-consumption:
    Education, waste banks, technical assistance to recyclers; R&D in recycling technologies

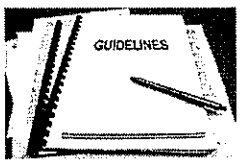


Policy Paper on ESR, 2015

PRAISE

4. Availability of technical implementation guidelines

- Guidelines on implementation that provide clarity, uniformity and standardization
- Focus on business cycle and business process



5. Suitability of policies in diverse local conditions

- Ensure good understanding of actual conditions at local level
- Establish pilot program that demonstrates the principle of ESR at work, in which all partners have a role to play
- Strengthen, accelerate, and support waste management regulations in districts/cities which can be replicated in other areas
- Measurable and actionable results with continuous monitoring of progress

Topics for further elaboration

PRAISE
Packaging and Recycling Alliance for Indonesia Sustainable Environment

- Understanding of sustainable production and consumption
- Credible labelling and certification standards
- Increase demand for recycled products through education and incentives
- Implement 'Green procurement' policies to drive wider implementation

Our Focus

PRAISE

Support the establishment of ESR framework to optimize the potential of instituting a sustainable *Circular Economy* model

ADVOCACY
To drive implementation of ESR framework into waste management policy in Indonesia

RESEARCH & EDUCATION
To create awareness about the importance of sustainable waste management practices

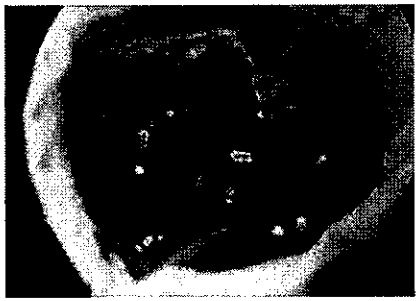
PARTNERSHIPS & COLLABORATION
To empower stakeholders through collaborative action

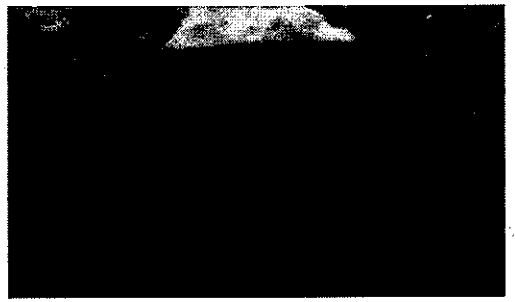
In partnership with government and all relevant stakeholders to support a holistic, integrated and sustainable approach to packaging waste management in Indonesia.

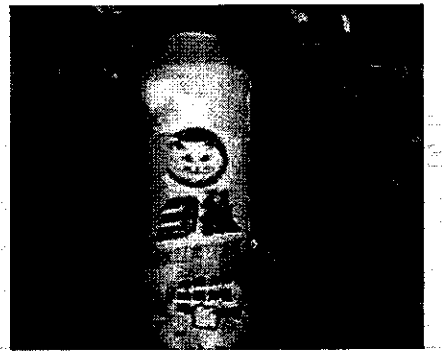
環境省
Ministry of the Environment

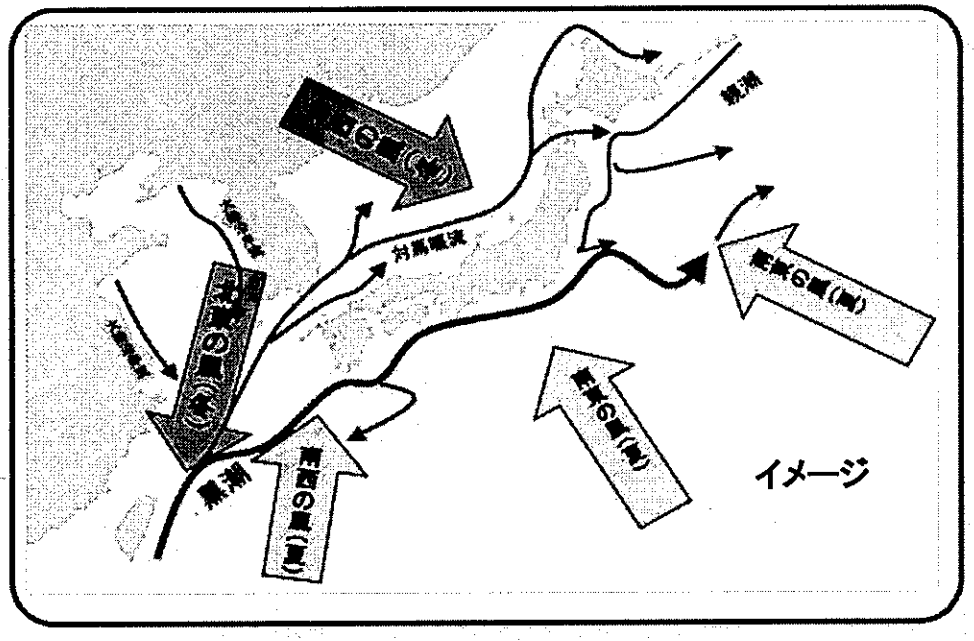
Marine Litter and Waste Management Policy in Japan

環境省
Ministry of the Environment









Cooperation under Marine Litter Law in Japan

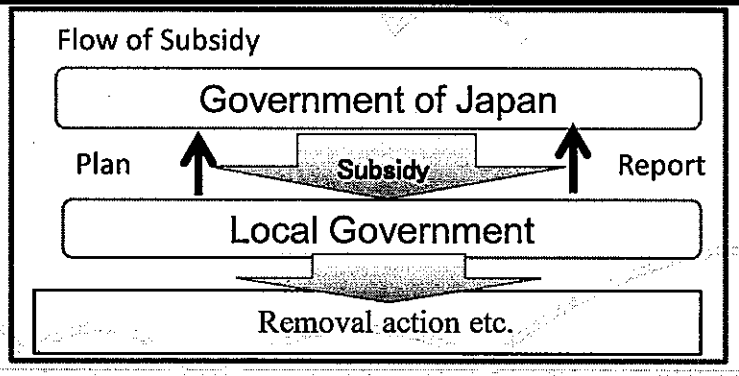
Subsidy Project
to Local government for cleaning up coast, reducing generation etc.

National Budget ⇨

2009 - 2012 About **54 million US$**
2013 - 2014 About **91 million US$**
2015 About **26 million US$**
2016 About **27 million US$**

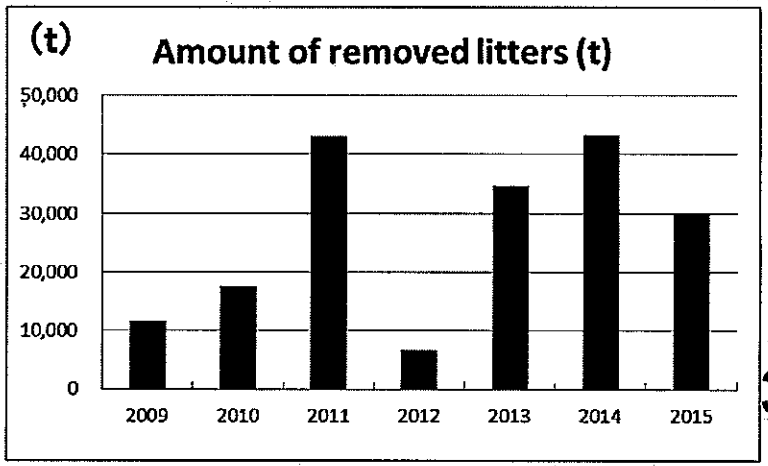
US$1= JY110

- **Subsidy money can be used for**
  - **Cleaning up coast**
  - **Reducing generation**
- **From 2015, removing drifting and sea bed litters is added to the menu of subsidy.**



Result of Subsidy Project by Government of Japan

Fiscal year	2009	2010	2011	2012	2013	2014	2015	2016
Budget (Thousand US$)	54,182				90,800		25,910	27,272
Used Budget (Thousand US$)	2,182	14,073	29,127	5,464	29,945	45,318	24,536	—
Amount of removed litters (t)	11,760	17,584	43,058	6,617	34,610	43,259	30,100	—

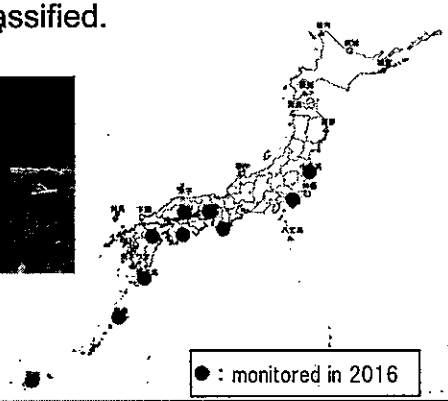


Marine Litter Research by MOE

Monitoring on marine litter is conducted on the coasts around Japan, and visual observation of floating marine litter, microplastics survey and seabed marine litter survey are conducted in coastal waters (Mutsu Bay, Toyama Bay and Wakasa Bay in 2016) and open oceans by the Government of Japan.

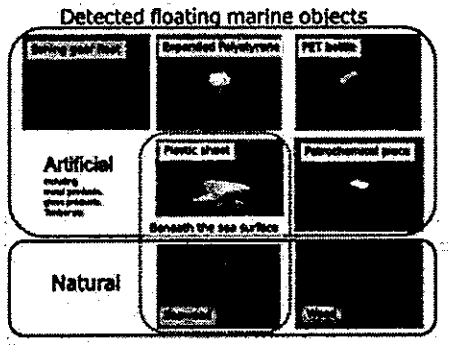
Marine Litter Monitoring on the coasts

Marine Litter Monitoring is conducted on 28 coasts for 5 years. Information concerning amount, items, composition and languages on the label(showing the origin), etc. of marine litter is collected and classified.



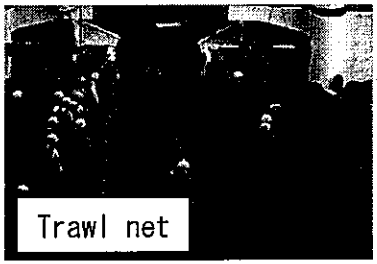
Visual Observation of floating marine litter

Floating marine litter is observed visually from vessels in coastal waters and open oceans. Density and amount of marine litter are estimated on each ocean.



Seabed Marine Litter Survey

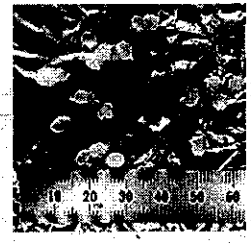
Seabed marine litter is monitored with trawl net in coastal waters and open oceans. Density and amount of marine litter are estimated.



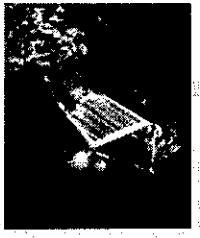
Microplastics survey

Microplastics survey is conducted to promote research on marine pollution. Concretely, the following items are researched,

- distribution of microplastics around Japan
- amount of hazardous chemical substances such as PCB adsorbed on microplastics



Resin pellet



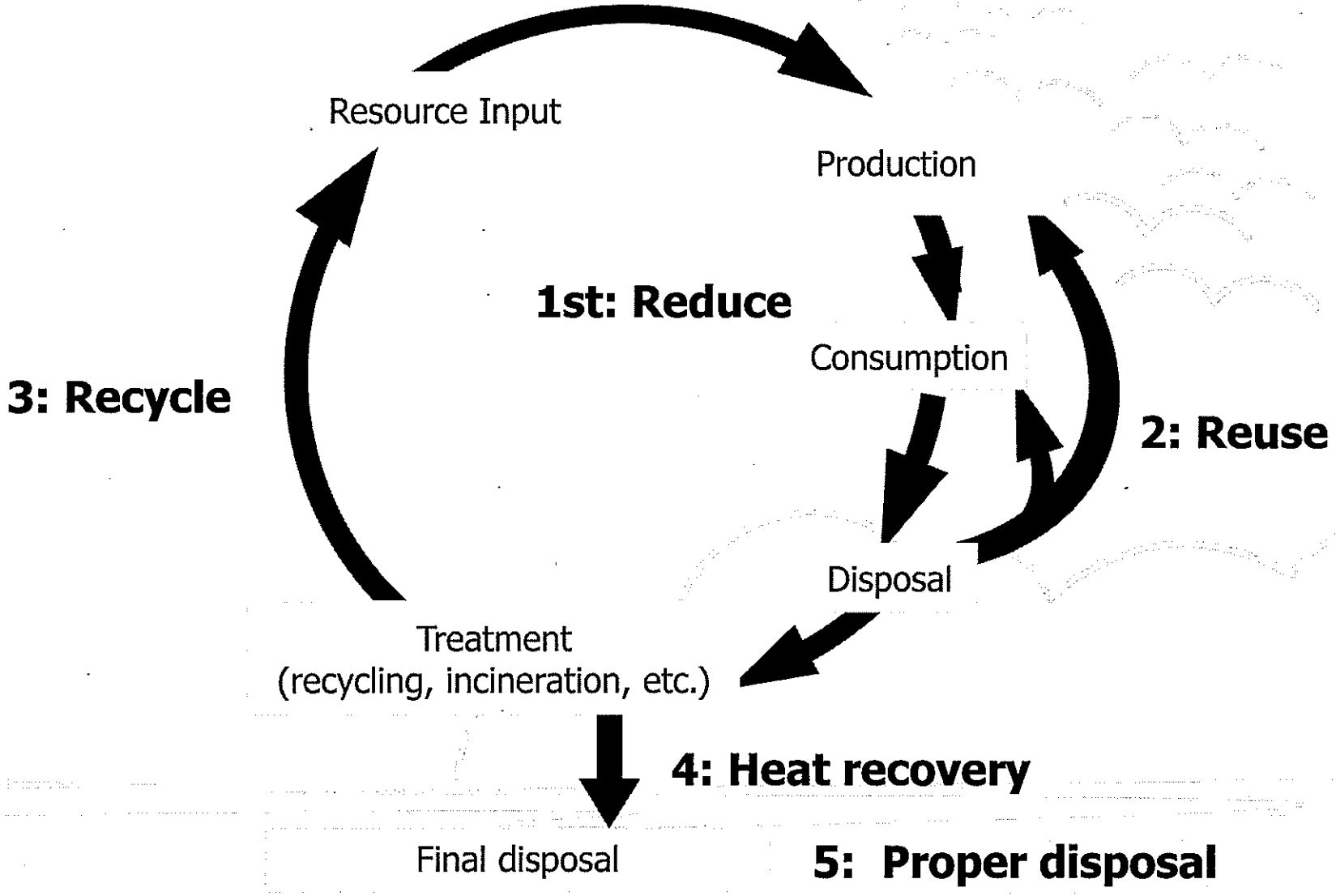
Net sampling

Counting with microscope

環境省
Ministry of the Environment

3R (Reduce, Reuse, Recycle)Principle

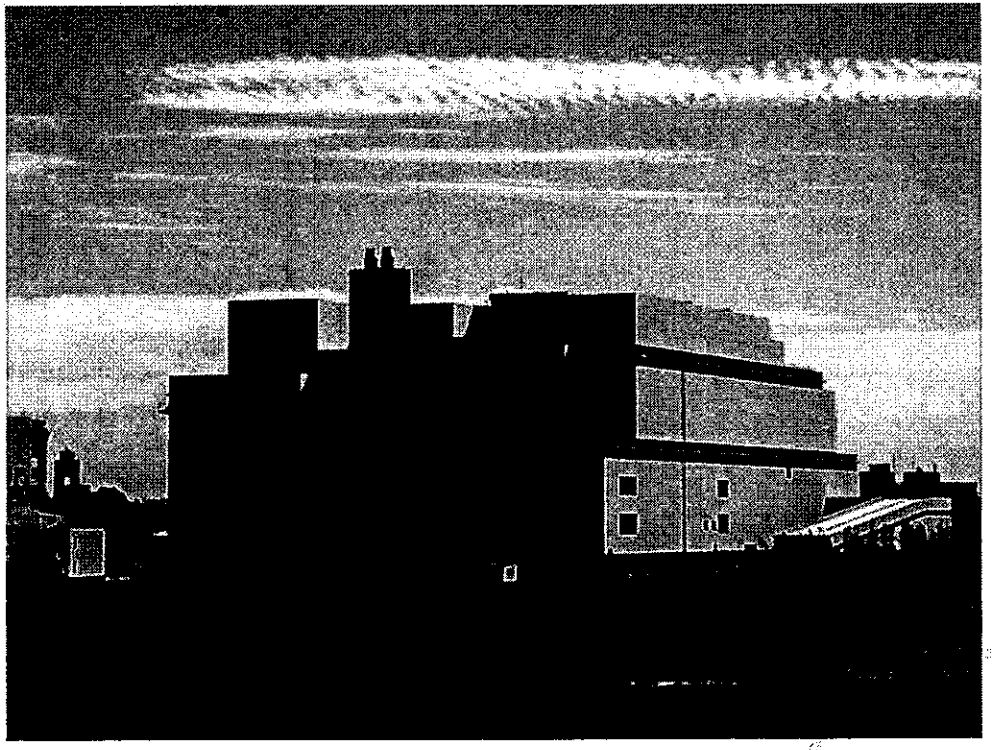
To prevent marine litter, sound waste management system on the land is indispensable.

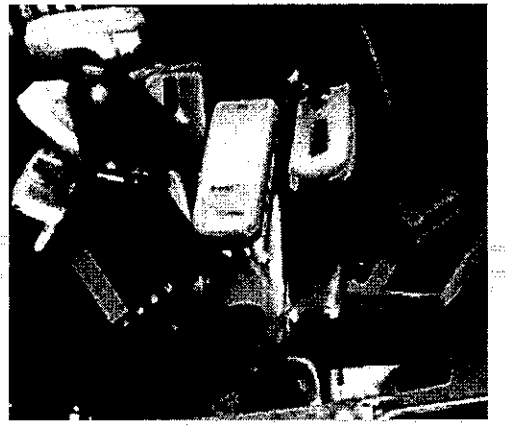


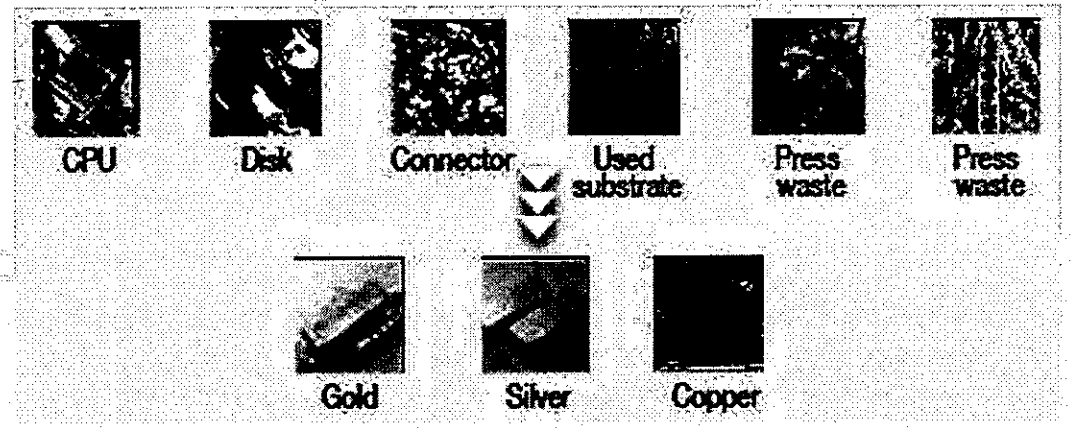
Fundamental Law for Establishing a Sound Material-Cycle Society

環境省
Ministry of the Environment

Sound Waste Management On the Land



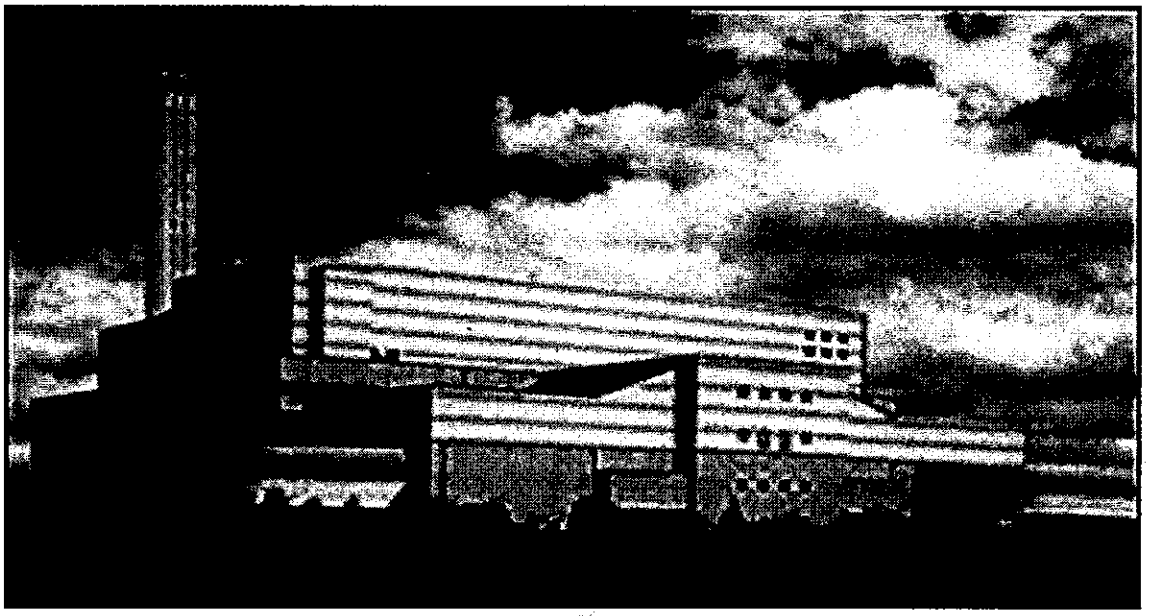




Ex.) Japanese Case
Government Subsidy Program for Material-Cycle Society

57% of the total waste management-related MOEJ budget (FY2016)

▶ To install a high-quality waste management facility in local regions
In the long run, high-quality waste management facility is much more beneficial



- Should meet the technical criteria
- If a planned facility meet the higher criteria like high-efficiency of power generation, a local government can receive ½ of the initial cost.

ex) **Local governments can receive 1/2 or 1/3 of the initial cost <u>if their planned facility meet the criteria of the subsidy</u>**

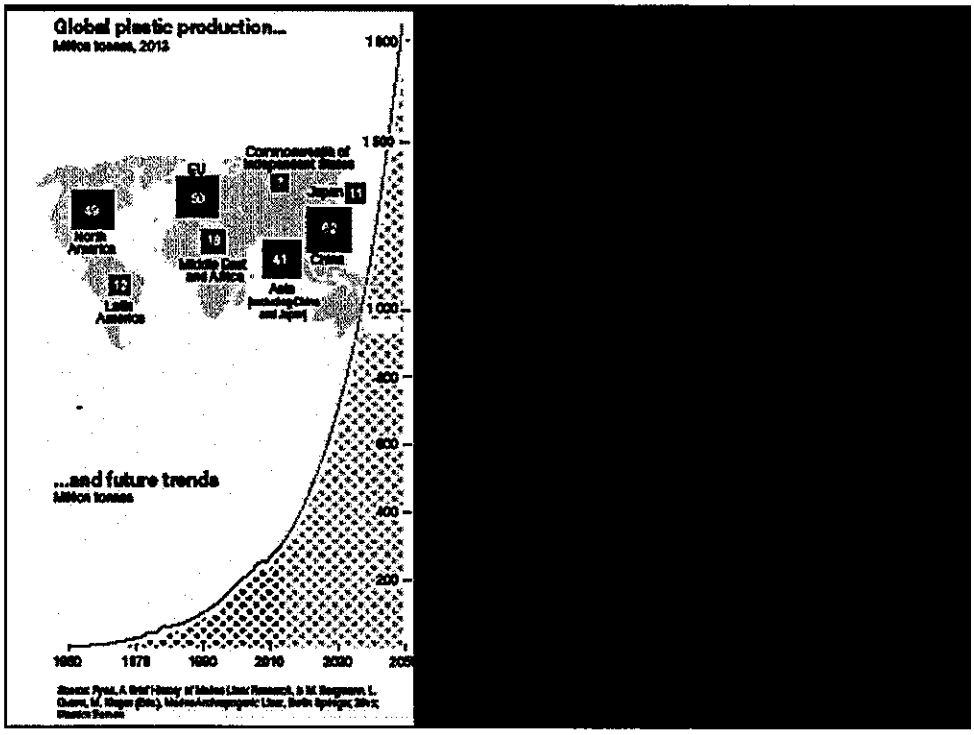
The important thing when establishing a feasible business model of waste management project is ・・・

Waste Management Facility must not be "Cheap and Nasty" We get "what we pay for" Otherwise it will be much more costly in the long run

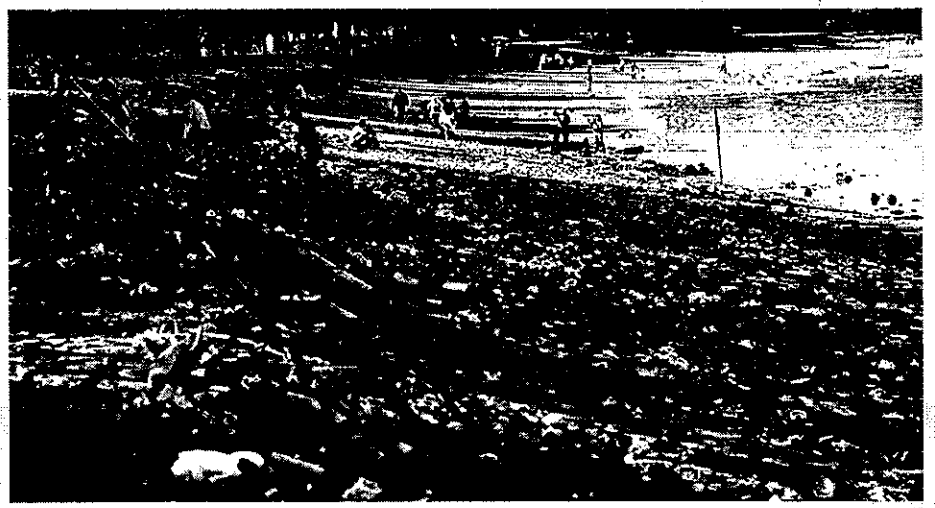
ACCELERATION OF MARINE DEBRIS REDUCTION IN INDONESIA

MMAF PROGRAMS

DIRECTORATE GENERAL OF MARINE SPATIAL PLANNING
MINISTRY OF MARINE AFFAIRS, REPUBLIC OF INDONESIA
BALI, 5 SEPTEMBER, 2017



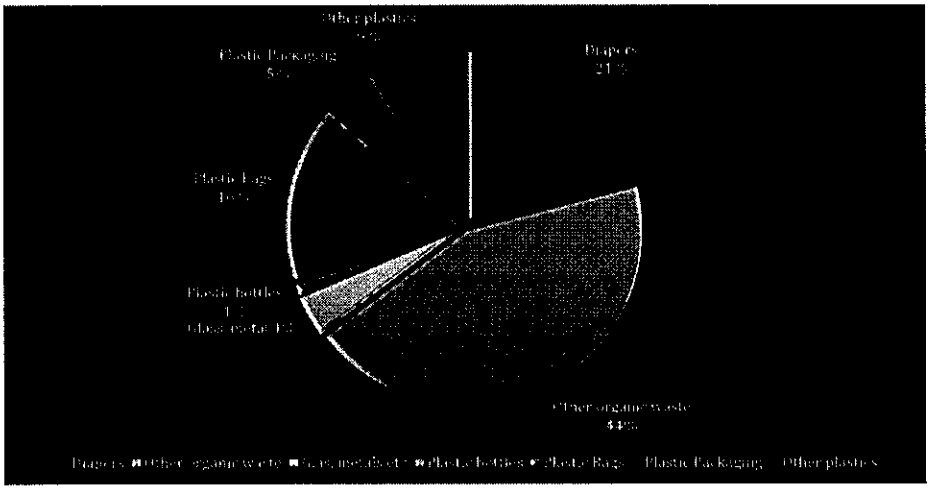
The Marine Debris Problem



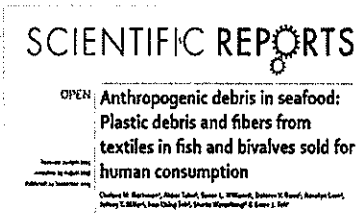
Marine Debris from other islands that landed on Kuta Beach, Bali, February 2017

The World Bank Review

Average Waste Composition from Indonesia's Waterways entering the Sea



THE WORLD BANK
IBRD • IDA


SCIENTIFIC REPORTS

OPEN Anthropogenic debris in seafood: Plastic debris and fibers from textiles in fish and bivalves sold for human consumption

The Impacts of Marine Plastic Debris

JOINT STUDY HASSANUDIN UNIVERSITY AND UC DAVIS
24 December 2015

PAOTERE FISH MARKET: Makassar

76 fish of 11 species
28% of fish eat plastic with debris size 0.1 – 1.6 mm

HALFMOON BAY FISH MARKET: California

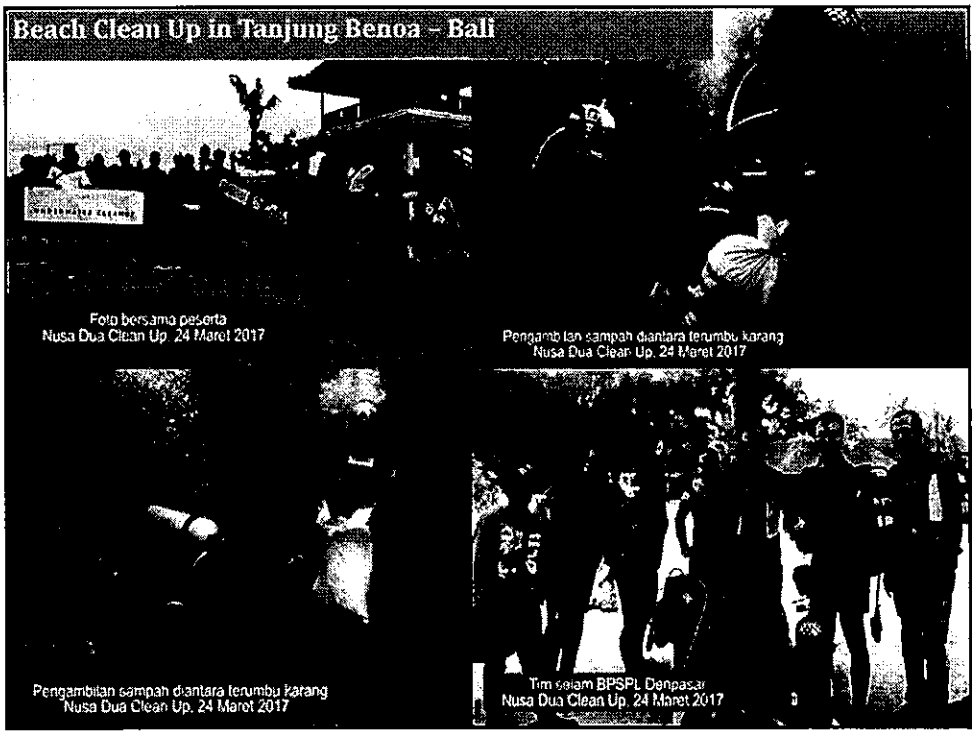
64 fish of 12 species. 12 shellfish.
67% of fish and 25% of shellfish eat plastic with debris size 0.3 – 5.9 mm

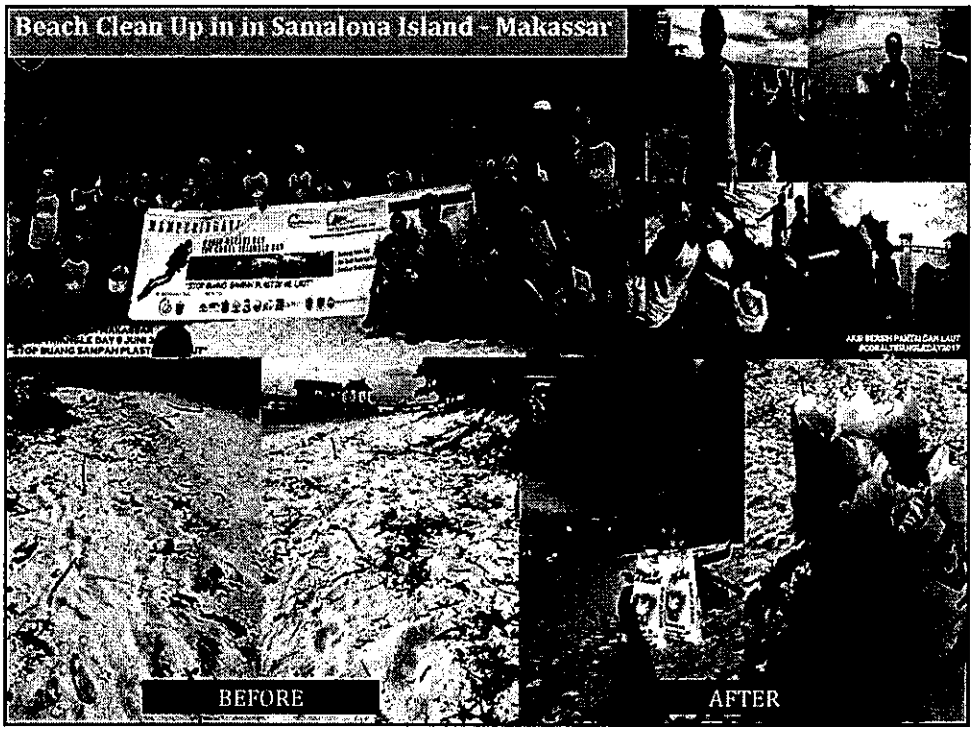
5

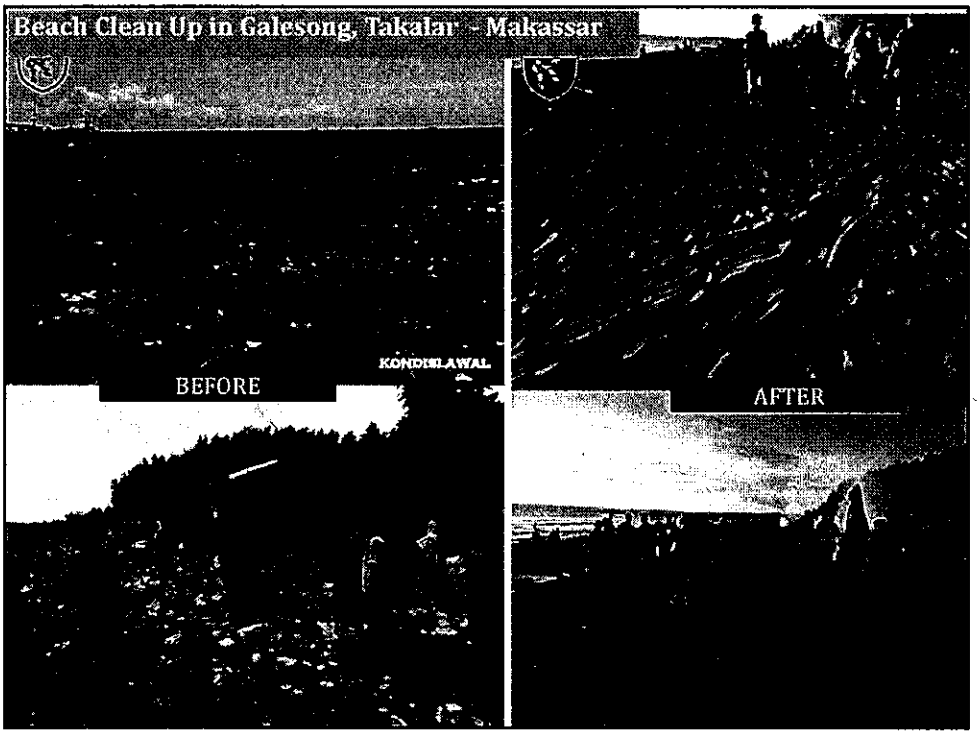
MMAF Progress to Date

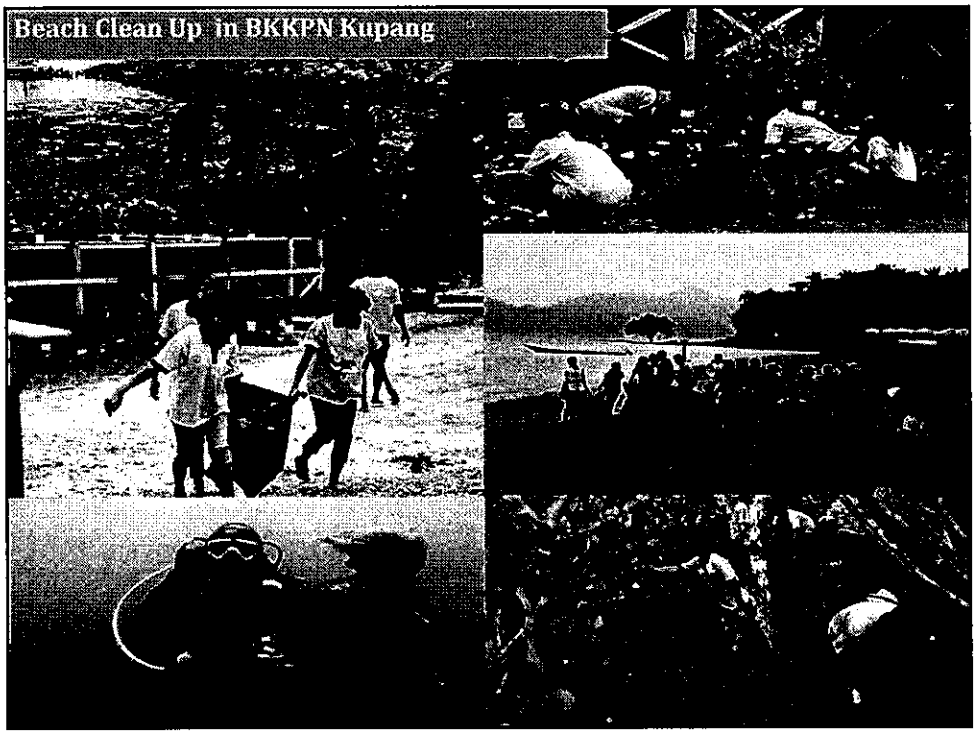
- Gita Laut (*Gerakan Cinta Laut*) is a national public awareness movement to reduce marine waste and pollution and to conserve coastal ecosystems including Beach Clean Up, Sekolah Pantai, Jambore
- Beach Clean Up (*Gerakan Bersih Pantai*) and Underwater Clean Up have been done under DG of Marine Spatial Planning (BPSPL/BKKPN) in Bali, Kupang, Makassar, Wakatobi, Pangandaran, Lampung, Demak and Pontianak
- A national action program of beach clean up to remove marine debris will be carried out in Sabang, Batam, Cirebon, Labuanbajo and Wakatobi from the third week of September to the end of November 2017
- A workshop on Marine Debris Pollution was held in Bali in March 2017 to make a draft marine debris national action plan led by Menko mar, and then followed up by MMAF with its vertical line agencies


Beach Clean Up in Nusa Dua Bali
Keberangkatan menuju Lokasi penyelaman
Nusa Dua Clean Up, 24 Maret 2017
Pengambilan sampah diantara terumbu karang
Nusa Dua Clean Up, 24 Maret 2017
Sebagian sampah yang terkumpul,
Nusa Dua Clean Up, 24 Maret 2017
Sambutan oleh GM Conrad Bali Hotel
Nusa Dua Clean Up, 24 Maret 2017


Beach Clean Up in Tanjung Benoa – Bali
Foto bersama peserta
Nusa Dua Clean Up, 24 Maret 2017
Pengambilan sampah diantara terumbu karang
Nusa Dua Clean Up, 24 Maret 2017
Pengambilan sampah diantara terumbu karang
Nusa Dua Clean Up, 24 Maret 2017
Tim selam BPSPL Denpasar
Nusa Dua Clean Up, 24 Maret 2017


Beach Clean Up in in Samalona Island - Makassar
BEFORE
AFTER


Beach Clean Up in Galesong, Takalar - Makassar
BEFORE
KONDISI AWAL
AFTER



MMAF's FUTURE PLANS AND DIRECTIONS

- Regulations (Law Numbers: 27/2007 jo 1/2014, 32/2014)
- Building commitment among national/local government/ non-government organizations
- Building coastal community awareness through socialization with a view to fishing ports and fishing villages
- Improve sanitary facilities in Coastal and Small Islands
- Innovation in marine plastic debris processing that has an economic value
- Proposed Presidential Decree to eradicate and to endorse mari ne plastic debris reduction and a related action plan

MMAF Commitment in the National Plan of Action for Marine Plastic Debris Prevention and Management

1. Beach Clean Up (Gerakan Bersih Pantai dan Laut)

Location	Time Schedule in 2017
Labuan Bajo, Kab. Manggarai Barat	Fourth week of September
Kota Batam, Kepulauan Riau	First week of October
Kota Cirebon, Jawa Barat	Fourth week of October
Kab. Wakatobi, Sulawesi Tenggara	Second week of November
Kota Sabang, Aceh	Fourth week of November

MMAF Commitment in the National Plan of Action for Marine Plastic Debris Prevention and Management

2. Waste Processing Machinery (Plastic Crusher, Conblock and Composting)

P4K	Plastic Crusher, Conblock	PPS Muara Baru, PPI Muara Angke	-	-
BPSPL PADANG	Plastic Crusher, Conblock	PPS Bungus, PPS Belawan	Composting	Batam
BPSPL PONTIANAK	Plastic Crusher	TPI Alah-Alah Besar	Composting	TPI Sungai Nibung
BPSPL DENPASAR	Plastic Crusher, Conblock	PPI Kedonganan, Kenjeran/ Brondong, Gili Matra	Composting	Nusa Penida/ PPP Tenau
BPSPL MAKASSAR	Plastic Crusher, Conblock	PPS Bitung, Teluk Gorontalo	-	-
LPSPL SERANG	Plastic Crusher	Labuan	Composting	PPS Cilacap, Tegal
LPSPL SORONG	Plastic Crusher	Kota Sorong	Composting	Kota Ambon

MMAF Commitment in the National Plan of Action for Marine Plastic Debris Prevention and Management

3. Sekolah Pantai (Beach Training)

Location	
Aceh	Kota Sabang
Jawa Barat	Kabupaten Pangandaran
NTT	Kabupaten Lembata
Papua	Kabupaten Merauke

4. Jambore Nasional (National Scout Jamboree)

Location	
Jawa Barat	Kabupaten Cirebon
	Kabupaten Pangandaran

NATIONAL PLAN OF ACTION FOR MARINE PLASTIC DEBRIS PREVENTION

Serves as a national guideline and reference for National/ Local Governments and Stakeholders for implementation to:

1. **Reduce** marine plastic debris in the Indonesian waters
2. **Prevent** marine plastic debris from entering the sea
3. **Increase** research and innovation on marine plastic debris prevention
4. **Enhance law enforcement** on waste entering the seas.

FIVE STRATEGIES FOR IMPLEMENTING THE NATIONAL PLAN OF ACTION

1st Strategy at Local Government level

- Strengthening human and financial resources, infrastructure management and behavior change
- Developing an integrated coastal management project
- Improving river catchment authorities to filter out plastic waste from river mouths

2nd Strategy at National level

- Enhancing stakeholder awareness through education, outreach and public campaigns
- Convertion of waste to energy
- Implementation of a paid plastic bag policy
- Utilization of plastic debris as asphalt mix for making "plastic tar roads"
- Processing plastics into other economic materials

FIVE STRATEGIES FOR IMPLEMENTING THE NATIONAL PLAN OF ACTION

3rd Strategy at International level

- Reducing transboundary marine debris moving over the sea
- Reducing marine debris from sea transportation
- Developing int. financial pledges to create a trust fund
- Setup pilot projects in chosen municipalities and for new a nd better waste management in other municipalities

4th Strategy at Industrial Sector

- The use of bio degradable plastics
- Foreign investment for the bio degradable plastic industry
- Manufacturers of plastics and related products have to be involved actively in the efforts to manage plastic wastes
- Introduction of 3 R (Reduce, Reuse, Recycle) principles.

5th Strategy at Academic and Community Organizations

- Research and development
- Campaigns
- Waste Bank (*Bank Sampah)*

CONCLUSION

1. MMAF is conducting a range of efforts to accelerate waste managem ent solutions to reduce marine litter. These include Gerakan Bersih Pantai dan Laut, Sekolah Pantai, Jambore Pesisir, Bye Bye Plastic Cam paign, providing plastic processing machinery in the fishing port, etc.

2. Marine Debris, and especially plastic, is not just an Indonesian issue, but rather a global concern, therefore regional coopera- tion is espec ially important between APEC countries;

3. Indonesia is creating a National Plan of Action by presidential decree on marine debris management;

4. Indonesia invites other countries to join it in education cam- paign s and pilot projects to combat marine debris. Especially appropriate is development of pilot projects in APEC countries and the Indian Oc ean Rims Association (IORA) region.

CLOSED LOOP *partners*

Financing Waste & Recycling Innovation and Infrastructure in Developing Markets

The information contained in this presentation is being provided for information purposes only to a limited number of financially sophisticated persons who have expressed an interest in the matters described herein. The Presentation does not constitute an offer to sell, or a solicitation of an offer to purchase, any securities. Any such offer or solicitation will be made in accordance with applicable securities laws.

The Closed Loop Fund is a social impact fund investing up to $100M to increase the recycling of products and packaging.

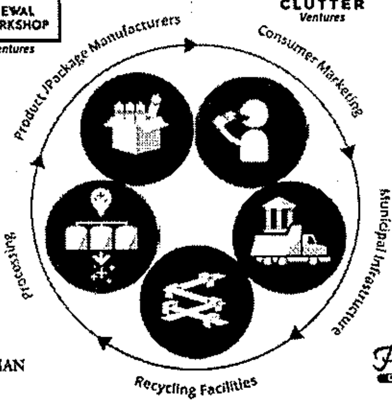
Investors include: 3M, Goldman Sachs, Unilever, P&G Procter & Gamble, Walmart, Coca-Cola, Dr Pepper Snapple, Johnson & Johnson Family of Consumer Companies, Colgate-Palmolive, Keurig Green Mountain, PepsiCo

CLOSED LOOP partners

Invests in Innovation, Companies, and Infrastructure that Turn Waste into Value, Optimize Supply Chains

Incubate	Commercialize	Scale
CLOSED LOOP foundation	CLOSED LOOP ventures	CLOSED LOOP fund
Partners	Investors	Investors
Goldman Sachs, Walmart Foundation, SC Johnson A Family Company, The Henry and Jean Fisk Foundation, Heineken	Family offices, institutions, individuals interested in strong financial returns and measurable social impact. Impact First Investments, tonic	Coca-Cola, P&G Procter & Gamble, Unilever, PepsiCo, Walmart Foundation, Keurig Green Mountain

End-to-end Investment Strategy to Accelerate Holistic Recycling Systems



The Renewal Workshop — Ventures

Curb Your Clutter — Ventures

Foundation

HomeBiogas — Ventures

Quad Cities — Fund

Momentum Recycling — Fund

City of Memphis — Fund

Zzyzx Polymers — Foundation

QRS, Canusa Hershman Recycling Company — Fund

Portage County — Fund

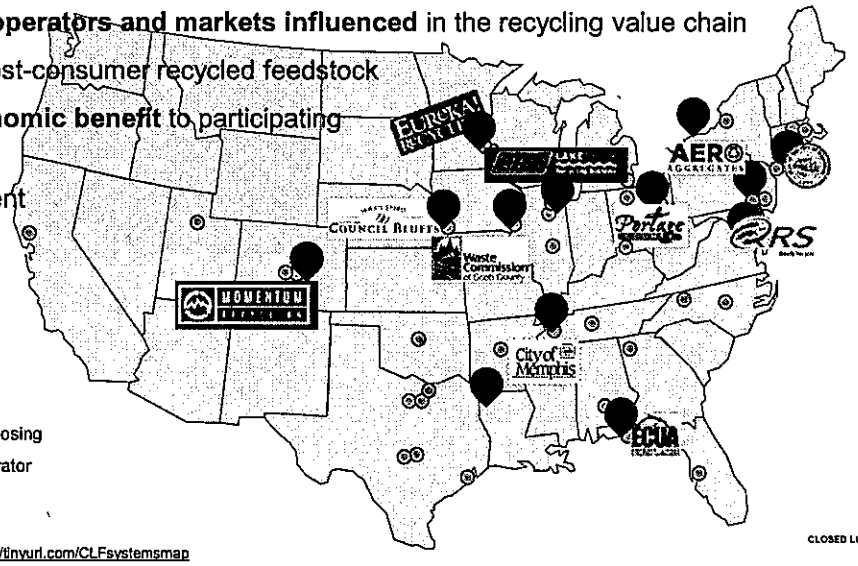
LRS Lakeshore Recycling Systems — Fund

AMP Robotics — Ventures

Trash Free Seas Alliance · Ocean Conservancy · CLOSED LOOP partners · PAGE 4

The First 12 CLF Investments: From Collection to Manufacturing

- Improved recycling access and diversion for at least **4.1M households**
- **30+ affiliated operators and markets influenced** in the recycling value chain
- **4M+ tons** of post-consumer recycled feedstock
- **$17M+ of economic benefit** to participating municipalities
- **3X** co-investment ratio



Export markets (e.g., Canada)

CLF Deal closed / Near-closing
Affiliated / influenced operator
Early pipeline

Also refer to Interactive map: https://tinyurl.com/CLFsystemsmap

Example Public-Private Investment: Scott County Waste Commission

The County's aging recycling equipment needed to be replaced, so the Commission pursued a change from dual to single stream recycling. Needed $10.7m+ to provide new 50,000 carts, trucks, and upgrade their facilities, but the city wouldn't approve the full amount due to other obligations.

CLF Investment: $2.7 million loan for 7 years, paid back by commodity revenue and landfill savings

Capital Unlocked: $8.0 million from a municipal bond offering

Status: The recycling program is a 6%+ net positive contributor to the Commission's overall budget.

TONS DIVERTED	GHG AVOIDED (MTs)	JOBS CREATED	ECONOMIC BENEFIT TO MUNICIPALITIES
3,762	**20,628**	**7** FTE	**$136,905**
88,000 diverted by 2025	248,000 by 2025	9 by 2025	Dollars saved
			>$2.5M in by 2025

■ Progress as of Jan 2017
■ Projected by 2025

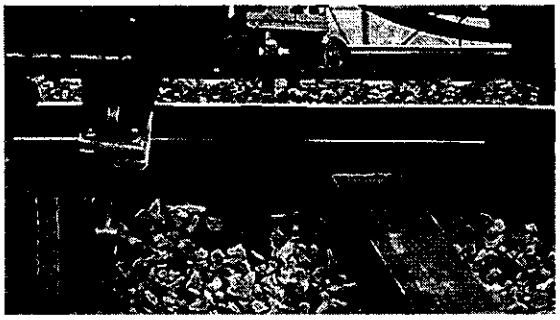
Example End Markets Investment:

Many plastics collected for recycling have limited markets and end up as waste. In order to incentivize recycling systems, more end-markets for plastics need to develop. Integrico **buys** waste rigid and film plastics and use them to manufacture high value railroad ties, which are also recyclable at end of life

CLF Investment: Up to $2.8 million loan for 7 years, paid back by sales of railroad ties

Capital Unlocked: $6.0 million of equity financing from private investors

Status: The facility presently has pre-sold all capacity through 2017. CLF capital is add a second line to boost production, currently under construction.



TONS DIVERTED	GHG AVOIDED (MTs)	JOBS CREATED
184,000 diverted by 2025	209,000 by 2025	125 by 2025

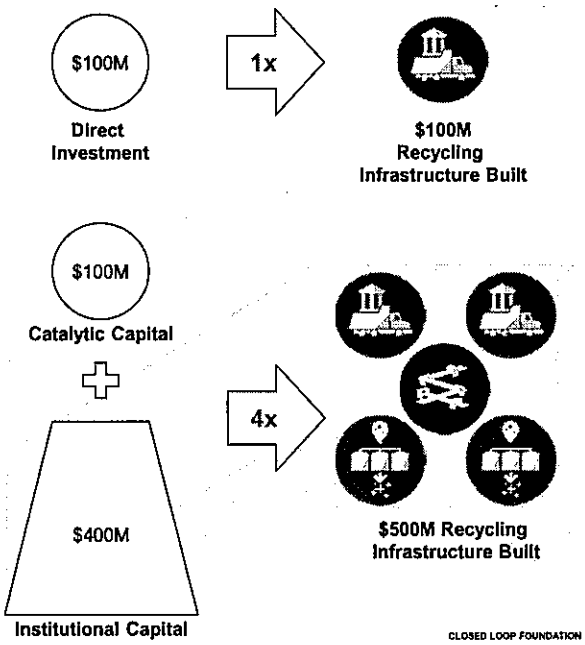
■ Projected by 2025

CLOSED LOOP FOUNDATION | PAGE 7

Catalytic Capital is...

A small, finite amount of risk-tolerant, concessionary financing with the ability to:

- Leverage unique corporate networks
- Attract institutional investors
- Unlock significant capital to build holistic recycling and waste infrastructure systems



CLOSED LOOP FOUNDATION | PAGE 8

Exploring an International Financing Platform

3M P&G PEPSICO

TRASH FREE SEAS ALLIANCE® American Chemistry Council Ocean Conservancy

Implementing a Phased Approach to Building an International Platform: Phase I

Deliverables

1) Country landscape and selection
2) Criteria development and investment strategy
3) Shortlist of investment partners
4) 5-10 potential investments mapped
5) Draft playbook for other funds and markets

Opportunities

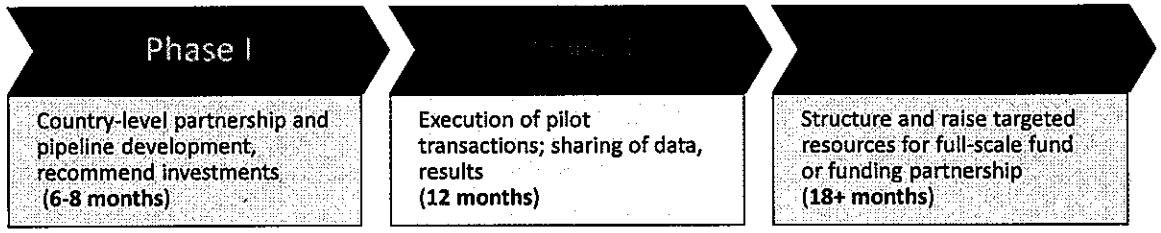
Looking for investments, project developers, implementation partners, and co-investors.

Phase I		
Country-level partnership and pipeline development, recommend investments **(6-8 months)**	Execution of pilot transactions; sharing of data, results **(12 months)**	Structure and raise targeted resources for full-scale fund or funding partnership **(18+ months)**

Implementing a Phased Approach to
Building an International Platform: Phase II

Deliverables

1) ~3 investments closed, monitored
2) Initial results analyzed and released
3) Playbook for other countries or regions completed and released

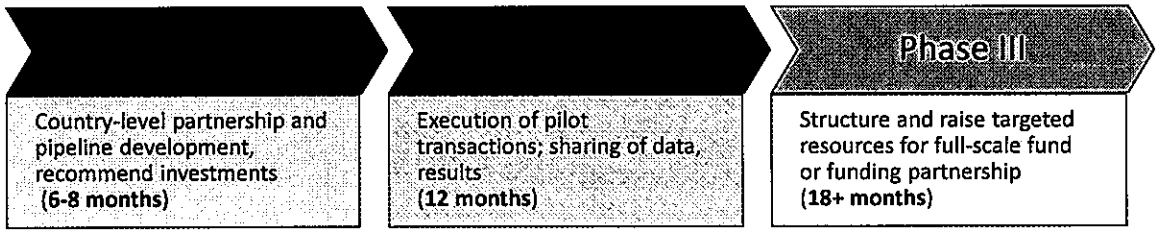


TRASH FREE SEAS ALLIANCE® Ocean Conservancy® CLOSED LOOP partners

Implementing a Phased Approach to
Building an International Platform: Phase III

Deliverables

1) Formation of International Financing Platform



TRASH FREE SEAS ALLIANCE® Ocean Conservancy® CLOSED LOOP partners

Discussion and Questions

Catalytic Capital Models in Healthcare, Fisheries, and Small Business

First Loss

BILL & MELINDA GATES *foundation* + GLOBAL HEALTH INVESTMENT FUND

First loss position funded by Gates unlocked over $100M from JPMC, IFC, Merck, Pfizer to invest in emerging drug solutions

JPMORGAN CHASE & CO. Pfizer

Grant-seeded

SHELL FOUNDATION + OPIC + symbiotics + Calvert Foundation

Fund incubation funded by grants from Shell & others; Leveraged senior debt from OPIC, Calvert, & Symbiotics; Completed >$70M in SME loans & issued SME bond in India

Guarantees

althelia ecosphere + USAID FROM THE AMERICAN PEOPLE + CREDIT SUISSE

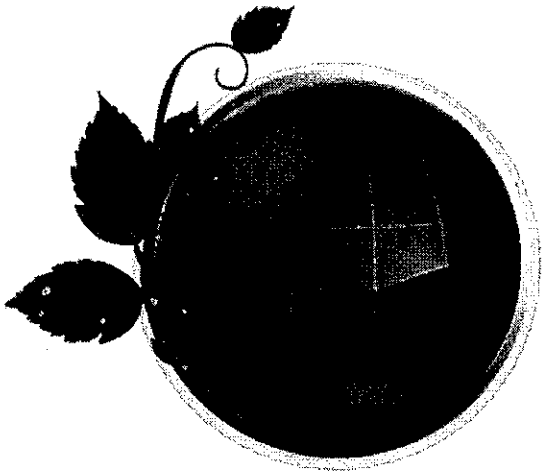
$100M sustainable oceans fund; USAID provides 50% guarantee to unlock $15M from Credit Suisse and others

Below Market Rates / Risk-Tolerant

CLOSED LOOP *fund* + Bank of America + Comerica

CLF makes investments more attractive through lower cost of capital, subordination, early stage: 3x-4x co-investment ratio per transaction

CLOSED LOOP FOUNDATION | PAGE 14



TLFF

TROPICAL LANDSCAPES FINANCE FACILITY

Introduction

- Indonesia has a funding gap in excess of USD 20 billion for projects that address climate change mitigation and adaptation through, inter alia, inclusive access to energy, improved smallholder productivity, rural livelihoods and poverty alleviation

- The Tropical Landscapes Finance Facility (TLFF) seeks to provide the world's first ever landscapes protection and rural livelihood finance program at scale with the avowed motto of "leveraging private finance for public good"

- TLFF is an innovative financial platform which will provide long-dated and concessional debt, securing refinancing from the capital markets via long dated Tropical Landscapes Bonds (TLB)

- The TLFF consists of a Tropical Landscapes Loan Fund (TLLF) that intends to lend in excess of USD 1 billion to commercial projects with significant environmental and social impact in Indonesia. As capacity building for smallholders and marginal communities need to go hand in hand with commercial investments to conserve, improve and enhance the landscapes, the TLFF will also have a Tropical Landscapes Grant Fund (TLGF) with the intent to disburse USD 100 million in grants

- Facilitated by UNEP and incubated by ICRAF, TLFF has BNP Paribas as the liquidity provider and ADM Capital as the fund manager

Leading Partners

UNEP	The United Nations Environment Programme (UNEP) is the leading global authority that sets the agenda on environmental issues, promotes the coherent implementation of the environmental dimension of sustainable development within the United Nations system and serves as an authoritative advocate for the global environment
ICRAF	The International Centre for Research in Agroforestry (ICRAF), known as World Agroforestry Centre, is recognized as the global leader in agroforestry research and development with five regional offices located in Indonesia, India, Kenya, Malawi, Peru and Cameroon, and conducting research around the developing world
ADM Capital	ADM Capital is a global investment manager. Currently with USD 1.4 billion assets under management, ADM Capital has been investing in Indonesia since 1998. ADM Capital is one of the most established players in the private debt space in Asia and manages open and evergreen funds to invest in illiquid debt instruments, including two funds with the IFC
ADM Capital Foundation	ADM Capital Foundation was established in 2006 as an impact-driven nonprofit initiative to provide funding and intellectual capital to help address specific forestry, water, air and marine environmental and social challenges. ADMCF is a leader in environmental philanthropy in Asia, with a focus on real impact based on solid research
BNP Paribas	BNP PARIBAS is an international financial institution with a presence in 75 countries and more than 185,000 employees. Being Europe's second largest bank by assets, it is an established financial institution with a long history in Asia

Vision and Mission

TLFF
TROPICAL LANDSCAPES FINANCE FACILITY

Vision

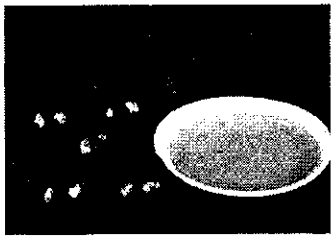
To mobilize international capital markets to assist marginal communities and smallholder farmers in countries with significant environmental and social challenges to be the stewards of their own destiny

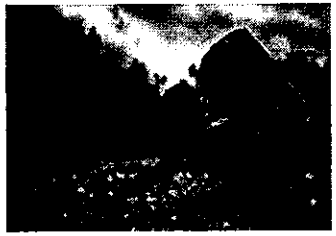
Mission

Collaborate, build and enhance a global partnership of public and private sector entities to leverage private finance for public good

Provide scalable and long-dated capital with competitive and commercial returns for investments that address forest conservation, emissions reduction, poverty alleviation and inclusive energy access

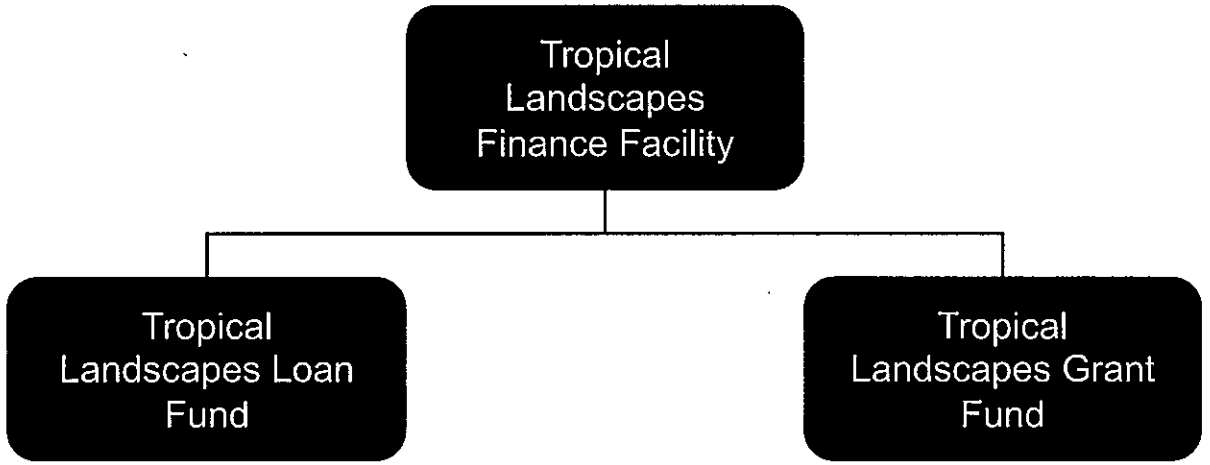
Help build a replicable "financing for development" model, through comprehensive proof of concept, applicability and scale via the TLFF



Tropical Landscapes Financing Facility - Structure

- The Tropical Landscapes Financing Facility consists of a Loan Fund and a Grant Fund
- Managed by ADM Capital, the Loan Fund is a commercially driven credit fund that is looking to lend in excess of USD 1 billion
- Managed by the TLFF Secretariat, the Grant Fund is a vehicle to provide grants for the purpose of capacity building for smallholders and marginal communities



Focus on Indonesia

Indonesia has a large and vibrant economy, representing the largest in the South East Asian region. While the country has significant challenges, the Government of Indonesia has set ambitious goals to address these challenges

- Consisting of ~17,500 islands, Indonesia is the 4th most populous country in the world with ~258 million people. The country has charted impressive economic growth since the Asian Financial Crisis in the late 90's and is a member of the G-20
- While the country ranks 16th in the world in terms of GDP, it is a top 10 emitter of greenhouse gases and easily the largest emitter of GHG per unit of GDP. This is largely due to emissions from deforestation and land use change
- Agriculture represents ~14% of GDP, a significant share of which is generated by ~38 million smallholder farmers
- ~11% of the population lives below the poverty line and an estimated ~40% of the population remain clustered around the national poverty line (USD 22 per month). An estimated ~40 million people do not have access to electricity

The Government of Indonesia has set ambitious growth targets:

- Renewable Energy to represent 23% in the energy mix by 2025 compared to 6% today
- To cut greenhouse gas emissions 26% by 2019, 29% to 41% depending on international support, by 2030
- An electrification rate of 99% by 2020 (84% in 2015)
- Increased agricultural productivity in primary sectors such as palm oil
- Doubling palm oil exports over the next five years
- Reducing the poverty rate to below 4% by 2025

There is a significant funding gap if Indonesia is to meet its targets. This is what TLFF is seeking to address

Tropical Landscapes Loan Fund - Fact Sheet

TLFF
TROPICAL LANDSCAPES FINANCE FACILITY

Product Offering(s)

- Long dated debt
- Target return on capital: credit use fee plus upside from financing spread contraction on exit
- Investment term of 10-15 years, average loan holding period 2-3 years
- Exit options: refinancing via MTN program

Deal Mechanics

- Deal size between USD 10-50 million (or IDR equivalent)
- Long-dated tenors (10-15 years)
- Minimum principal equity participation required: 20%
- Collateral or acceptable guarantee

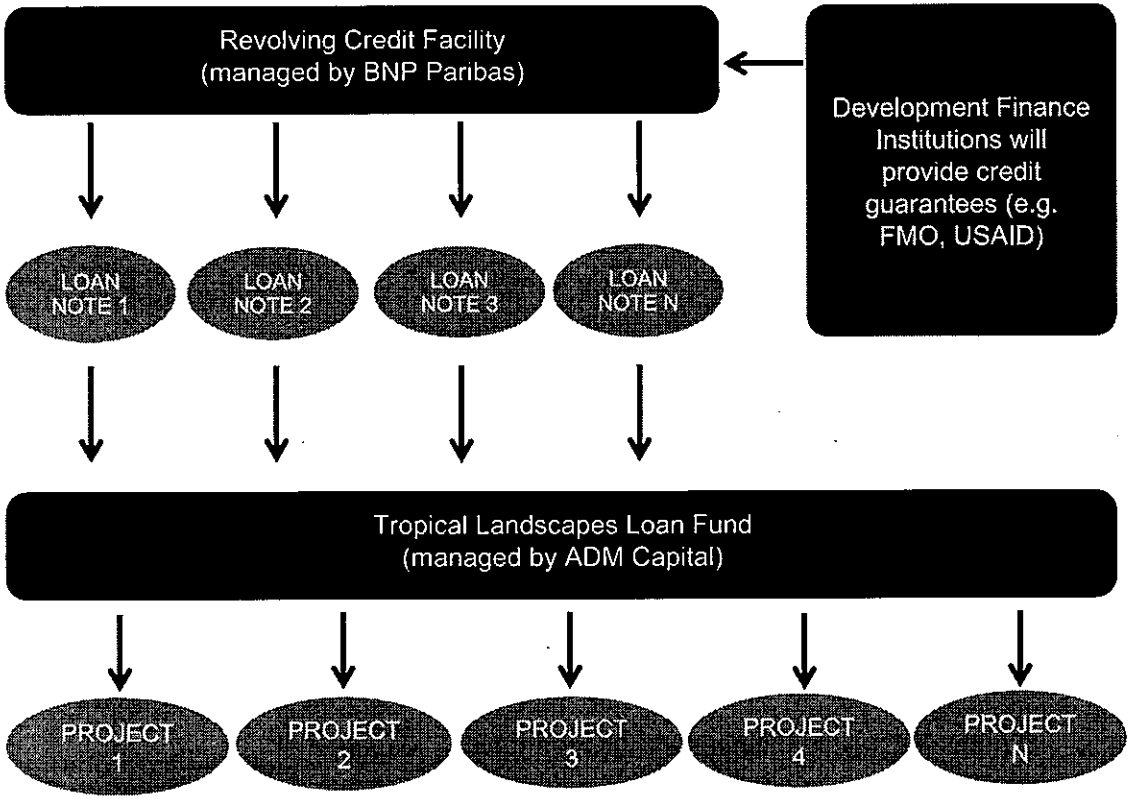
Sector Focus

- Renewable energy and rural electrification
- Land rehabilitation and rural livelihoods

Key Investment Criteria

- Key performance indicators to be applied
- Please see the section on Impact Assessment

Tropical Landscapes Loan Fund - Base Structure



BNP Paribas will provide a credit facility to finance the Tropical Landscapes Loan Fund

The credit facility will be supported by an effective credit guarantee through unfunded commitments from Development Finance Institutions

As investment manager of the Tropical Landscapes Loan Fund, ADM Capital will source and structure the project loans

The project cashflows generated will be securitised and sold by BNP Paribas via a Medium Term Note program titled the Tropical Landscapes Bond (TLB)

The Medium Term Notes will be limited recourse, secured obligations backed by individual project loans (each tranche of notes will fund a specific project)

Tranches may be sold with or without a credit guarantee

Tropical Landscapes Grant Fund - Fact Sheet

TLFF
TROPICAL LANDSCAPES FINANCE FACILITY

The Tropical Landscapes Grant Fund is a USD 100 million grant fund to be established under the UN Multi-Partner Trust Fund. Supervised by the Tropical Landscapes Grant Fund Advisory Board, the grant fund will be capitalized by donors, interested in contributing to significant social and environmental impact in Indonesia leading to the achievement of UN Sustainable Development Goals.

Examples of capacity building work to be undertaken by the Tropical Landscapes Grant Fund (TLGF)

Land rehabilitation / Rural livelihoods

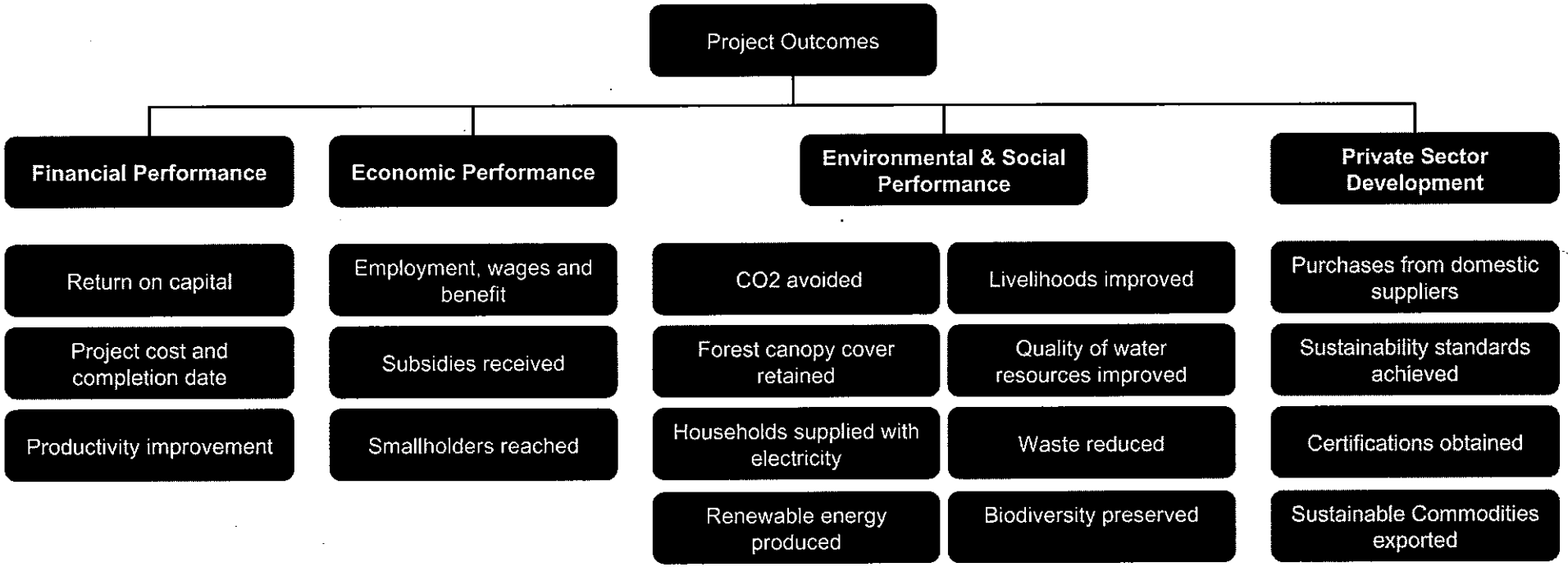
- Training for farming communities aiming toward improved crop productivity and environmental quality
- Forest and peat fire prevention, rehabilitation of degraded land
- Smallholder development and replanting
- Traceability technology
- Finance education for smallholders

Energy Access for Rural Communities

- Support for on-grid/off-grid renewables generation (hydro, solar etc.) in rural communities
- Vocational training in remote villages to maintain and repair renewable energy infrastructure
- Community building (education, community spaces, infrastructure)
- Renewable energy infrastructure to be used as solar panels to build a sheltered community space etc.

Impact Assessment

TLFF will adopt a clear ESG policy that requires projects to comply with IFC Performance Standards, as well as other standards, including the United Nations Framework Convention on Climate Change and others.



The TLFF team via the grant fund will work closely with portfolio projects to support implementation of the ESG policies and standards as well as provide the required monitoring and evaluation

Contact

Asia Debt Management Hong Kong Limited
1008 ICBC Tower, 3 Garden Road
Hong Kong

Chris Botsford

cb@admcap.com
+852 2536 4567

Lisa Genasci

lisa.genasci@admcf.org
+852 2810 6567

Martijn Hoogerwerf

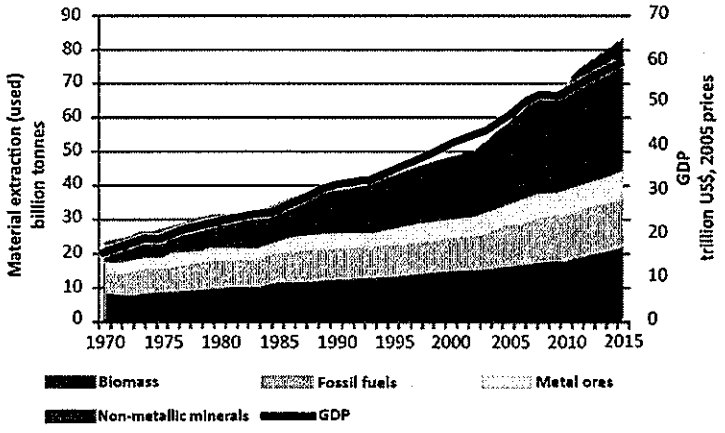
martijn.hoogerwerf@admcap.com
+852 2536 4567

Platform for Accelerating the Circular Economy (PACE)

August 2017

Dematerializing consumption and production is a key to a circular economy

PACE

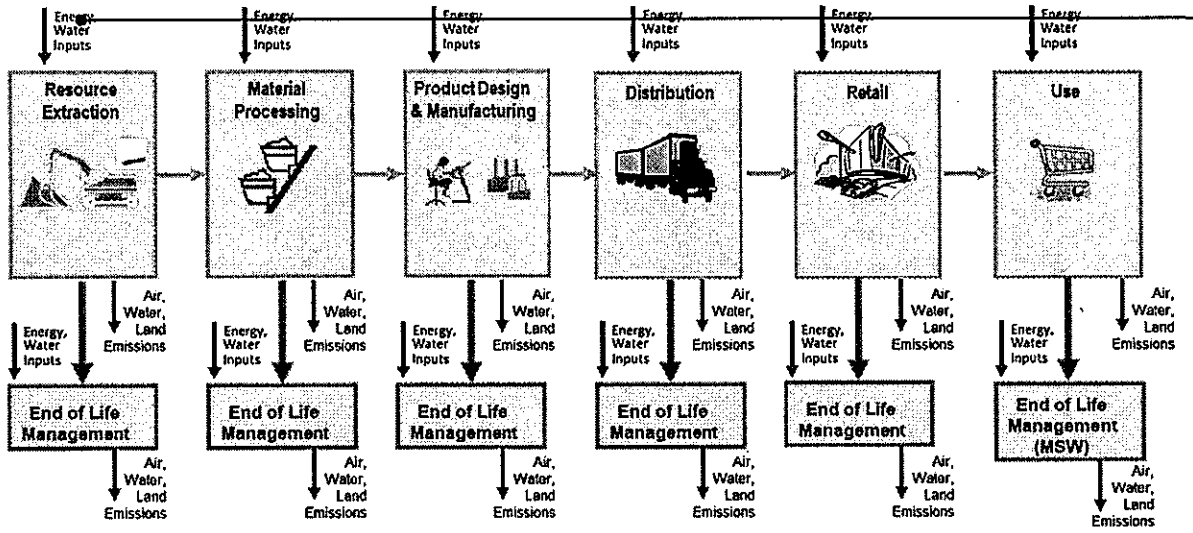


- Extraction of materials grew from 22 billion tons per year in 1970 to 70 billion tons per year in 2010
- Projected to reach 100 billion tons per year by 2030 (OECD)
- Factors include:
  - *Growing global resource consumption*
  - *Large shift of economic activity to less material-efficient economies*
  - *Asia -Pacific has increased its global share of material use from around 25% in 1970 to above 50% in 2010, while becoming a net exporter of materials through large exports of manufactured goods which are mostly consumed in Europe and North America*

2

Material/Product Life Cycle

PACE

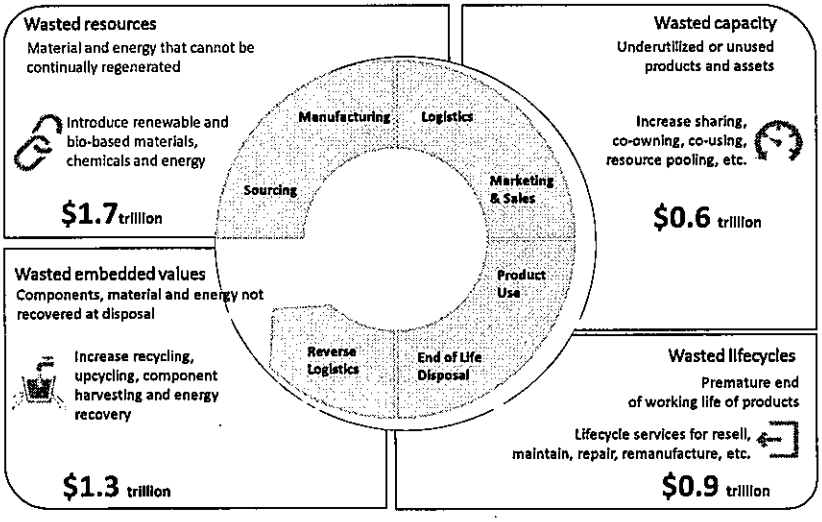


Hidden material flows (i.e., wastes) account for up to75% of the total materials moved, but are not accounted for in the gross domestic product. 3

There is a 4-dimensional view on waste along the value chain in a Circular Economy

PACE

1



Source: Waste to Wealth, Accenture, 2015

4

PACE operates on two levels, a global and a regional level, that complement and support each other

PACE

Global Leaders Network

- Surface, lead and collaborate in regional projects that require scaling or enhancing to advance the circular economy
- Annually identify 2-3 key challenges to advancing the Circular Economy based on what has surfaced within projects and through network experience and convene focused high-level public-private dialogues to address these
- Link the outcomes of these dialogues to existing structures to take outcomes forward

Regional Hubs

- Link regional public and private actors to advance the Circular Economy at the regional/national levels
- Blend finance and broker partnerships to scale existing and kick-start new Circular Economy projects between private, public and regional funding organizations
- Blueprint, replicate and scale solutions

INFORMS THE SELECTION OF ISSUES

INFLUENCES PROJECT SELECTION

5

PACE is currently building a strong foundation of partners from public and private sector to collaborate on driving action

PACE

Co-Chairs

gef · PHILIPS · UN

Knowledge Partner

accenturestrategy · Ellen MacArthur Foundation · International Resource Panel

Global Leaders Network

Preliminary discussions have taken place with these organizations. Formal invitations to be issued following co-chair sign-off

ORGANIZATIONS
- UN Environment ●
- UNIDO
- UNDP
- OECD
- GGGI
- GEF
- GIZ
- EMF ●
- WBCSD
- IISD
- ISEAL
- ITC
- Circle Economy
- World Resources Institute
- WWF
- China Council for International Cooperation on Environmenta & Development ●
- SEBRAE (Brazil)
- Conservation International

GOVERNMENTS
- Argentina ●
- Barbados
- Brazil
- Canada
- China ●
- Chile
- Colombia ●
- Costa Rica
- Croatia
- Egypt and/or Jordan
- France
- Finland
- Germany
- Ghana
- Indonesia
- Japan
- Italy
- Malaysia
- Mauritius

GOVERNMENTS CONT'
- Mexico
- Netherlands
- Peru
- Philippines
- Romania
- Rwanda ●
- South Africa ●
- Slovenia
- Sri Lanka
- Sweden
- UK
- European Commission

DEVELOPMENT BANKS
- Inter-American Development Bank / Multilateral Investment Fund
- CAF ●
- European Bank for Reconstruction & Development
- European Investment Bank ●
- African Development Bank ●
- Asian Development Bank ●
- World Bank and IFC

COMPANIES
- Adidas
- Alibaba Group
- Airbnb
- Alstom
- Amcor
- Arup
- Averda
- BASF ●
- Cargill
- Carlsberg
- Cisco
- Coca-Cola
- Dell
- Didi Chuxing
- DSM
- Ebay
- EcoLab
- FEMSA
- Heineken
- Henkel
- Hennes & Mauritz
- HP ●
- ING ●
- Ikea

COMPANIES CONT'
- Intesa san Paolo ●
- Indorama
- Johnson Controls
- Lego
- Lenzing
- Levis
- Nestle
- Nike
- MiniWiz
- Pepsi
- P&G
- Philips
- Repsol
- Suez
- Tarkett
- Terracycle
- Triciclos
- Trina Solar
- Triodos Bank
- Unilever
- Veolia
- Walmart
- Yara

Confirmed expression of interest to co-chair the regional hubs: ● Africa ● China ● Europe ● Latin America

6

Consultations with leaders from public and private sector, identified the need for a public-private collaboration platform to scale the circular economy

PACE

2

Bringing the private and public sector into public-private collaborations to scale impact around Circular Economy initiatives

Stakeholder consultations revealed that there are many activities on Circular Economy under way by private, public and institutional actors. All parties expressed a lack of deliberative public-private engagement of either the private, or the public sector in different efforts. This was identified as a barrier to achieving scale or to addressing specific barriers that impede progress.

The Platform will provide a public-private collaboration space to advance concrete scaling of Circular Economy solutions by linking the interests of private and public sectors .

Develop blended financing models for Circular Economy projects in developing economies

MDB's and other funding partners are keen to invest in Circular Economy innovators or explore how to reorient their larger-scale investments to integrate Circular Economy design/principles, apply mixed funding approaches to de-risk private investments, and identify strategies for national governments to scale private sector Circular Economy activities such as secondary materials recovery systems.

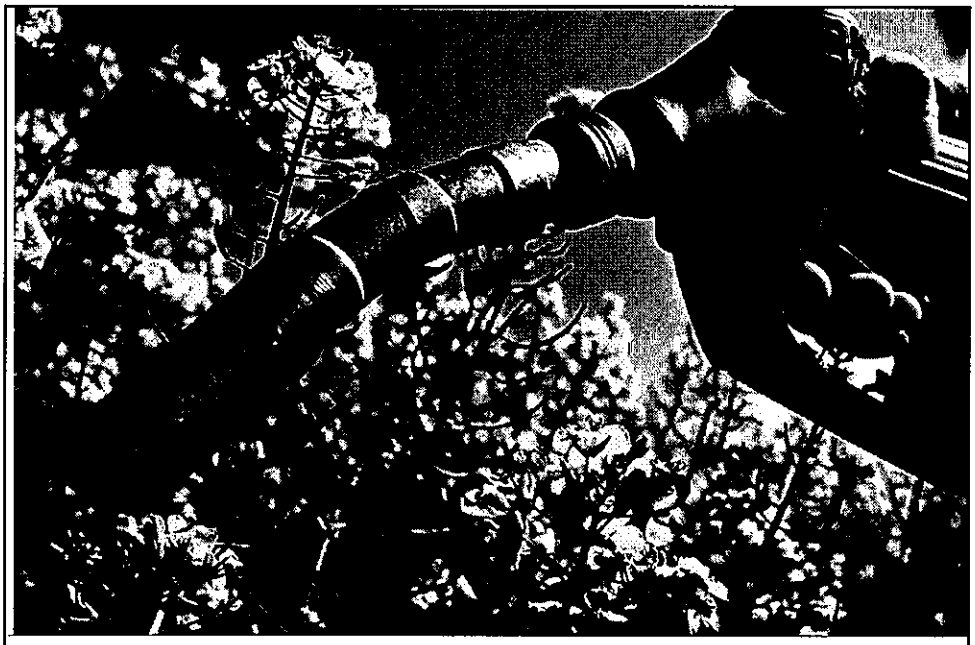
The Platform will help scale existing activities by brokering partnerships and test collaborative funding approaches through the network of private, public sector and institutional partners.

Help to create and adjust enabling frameworks to address specific barriers to advancing the circular economy

Policies and regulation surfaced as both key barrier but also enabler for scaling up Circular Economy efforts – including trade policies, waste regulations, public procurement policies, resource pricing etc. Identifying and resolving policy barriers have not been based on solutions designed collaboratively between government, business and the civil society. These cross-cutting systemic policy issues need to be addressed from both global and national perspectives.

The Platform will bring key stakeholders to the table to collaboratively design public policy reforms from both a global perpsective through the leaders network, and a local view through the projects.

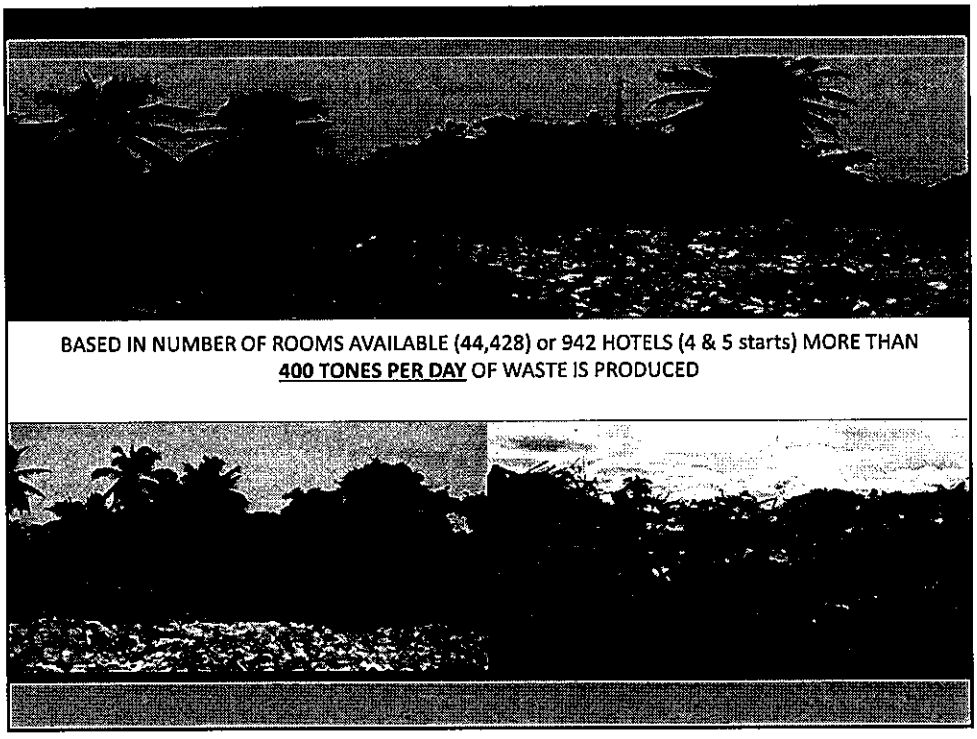
7



Waste management EXAMPLE

PLASTIC ENERGY

BALI: 2014
3,8 million tourist



BASED IN NUMBER OF ROOMS AVAILABLE (44,428) or 942 HOTELS (4 & 5 starts) MORE THAN **400 TONES PER DAY** OF WASTE IS PRODUCED

- HOW LANDFILLS ARE MANAGED?
- LEACHATE MANAGEMENT?
- TIPPING FEES LINKED TO PROPER LANDFILL MANAGEMENT?

WHAT A "SEMI-MANUAL" SORTING FACILITY COULD DO?

- Capacity: 500 tones per day
- CAPEX: USD 5,0M
- Personal: 40 people
- Energy consumption: 216 Kw/h
- Construction time: 8 months
- THAT COULD RECOVER UP TO:
  - 75 tn (28%) diverse mechanically recycled commodities +
  - More than 30 tn (14%) of dirty, contaminated waste plastic

EVEN IF ONLY 50% OF WASTE FROM HOTELS COULD BE TARGETED:

..... WE COULD DIVERT ABOUT 75 TONES PER DAY OF VALUABLE MATERIALS AND
..... OVER 30 TONES OF WASTE PLASTICS THAT COULD HAVE A SECOND LIFE

500				
270	54%		DIARIO	MENSUAL
	TONAJE VALOR	PORCENTAGE	TONS	TONS
Carton	$ 117.02	8%	21.6	648
Mixed Paper	$ 85.11	3%	8.1	243
Pet Clear Bottles	$ 276.60	3%	8.1	243
Pet Color	$ 234.04	1%	2.7	81
Tin	$ 85.11	1%	2.7	81
Aluminio	$ 135.00	1%	2.7	81
Vidrio	$ 55.00	11%	29.7	891
RAW TON AVG	$ 141.12	28%	75.6	1377

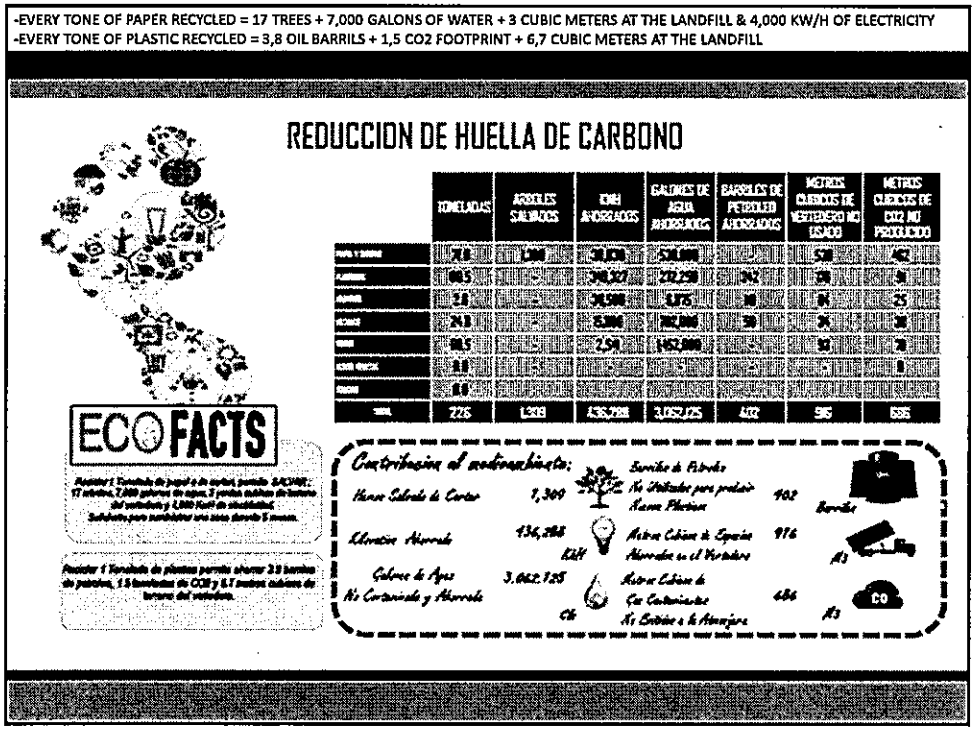
			DIARIO	MENSUAL
Dirty Plastics	$ -	6%	16.2	449
HDPE THERMOSET	$ -	2%	5.4	150
HDPE Clear	$ -	1%	2.7	75
HDPE Color	$ -	1%	2.7	75
LDPE Color	$ -	2%	5.4	150
LDPE STRETCH	$ -	2%	5.4	150
		14%	37.8	1048

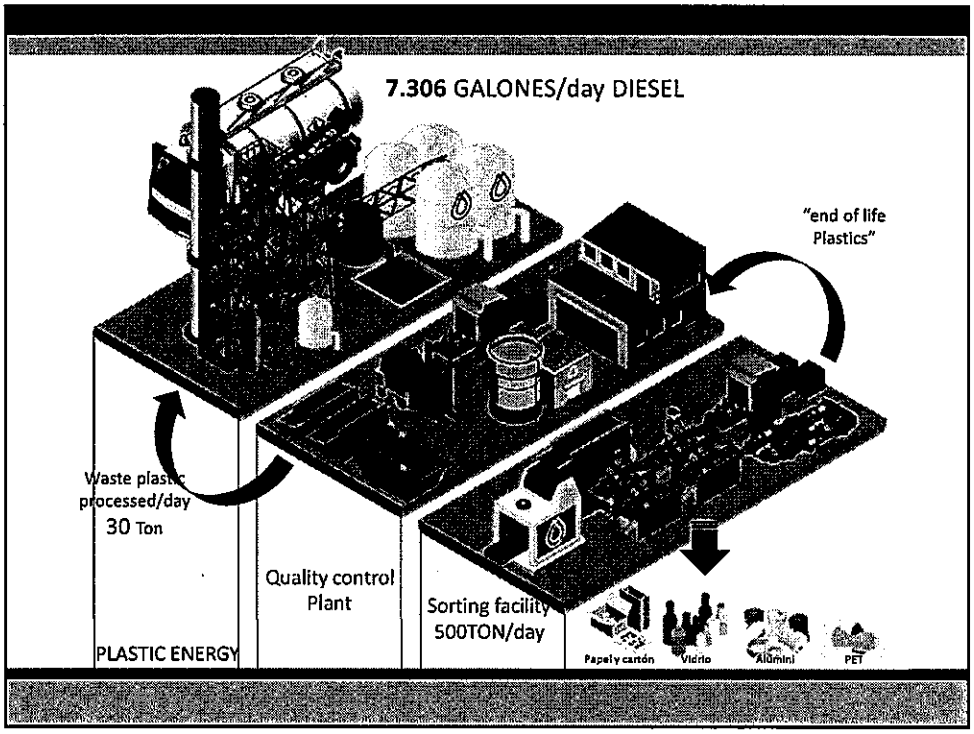
BASED IN INTERNATIONAL MARKETS...

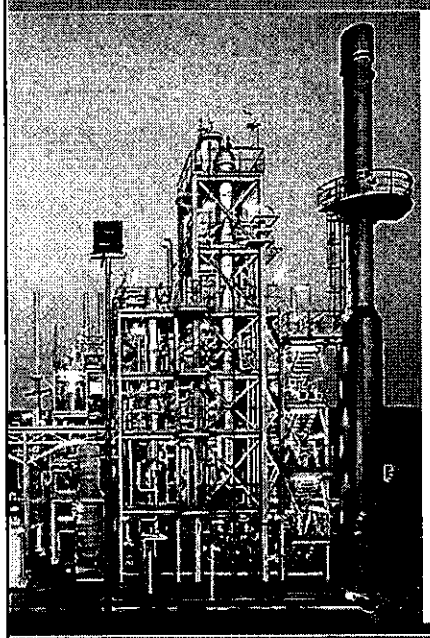
		DIARIO	MENSUAL
		VALOR	VALOR
Carton	$ 117.02	$ 2,527.66	$ 75,829.79
Mixed Paper	$ 85.11	$ 689.36	$ 20,680.85
Pet Clear Bottles	$ 276.60	$ 2,240.43	$ 67,212.77
Pet Color	$ 234.04	$ 631.91	$ 18,957.45
Tin	$ 85.11	$ 229.79	$ 6,893.62
Aluminio	$ 135.00	$ 364.50	$ 10,935.00
Vidrio	$ 55.00	$ 1,633.50	$ 49,005.00
RAW TON AVG	$ 141.12		
		$ 8,317.15	$ 249,514.47

- MORE THAN USD 200,000 per month of revenues that could cover OPEX and CAPEX payback

-EVERY TONE OF PAPER RECYCLED = 17 TREES + 7,000 GALONS OF WATER + 3 CUBIC METERS AT THE LANDFILL & 4,000 KW/H OF ELECTRICITY
-EVERY TONE OF PLASTIC RECYCLED = 3,8 OIL BARRILS + 1,5 CO2 FOOTPRINT + 6,7 CUBIC METERS AT THE LANDFILL







TACoil PLANT from **PLASTIC ENERGY**

- Capacity: 30 tones /day
- CAPEX: USD 18,0m + transportation
- Energy consumption: 400 Kw/h
- People: 20
- Fabrication time: 15 months to operate 24/7

REVENUES

- Precio venta diesel: USD 0,6/litro
- Production: 8,975,000 liters/year
- Revenues: USD 5,3m

Investment summary

- ✓ CAPEX: USD **23,0m**
- ✓ AVERAGE REVENUES: USD 6.000.000
- ✓ **EBITDA: 5.200.000**
- ✓ **IRR: 23.3%**
- ✓ **DIFFICULTIES TO FINANCE? OR LEGAL IMPLEMENTATION OF MINIMUM RULES?**

There is growing external momentum on plastics packaging - Regulation

Example:
EU waste legislation

Proposed 2017 revisions:

- common EU target for recycling 75% of packaging waste by 2030
- binding landfill target to reduce landfill to maximum of 10% of municipal waste by 2030
- ban on landfilling of separately collected waste
- economic incentives for producers to put greener products on the market and support recovery and recycling schemes

European Parliament

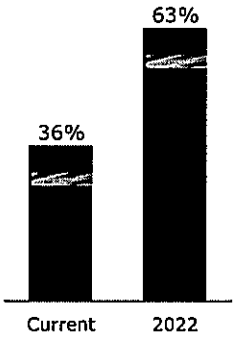
"We have taken the decision to reinstate the original, ambitious targets set for recycling and landfill...re-use, recycling and recovery will become key concepts, with waste no longer being a problem but a resource"

"Simona Bonafè, Rapporteur (2017)

European Parliament

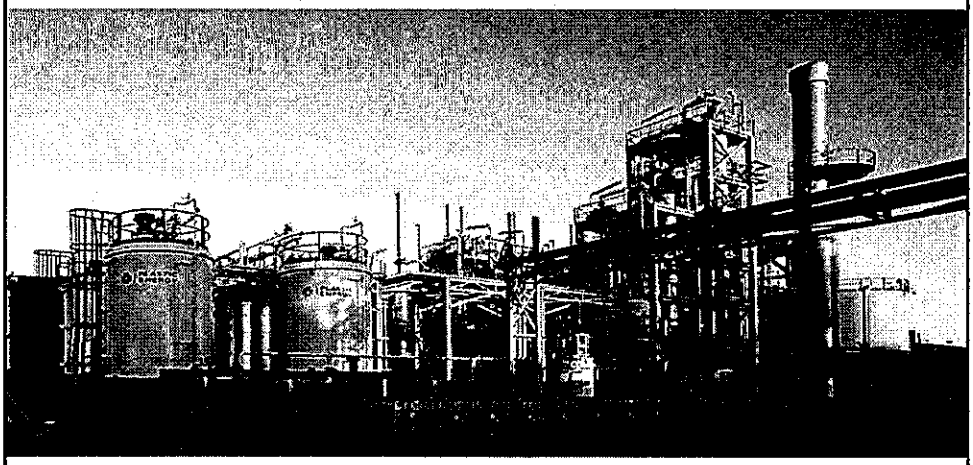
National regulation (Germany)

Plastic packaging recycling rate
Packaging Act (April 2017)



Source: SYSTEMIQ

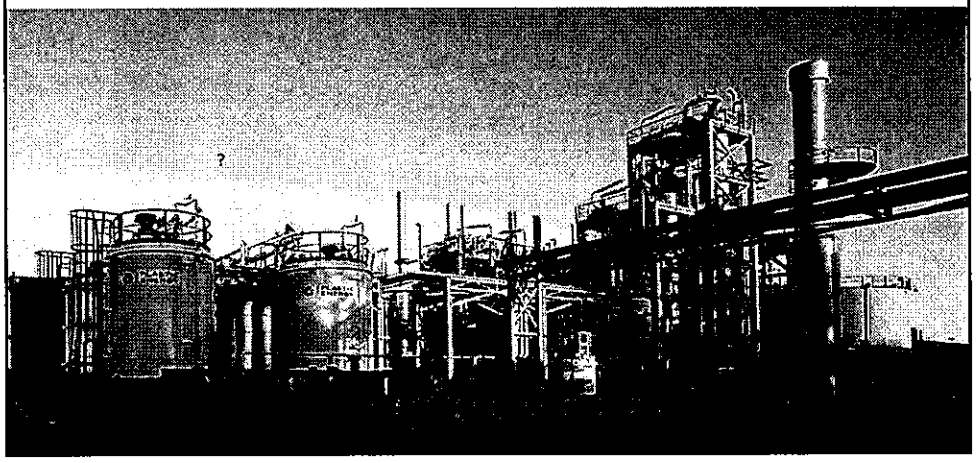
CHEMICAL RECYCLING FACILITY OF 20 TONES/DAY WASTE PLASTIC CAPACITY



OUTPUTS:
A) PLASTIC TO DIESEL
B) PLASTIC2PLASTIC

PLASTIC ENERGY

- ✓ REMEMBER....LESS THAN 1,000 HOTELS IN BALI THAT COULD SET THE EXAMPLE PROTECTING THEIR FUTURE BUSINESS WITHIN SUSTAINABILITY



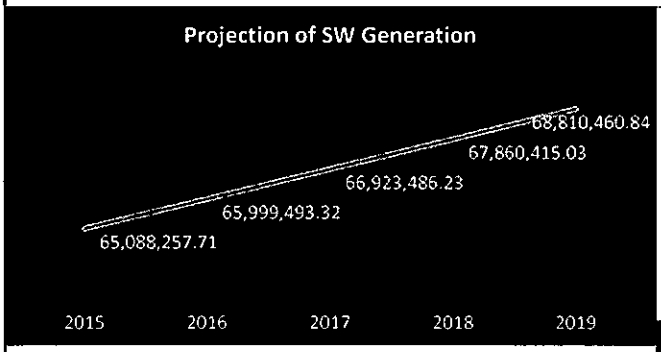
Ministry of Environment and Forestry
Republic of Indonesia

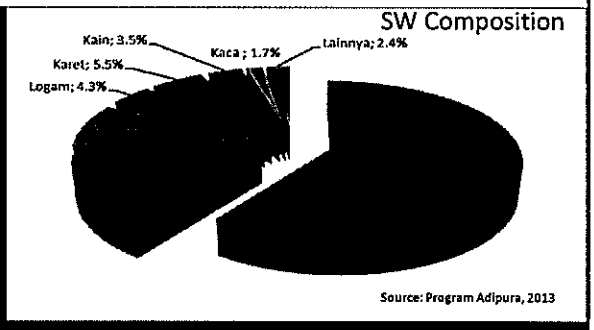
Indonesia National Policy and Strategy on Solid Waste Management

APEC high Level Meeting on Accelerating Solid Waste Management Solutions to Reduce Marine Litter

R. Sudirman
Director of Solid Waste Management
Director General for Solid Waste, Hazardous Waste and Hazardous Substance Management

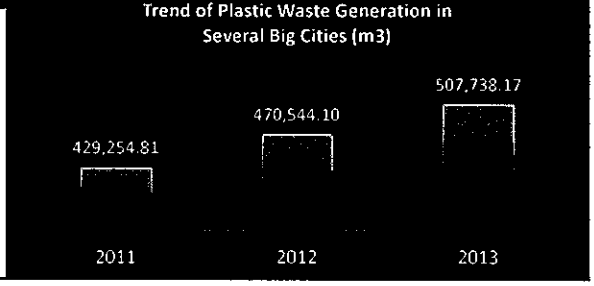
Indonesia SWM State

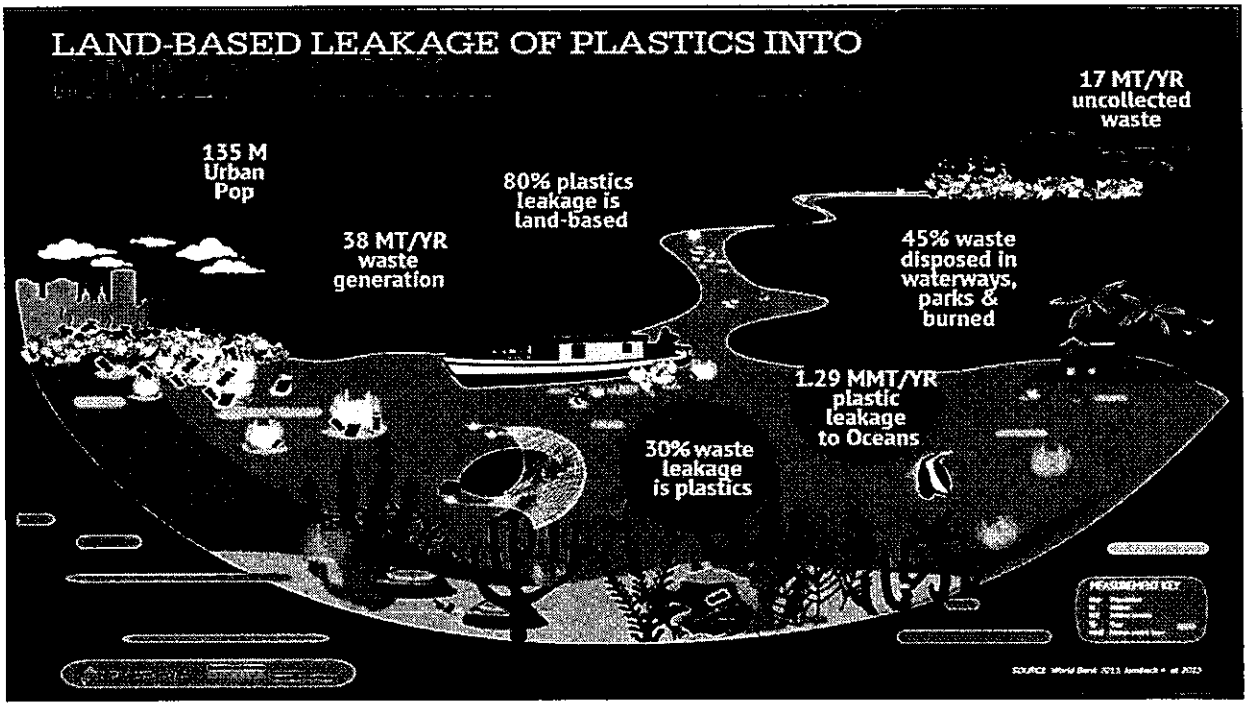


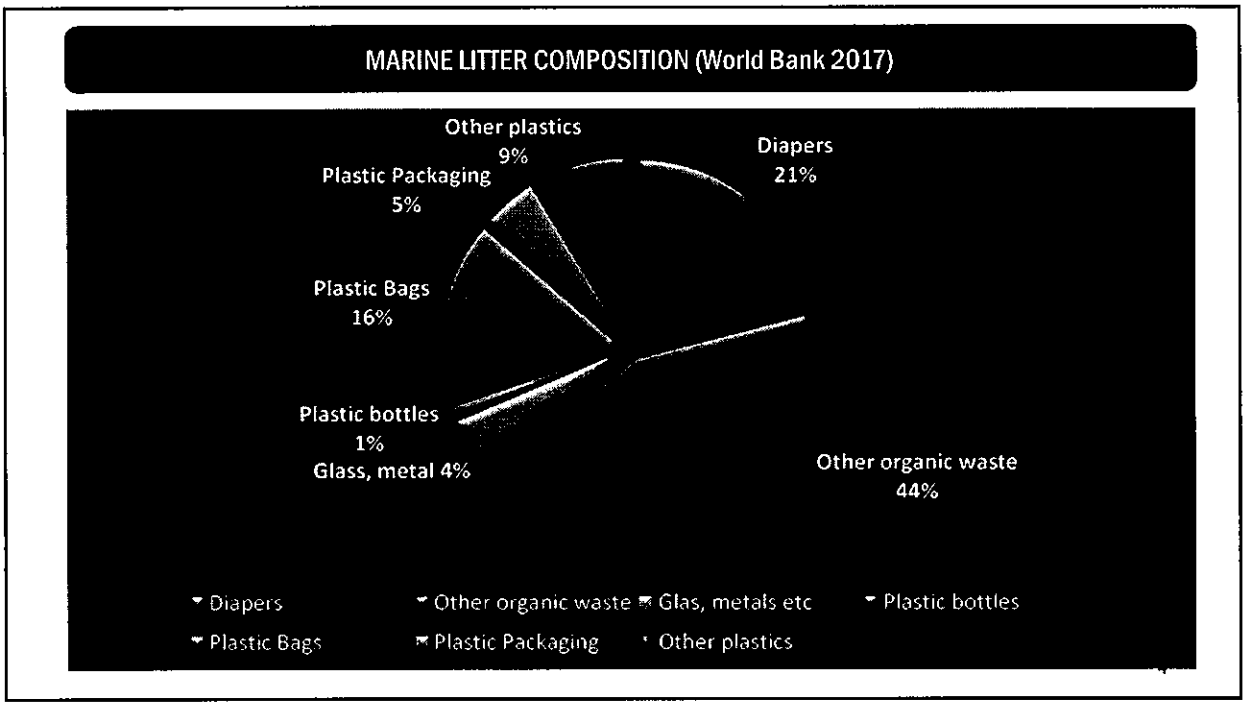


SW Management	State (%)
Landfilled	69%
Buried (traditionally)	10%
Composted and recycled	7.5%
Burned (openly)	5%
Un-managed	8.5%

Source: Program Adipura , 2013




LAND-BASED LEAKAGE OF PLASTICS INTO
17 MT/YR uncollected waste
135 M Urban Pop
80% plastics leakage is land-based
38 MT/YR waste generation
45% waste disposed in waterways, parks & burned
1.29 MMT/YR plastic leakage to Oceans
30% waste leakage is plastics


MARINE LITTER COMPOSITION (World Bank 2017)
Other plastics 9%
Diapers 21%
Plastic Packaging 5%
Plastic Bags 16%
Plastic bottles 1%
Glass, metal 4%
Other organic waste 44%
Diapers
Other organic waste
Glas, metals etc
Plastic bottles
Plastic Bags
Plastic Packaging
Other plastics

GLOBAL COMMITMENT

Indonesia mengurangi sampah melalui **reduce-reuse-recycle** sebanyak 30% pada 2025, dan menargetkan pengurangan sampah plastik di laut sebanyak **70% pada 2025**

(Indonesia to minimize solid waste by 30% through 3R and to reduce marine plastic waste by 70% in 2025)

President Joko Widodo at Leaders Retreat, G20 Summit, Hamburg-Germany, Friday July 7th, 2017

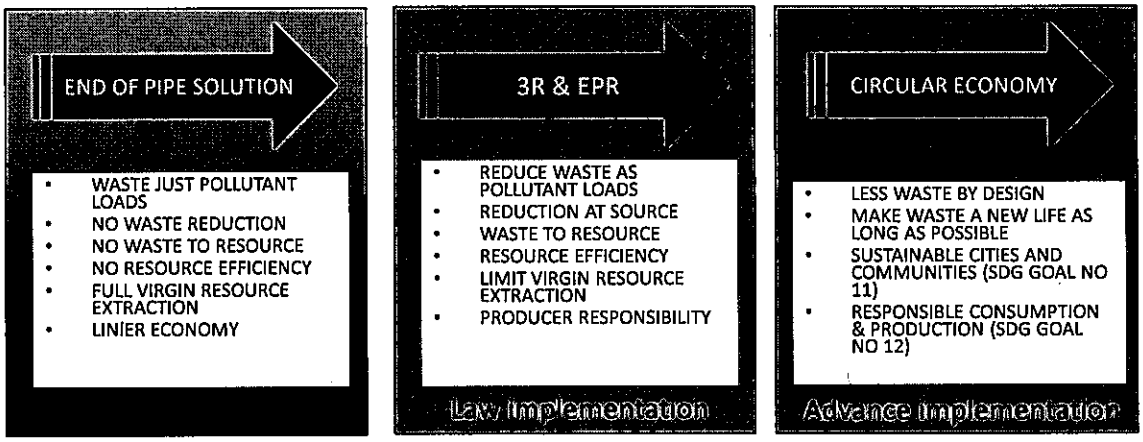
ANOTHER GLOBAL COMMITMENT

- **Within this Campaign and also within our own national strategy, Indonesia, by the end 2025, will reduce 70% of its plastic debris from 2017. Indonesia will launch its National Action Plan on Marine Plastic Debris that contains a numerous strategies and concrete plans on land, on coastal areas, and at sea aimed at significantly reducing marine plastic debris as well as contribute to the national ambition on the realization of trash-free Indonesia.**
- **Indonesia will provide financing in executing such strategy up to 1 billion USD per year, and welcome collaboration from strategic partners in different ways and means**

PLEDGING STATEMENT BY H.E GENERAL (RET.) LUHUT BINSAR PANDJAITAN, COORDINATING MINISTER FOR MARITIME AFFAIRS OF INDONESIA ON THE FIGHT AGAINST MARINE PLASTIC DEBRIS, AT THE LAUNCH OF UNITED NATIONS GLOBAL CAMPAIGN ON CLEAN SEAS THE UNITED NATIONS ENVIRONMENT PROGRAM, NUSA DUA, BALI, 23 FEBRUARY 2017

POLICY TRANSFORMATION (UU NO. 18/2008 & PP NO. 81/2012)

SHIFTING THE PARADIGM



NATIONAL POLICY AND STRATEGY ON SOLID WASTE MANAGEMENT TARGET 2017–2025*

Indicator	2017	2018	2019	2020	2021	2022	2023	2024	2025
SW generation estimation (million ton)	65.8	66.5	67.1	67.8	68.5	69.2	69.9	70.6	70.8
SW reducing target (million ton)	9.80 (15%)	12 (18%)	13.4 (20%)	14 (22%)	16.4 (24%)	17.99 (26%)	18.9 (27%)	19.7 (28%)	20.9 (30%)
SW handling target (million ton)	47.3 (72%)	48.5 (73%)	50.3 (75%)	50.8 (75%)	50.7 (74%)	50.5 (73%)	50.3 (72%)	50.1 (71%)	49.9 (70%)

* Stated on Proposed Draft of Presidential Regulation concerning National Policy and Strategy on Solid Waste Management

NATIONAL SOLID WASTE MANAGEMENT TARGET

30% REDUCTION

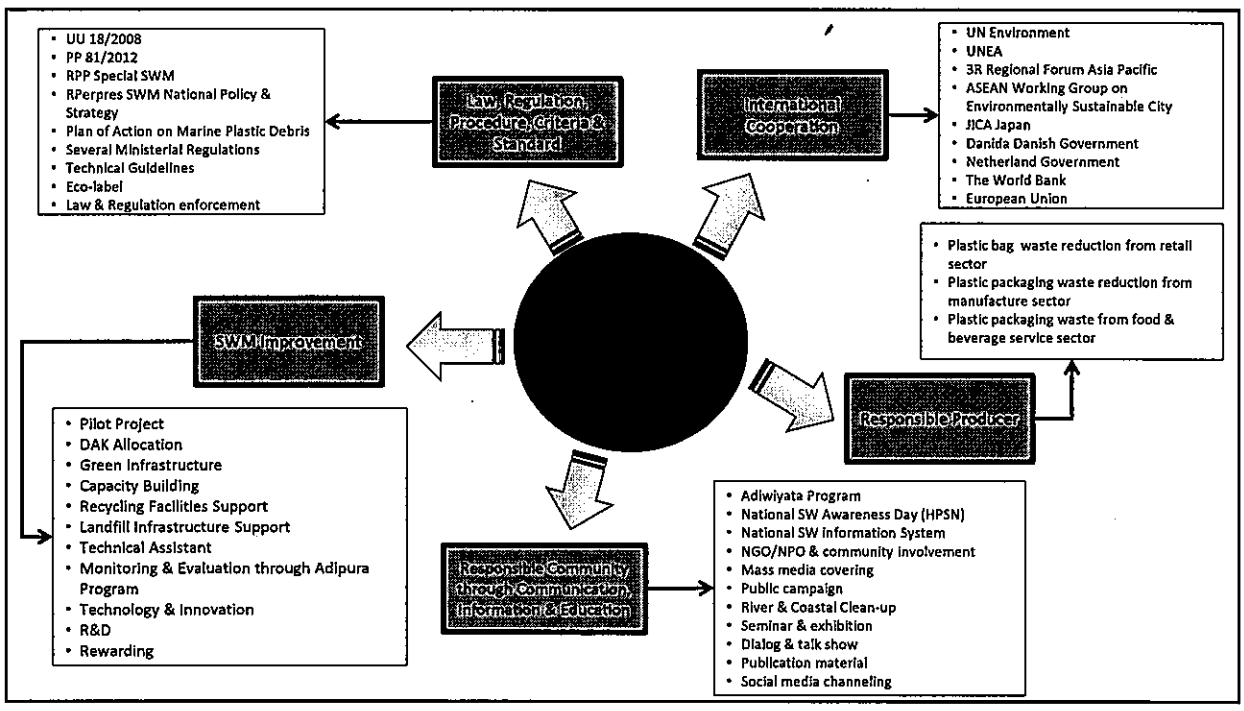
INDICATORS:

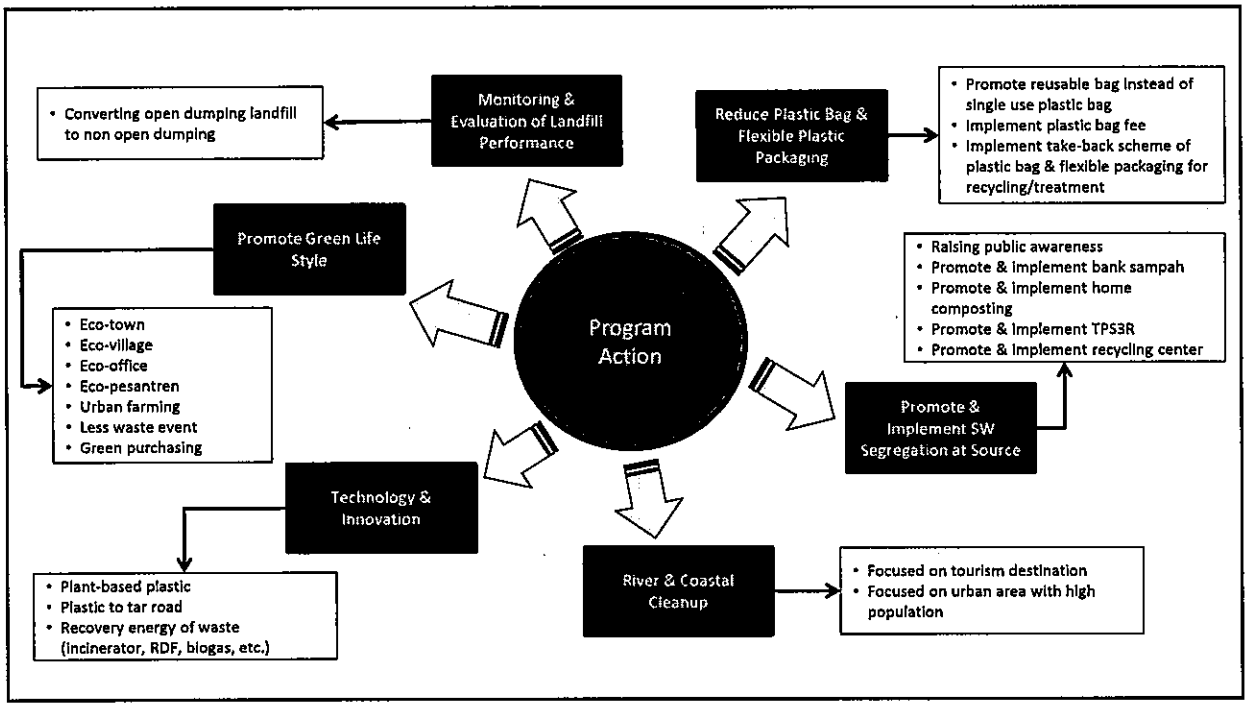
1. DECREASING SW GENERATION PER CAPITA
2. SW REDUCTION AT SOURCE
3. SW REDUCTION TO BE LANDFILLED
4. SW REDUCTION TO ENVIRONMENT (LAND & WATER ECOSYSTEM)

INDICATORS:

1. INCREASING SW TREATMENT (RECYCLING, COMPOSTING, ENERGY RECOVERY, ETC)
2. CONVERT UN-MANAGED LANDFILL TO WELL-MANAGED LANDFILL
3. SW REDUCTION TO ENVIRONMENT (LAND & WATER ECOSYSTEM)

REDUCED MARINE PLASTIC 70% BY 2025





THANK YOU
TERIMA KASIH

12

Designing and Implementing National Strategies

- The Philippine Experience-

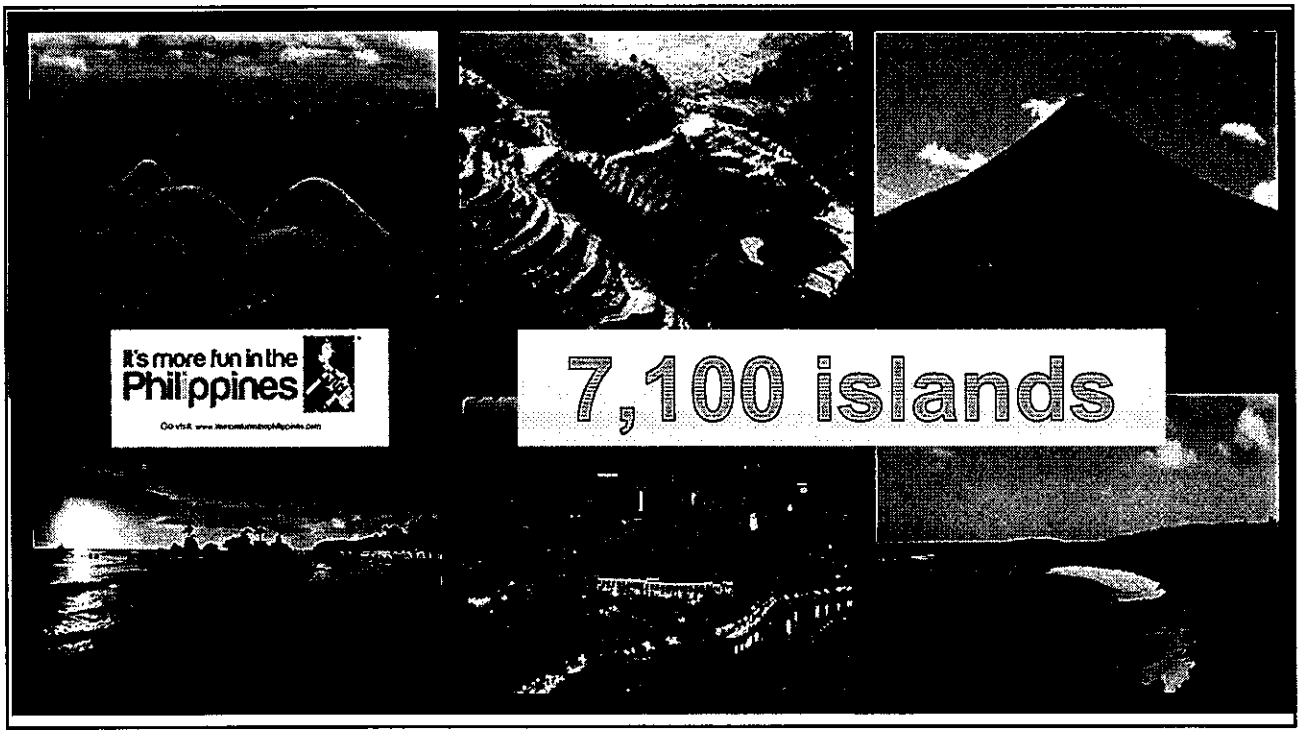
Presented by:
Commissioner Crispian N. Lao
Vice Chairman
National Solid Waste Management Commission

Outline of the Presentation

I. Philippine Geography

II. Solid Waste Management Situationer

III. Approaches to the Situation



Solid Waste Management Situationer

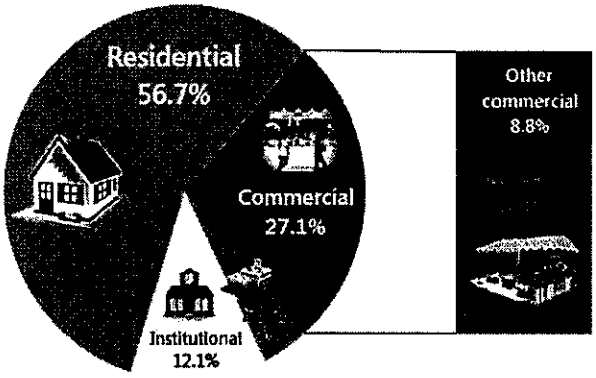
Projected Daily Waste Generation Rates (2014-2019)

Coverage	2014	2015	2016	2017	2018	2019
Philippines						
Population[a]	100,420,642	102,549,559	104,723,610	106,943,750	109,210,958	111,526,230
Tons/day[b]	40,168	41,020	41,889	42,778	43,684	44,610
Metro Manila						
Population[a]	12,843,357	13,102,793	13,367,469	13,637,492	13,912,969	14,194,011
Projected Tons/day[d]	9,119	9,303	9,491	9,683	9,878	10,078

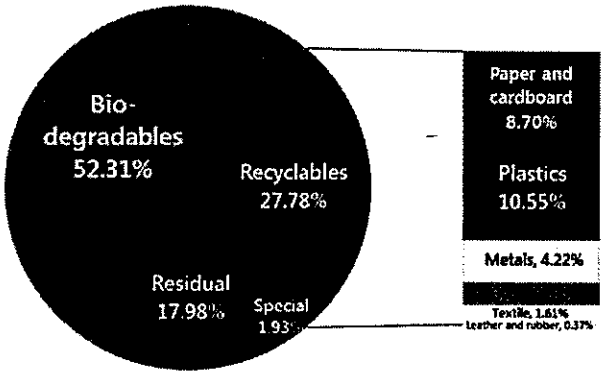
National Solid Waste Management Status Report 2008-2013

Solid Waste Management Situationer

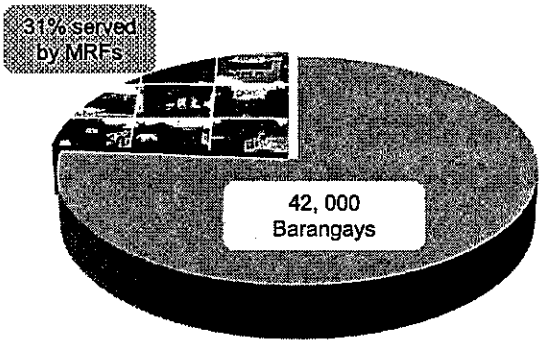
Percentage (%) contribution of the various sources of MSW

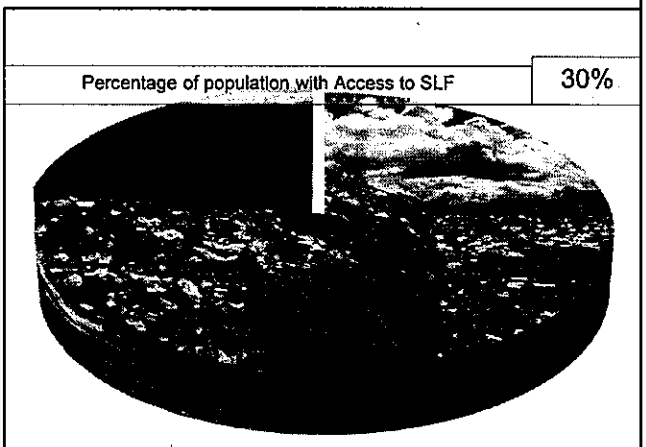


Percentage (%) by weight of MSW fractions in the Philippines



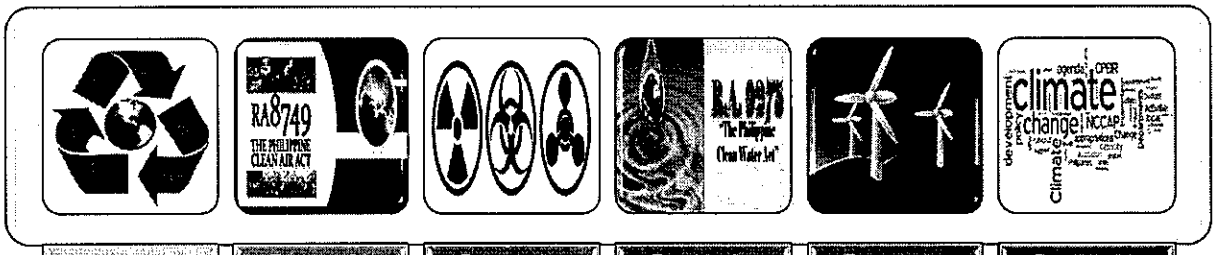
Solid Waste Management Situationer





APPROACH TO THE SITUATION

Legislations



Republic Act 9003	Republic Act 8749	Republic Act 6969	Republic Act 9275	Republic Act 9513	Republic Act 9729
Ecological Solid Waste Management Act of 2000 under the National Solid Waste Management Commission	Philippine Clean Air Act of 1999	Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990	Philippine Clean Water Act of 2004	Renewable Energy Act of 2008	Climate Change Act of 2009

APPROACH TO THE SITUATION

ECOLOGICAL SOLID WASTE MANAGEMENT ACT

(R.A. NO. 9003; JANUARY 26, 2001)t is proper wmanagement?

- Guide in proper solid waste management.
- Created the National Solid Waste Management Commission to prepare National Solid Waste Management Framework, approve and monitor 10-yr LGU SWM plans, among others.
- Local government units mandated to implement proper solid waste management
- Mandates Closure of Open and Controlled Dumpsites
- Sanitary Landfill as Final Disposal

APPROACH TO THE SITUATION

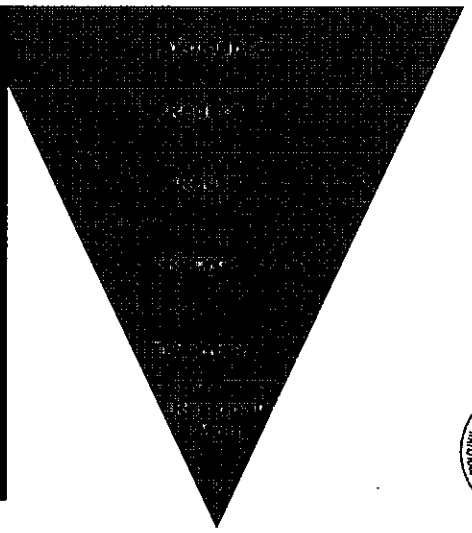
Ecological Solid Waste Management Act of 2000

Mandatory segregation at source
(Section 21 RA 9003)

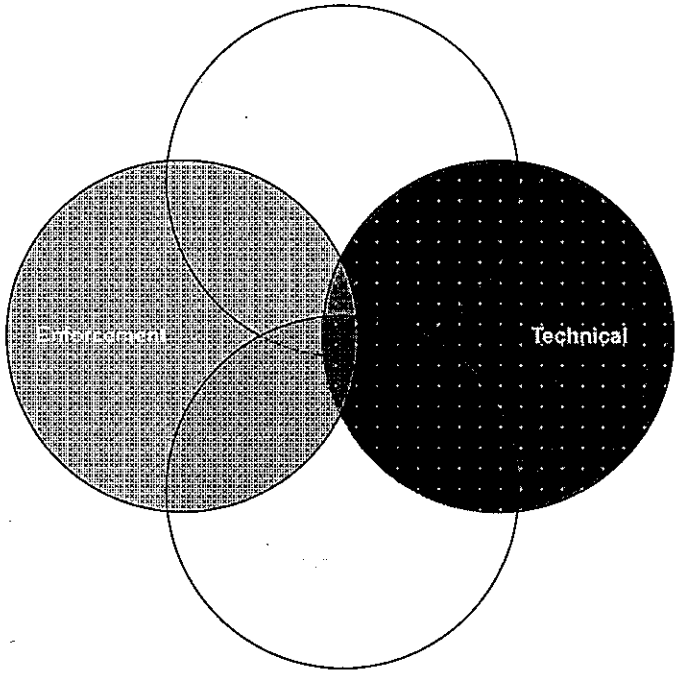
Mandatory segregated collection;
(Section 1 Rule X, IRR)

Mandatory waste diversion goal of at least 25%;
(section 20 RA9003)

Establishment of Materials Recovery Facilities;
(section 32 RA 9003)

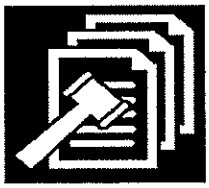


APPROACH TO THE SITUATION



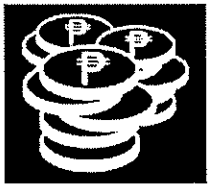
APPROACH TO THE SITUATION

National Solid Waste Management Strategy

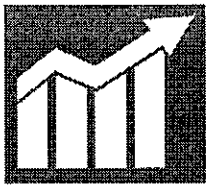


1. BRIDGING POLICY GAPS AND HARMONIZING POLICIES

2. CAPACITY DEVELOPMENT, SOCIAL MARKETING AND ADVOCACY



3. SUSTAINABLE SWM FINANCING



4. CREATING ECONOMIC OPPORTUNITIES

5. SUPPORT FOR KNOWLEDGE MANAGEMENT ON TECHNOLOGY, INNOVATION AND RESEARCH

6. ORGANIZATIONAL DEVELOPMENT AND ENHANCING INTER-AGENCY COLLABORATION

7. COMPLIANCE MONITORING, ENFORCEMENT AND RECOGNITION

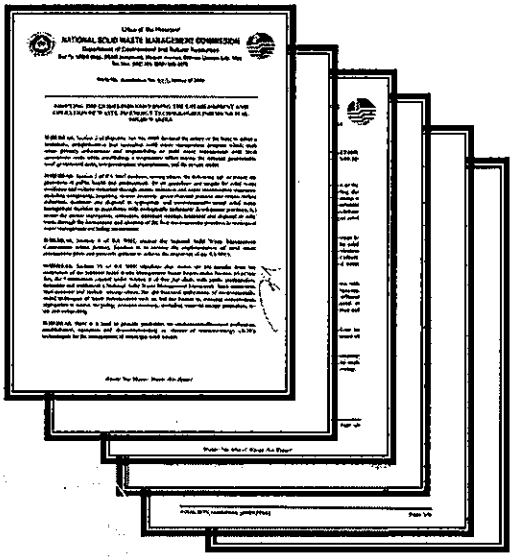
8. CROSS-CUTTING ISSUES:
a) GOOD GOVERNANCE
b) CARING FOR VULNERABLE GROUPS
c) REDUCING DISASTER AND CLIMATE CHANGE RISK

APPROACH TO THE SITUATION

Ombudsman Morales and Sen. Legarda during the ceremonial filing of complaints against local officials over illegal dump sites. YUJI VINCENT GONZALES/INQUIRER.net
http://newsinfo.inquirer.net/763517/ombudsman-probes-local-govt-execs-over-illegal-dump-sites#ixzz3zuhoibdr

APPROACH TO THE SITUATION

Approved Guidelines Governing The Establishment And Operation Of Waste-to-Energy Technologies For Municipal Solid Waste

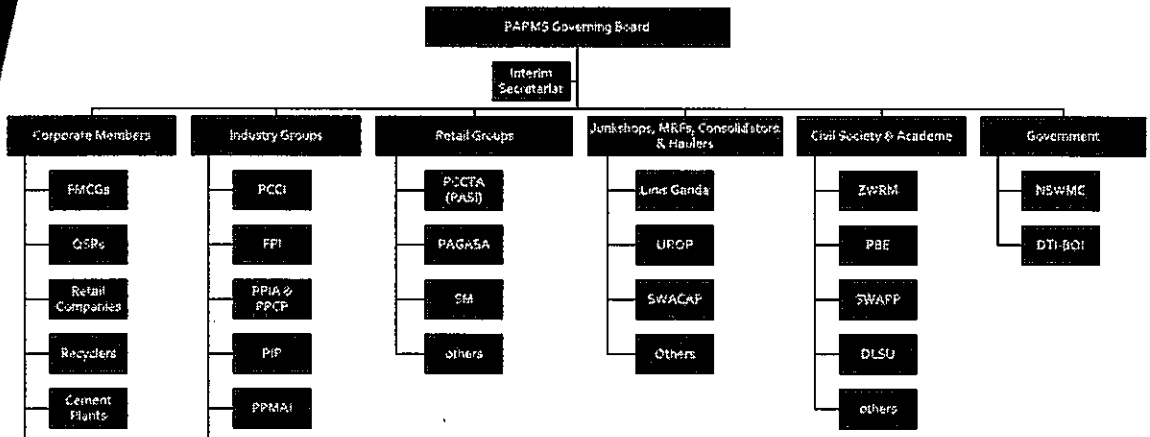


Objective: to provide guidelines on environmentally-sound evaluation, establishment, operation and de-commissioning or closure of ***waste-to-energy (WTE) technologies*** for the management of ***municipal solid wastes.***

Scope and Coverage: The guidelines set the registration and permitting requirements, standards and procedures on the establishment and operation of commercial-scale WTE combustion technologies utilizing municipal solid wastes, which include among others.

APPROACH TO THE SITUATION

Philippine Alliance for Recycling and Material Sustainability (PARMS)



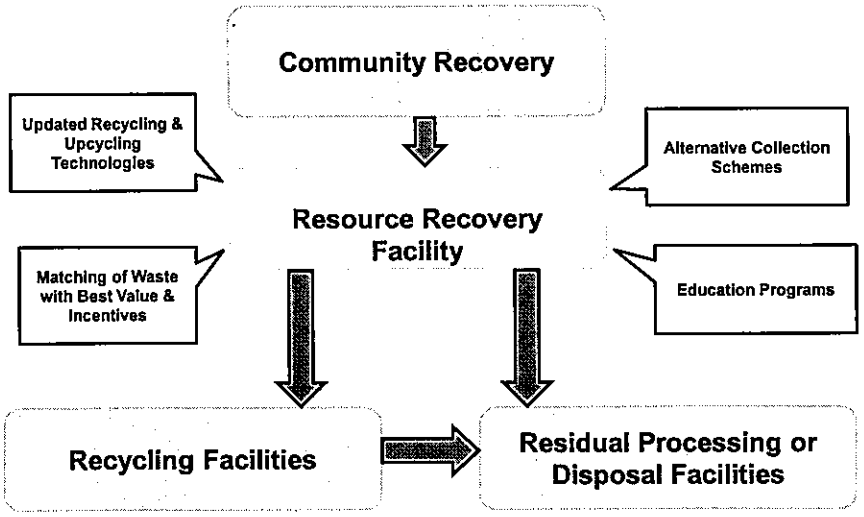
Objective: "Develop and Implement a Holistic & Comprehensive Program to Increase Resource Recovery and Reduce Landfill Dependence towards Zero Waste"

Concept Adopted: Full Waste Recovery and Recycling program

APPROACH TO THE SITUATION

Full Waste Recovery & Recycling Program

4-level Waste Diversion Scheme



Program Plan

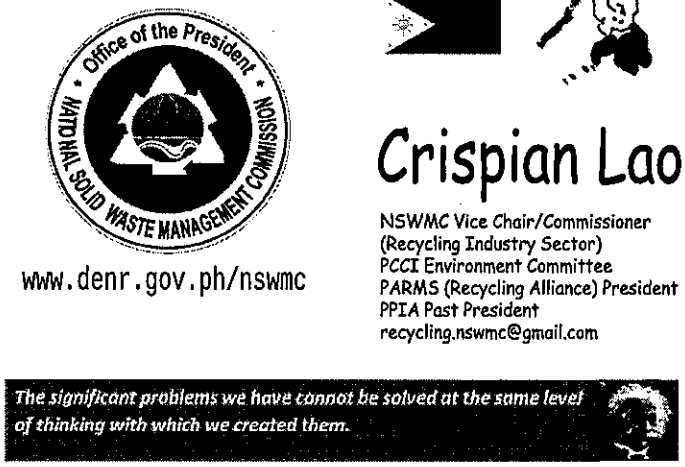
- **Component 1: IEC Campaign** to be developed geared towards proper disposal, recovery, and treatment. (using marine litter, health, etc)
- **Component 2: Recovery System.** Working with **Existing Programs** (e.g. Waste Markets, **DENR-DepEd's "Eco Savers", Unilever's "Misis Walastik Redemption ng Plastik"** and **Nestle's "Laki sa Tibay"**) to collect residual plastic for conversion to a marketable product.
- **Component 3: Collection from Recovery Points.** LGU to handle this through Barangays or LGU CENROS to bring it to a common storage area or treatment facility in line with the waste diversion targets.
- **Component 4: Technical Assessment.** We plan to work with DOST and other Industry "experts" to assess existing technologies (from hollow blocks, bricks, school chairs) including the proper BAT (Best Available Technologies) BEP (Best Environmental Practice and keep an eye on emerging and even developing new technologies
- **Component 5: Treatment Facility.** Following the model of GREEN ANTZ Eco-bricks or Villar SIPAG's plastic to school chairs factory. Managed by the community or cooperatives (preferably NOT LGU) under the supervision of PARMS to control the operations, monitor the data and will have the right to retrieve (confiscate) the equipment if it is not running. With a business model that runs itself without need of external funding support. LGU provides the land and structure, Industry provides the Equipment with no cost recovery or develop a revolving fund (if financial feasibility allows)

Thank you for your attention!

www.denr.gov.ph/nswmc

Crispian Lao

NSWMC Vice Chair/Commissioner
(Recycling Industry Sector)
PCCI Environment Committee
PARMS (Recycling Alliance) President
PPIA Past President
recycling.nswmc@gmail.com



World cities generate over 1.3 billion tons of solid waste per year. Population growth, economic development, combined with lifestyle and consumption patterns are increasing the amount of waste generated worldwide. Waste-related problems are often handled in an uncoordinated manner, mainly focusing on "end-of-pipe" solutions as opposed to preventive and vertically integrated approaches. A shift to reduce, reuse, recycle, and recover is essential to achieve the economic, environmental and social objectives of as called for in the UN Conference on Sustainable Development (Rio+20) declaration. This session will look at how APEC members are developing strategies to meet their own particular circumstances as well as some of the best practices and principles that can be used when developing a strategy. The session will also include a discussion **on establishing ambitious yet realistic targets based on the best available information as well as how that information can be collected and curated.**

Moderator: Anjali Acharya, World Bank

Speakers:

Indonesia Pak Sudirman, Director of Solid Waste Management

Philippines Crispian Lao, National Solid Waste Management Commission, Philippines

Vietnam Luu Duc Cuong, Ministry of Construction, Vietnam

Setting targets and measuring performance Hermann Koller, International Solid Waste Management Association

VIUP

MINISTRY OF CONSTRUCTION

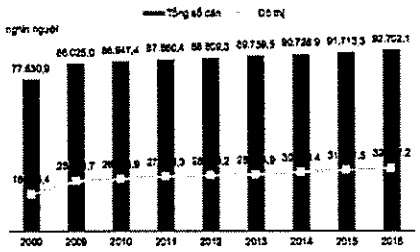
VIETNAM INSTITUTE FOR URBAN AND RURAL PLANNING

SOLID WASTE MANAGEMENT IN VIET NAM

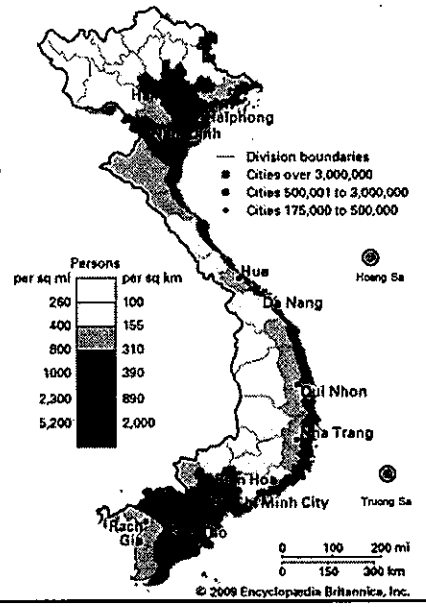
Assoc. Prof. Dr. Luu Duc Cuong
Director General of VIUP

1. Current Status
2. Legal provisions and strategies
3. Challenges
4. Directions

Area: 331,114 km²
Coastal length: ~ 3,400 km
Population: 92.7 mil. (2016)
Urbanization rate: 35.2%
795 cities (2016):
•02 special (Hanoi capital; Ho Chi Minh City
•17 grade I
•25 grade II
•125 grade III&IV
•626 grade V



Population size and growth 2000-2016
(General statistical agency, 2015)



- 2003-2010, solid waste generation increases 200%
- 2012: Total amount of solid waste: **57,410 tons/day**
- 2015: Urban domestic waste: **38,000 tons/day**
- urban domestic waste growth rate: **12%/year** (2011-2015)

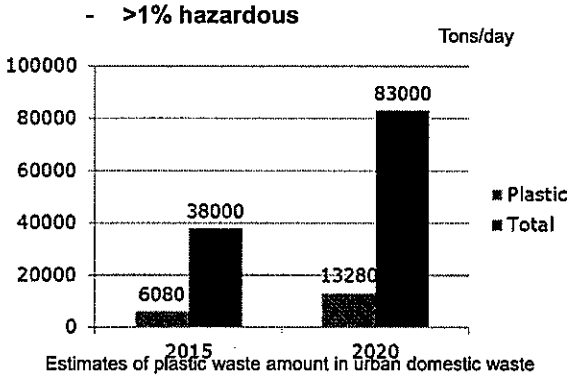
Solid waste Generation in 2012

No.	Region	Toral generation (ton/day)			
		Domestic waste in urban area	Industrial waste	Industrial Hazardous waste	Medical waste
1	*The Red River Delta*	9346.13	7249.12	1366.68	18.6
2	*The Northern Midland and Mountain*	1077.75	1314.57	188.63	11.96
3	*The North Central and Central Coast*	4,146.37	5,447.12	1,137.17	15
4	*The Central Highlands*	1,268.66	459.51	65.24	2.48
5	*The East Southern*	8,981.35	7,567.46	1,583.15	14.7
6	*The Mekong River Delta*	3625.82	2163.12	352.03	7.49
	Whole Country	***28,446.08***	***24,200.90***	***4,692.90***	***70.23***

National environmental statement 2011-2015

By 2020:
-urban domestic waste: **61,600 tons/day**
-Industrial waste: **25,000 tons/day**

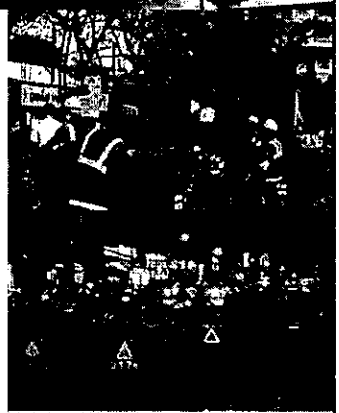
- Composition of domestic waste different among cities due to social-economic condition.
  - **54-77% organic**
  - **8-16% plastic, nylon**
  - **2% metal**
  - **>1% hazardous**

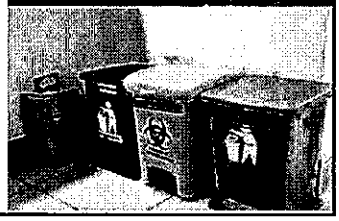


Estimates of plastic waste amount in urban domestic waste

Vietnam is one in five countries most discharging plastic waste to the ocean *(Ocean Conservancy)*

- 63 Urban Environmental Companies (URENCO) in 63 provinces/cities
- Collection rate of urban municipal SW: **85.3% (2015)**
- Collection rate in big cities (Hanoi, Danang, Hue, HCM, Hai Phong): **95-100%**
- Collection rate at rural area: **40-55%**
- Majority of Industrial and medical solid waste is separated and collected as legal regulations.





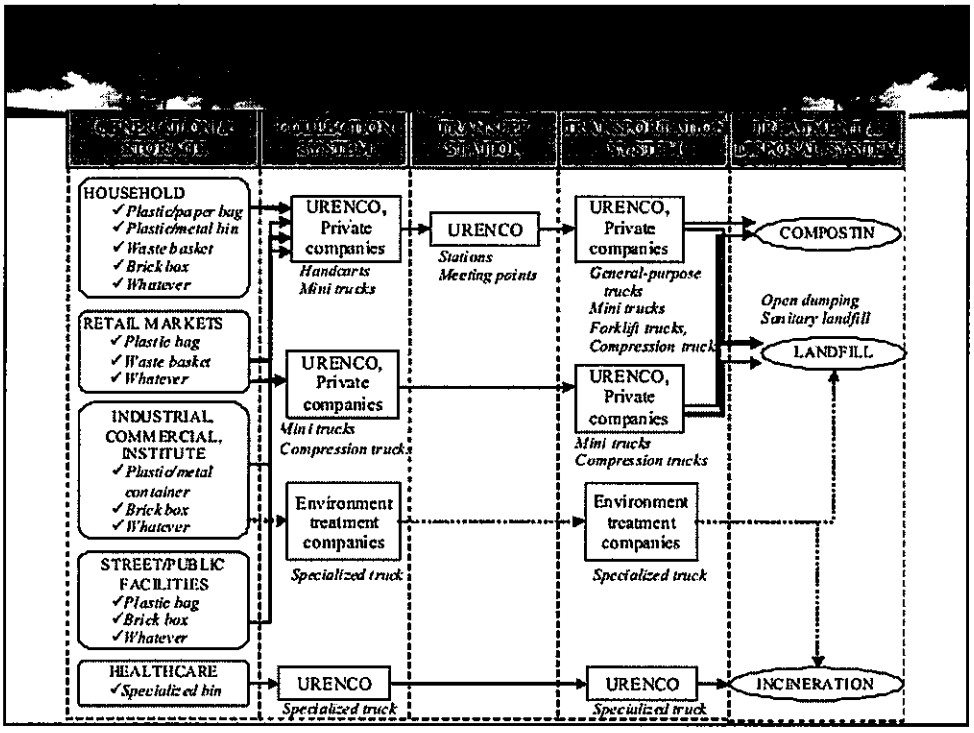
National environmental statement 2011-2015 Ministry of Construction

- Main SW treatment method: sanitary landfills (70-80%); small, temporary, and open dumping site -> pollution
- **26 disposal facilities (2014)** was implemented regarding to *National solid waste disposal program 2011-2020*: 04 incineration; 11 incineration and composting; 11 composting;.
- No effective model for treating and recycling domestic waste, no sorting at generation sources -> Organic product quality is low; difficult to select appropriate technology
- Small-scale incinerators installed: Dioxin and Furan pollution risk
- Most of 63 cities/province have formulated solid waste management plans.

National environmental statement 2011-2015 Ministry of Construction

Plastic waste treatment

Landfill	*Incineration*	*Recycle*
• Not a good way to deal with plastic waste	• Apply to plastic and hazardous waste from medical waste • Residual to landfill	• Recycled by small and medium companies or informal sector • Inappropriate technology -> pollution and unsafe products • Lack of recycled product quality control



Legal provisions

- Law on Environmental protection 2015 has provisions on waste management in general, hazardous waste, normal solid waste and waste-water management.
- Law on Construction 2015
- Law on Urban planning 2009
- Decree No. 59/2007/ND-CP dated on April 9, 2007 by the Prime Minster promulgating the regulations on the solid waste management activities, responsibility of individuals and organization related to solid waste management.
- Decree No. 38/2015/NĐ-CP dated on 24/04/2015 by the Prime Minister promulgating the regulations on waste management including hazardous waste, solid and liquid waste, industrial solid waste, waste water and industrial emissions.
- Decree No.04/2009/ND-CP dated on 14 Jan, 2009 by the Government on stipulating incentives and supports for environmental protection activities.
- Circular No. 13/2007/TT-BXD dated on 31/12/2007 guiding to implement some articles of Decree No.59/2007/ND-CP on solid waste management.

Legal provisions

- Circular No 36/2015/TT-BTNMT dated on 30/06/2015 regulating hazardous waste management.
- Decision 1216/QĐ-TTg dated on September 05, 2012 by the Prime minister approving the National Strategy on Environment protection to 2020 and vision to 2030.
- Decision No.2149/2009/QD-TTg dated on December 17, 2009 by the Prime Minister on approving the national strategy for integrated management of solid waste up to 2025, with a vision to 2050.
- Decision No.1440/QD-TTg dated on October 06, 2008 of the Prime Minister approving the Planning on construction of solid waste treatment facilities in three northern, central Vietnam and Southern key economic regions up to 2020; (The solid waste management planning for these regions is being adjusted).
- Decision No. 31/2014/QD-TTg dated on May 05, 2014, on supporting mechanism for development of electric power generation projects using solid waste in Vietnam.

Technical regulations and standards

- QCVN 07: 2009 on technical regulations for hazardous waste threshold
- QCVN 02:2008/BTNMT - National Technical Regulation on emission of health care solid waste incinerators
- QCVN 02: 2008 – National Technical regulation on emission outlet gas from medical solid waste incinerators
- QCVN 30:2010/BTNMT - National Technical Regulation on emission of industrial waste incinerators
- QCVN 07:2010/BXD - Urban Engineering Infrastructure, Chapter 9 on Solid waste.
- QCVN 25:2009/BTNMT – National Technical Regulations on Wastewater of the Solid waste landfills
- TCVN 6696-2009 - Requirement for environmental protection for sanitary landfills
- QCVN 25: 2009 technical standards requirements and characteristics of leachate from municipal waste landfills

Ministry of Natural resources and Environment: State management in environmental protection; issue guidelines, regulations, and standards on waste management; hazardous waste management

Ministry of Construction: municipal solid waste management and landfill sitting; developing and managing plans for the construction of solid waste facility related infrastructures nationally and provincially.

Ministry of Industry and Trade: guiding, supervising the implementation of the environmental protection law and other regulations related to industry, steering to develop the environmental industry.

Ministry of Health: medical waste management

Ministry of Agriculture and Rural Development: agricultural waste mgt.

Ministry of Science and Technology: Assessing waste treatment technologies which are recently studied and applied the first time in Viet Nam

Strategy

Overall objectives

- Efficient improvement of *integrated solid waste mangement*
- Advanced and appropriate technology application for source separation, collection, reuse, recycle and treatment
- Public awareness raising on *integrated solid waste mangement* and creation of environmentally friendly lifestyle

Specific objectives to 2025

- ❖100% of cities have recyclable facilities, sorting waste at households
- ❖100% of total amount of generated urban solid waste is collected and treated to environmental protection
- ❖90% of total amount of generated construction solid waste is collected and treated
- ❖85% reduction of plastic bags in supermarkets and shopping centers compared to 2010
- ❖100% of total amount of non-hazardous and hazardous industrial waste are collected and treated to environmental protection
- ❖90% of generated *SW* in rural residential areas and 100% of *SW* in craft villages are collected and treated.

Main tasks

- ❖ Reduce *SW* generation (*Integrated SWM* following market-based mechanism, *SW* reduction, imported *SW* limitation)
- ❖ Source separation improvement (capacity strengthening, collection network expansion, socialization, etc.)
- ❖ 3R enhancement (Reduce, Reuse, Recycle; market development, waste economy development; recycling fund establishment, etc.)
- ❖ *SW* treatment (policy development, advanced technology application, etc.)
- ❖ Environmental recovery (Guidelines, financial mobilization for environmental restoration)

Challenge

Main solutions for Implementation

❖Completion of legal provisions; mechanism and policy on solid waste management

❖Solid waste management planning

❖Establishment of national solid waste database and monitoring system

❖Resource mobilization for Strategy implementation

❖Scientific research to support SWM

❖Dissemination and awareness raising

❖International cooperation

- Overlaps in functions and responsibilities of relevant ministries and agencies
- Policies do exist but overlaps and conflicts still remain
- No legal document specialized for e-waste
- Waste is not separated at sources
- Lack large-scale centered treatment complex for industrial solid waste and hazardous waste
- Recycling: small-sized, spontaneous, informal, and difficult to control, applying backward technologies leading to pollution.
- Selection of appropriate treatment technology for Vietnam conditions
- Policy and enforcement to mainstream solid waste management plans in practical implementation.
- Plastic waste becoming a big issues

Solid waste

- Separation at source
- Improved collection
- Appropriate treatment technology
- Formal recycling sector
- Economic incentives for waste reduction
- Green growth

Technology

Plastic waste

- Studies on plastic waste & its impacts on the marine
- Specific legal texts
- Economic incentives
- Controlled quality of recycled products by informal sector
- Appropriate treatment methods
- Awareness raising

Management

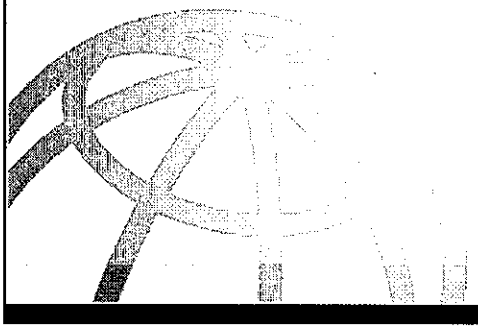
THANK YOU!

WORLD BANK GROUP

APEC High-Level Meeting on

Accelerating Waste Management Solutions to Reduce Marine Litter

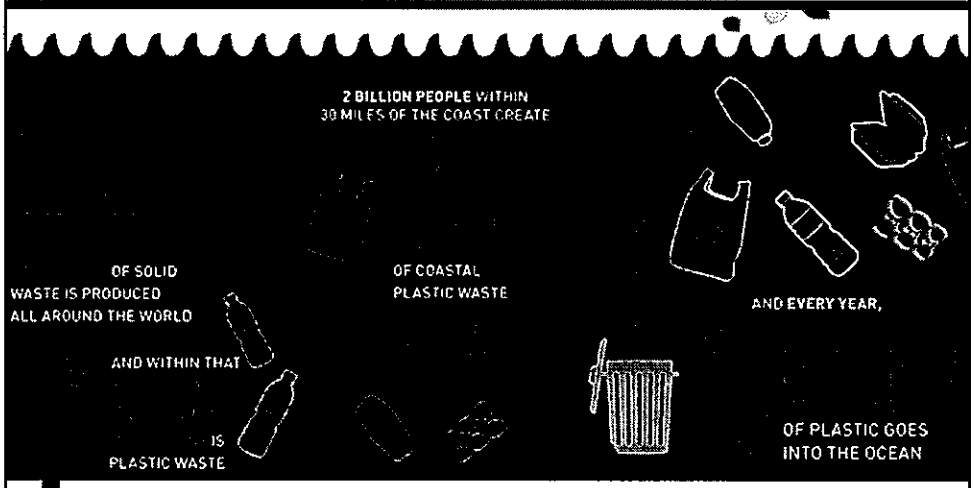
Designing and Implementing National Strategies



Dr. Anjali Acharya
Senior Environmental Specialist
The World Bank

September 5, 2017

Marine Litter ... a serious problem

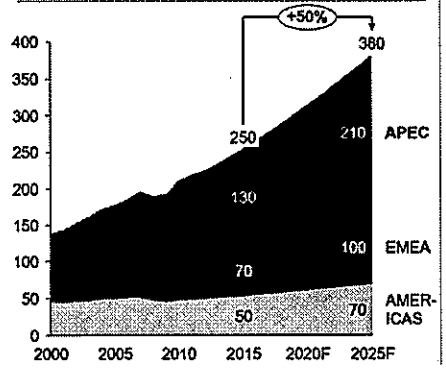


1

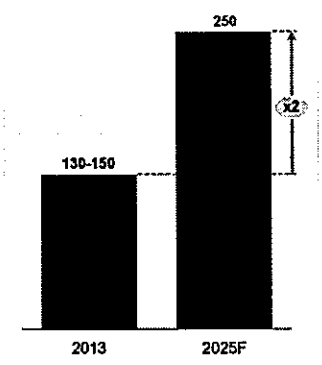
Marine Litter ... a crisis getting worse

Plastic production is forecasted to grow 50% in 10 years, with ocean plastic debris set to reach 250m tons by 2025

Global plastics production by region
Million tons plastic produced annually, 2000-2025F



Ocean plastic debris
Million tons estimated to be in the ocean

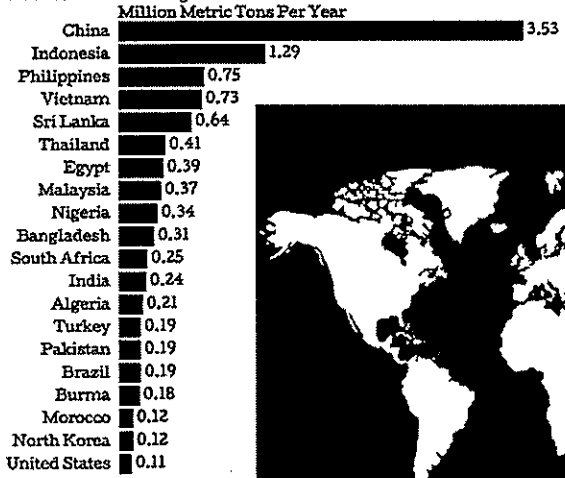


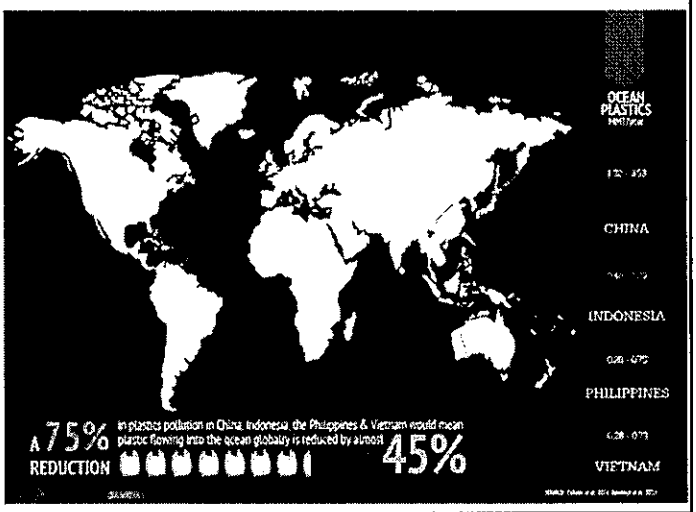
Source: ICIS Supply and Demand database; SPI's 2015 Global Business Trends

Ocean Conservancy

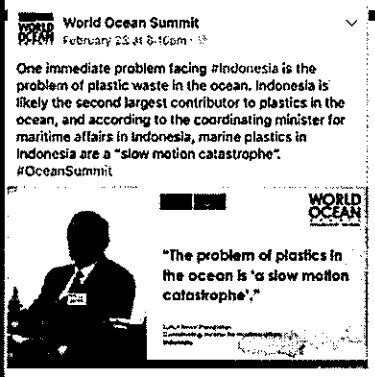
Oceans Plastics: Regional Dimension

Plastic Debris Entering World Oceans
Million Metric Tons Per Year





International Leadership



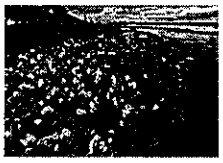
"Litter and micro-plastics in oceans and marine food chains are spreading at a catastrophic pace. We urgently need to identify the pathways of pollution, from land to sea, and take necessary action..."

Isabella Lövin, Minister for International Development Cooperation and Climate and Deputy Prime Minister

Alignment to Government Programs/Plans

Customize to each country by

- *Capacity (tech and financial)*
- *Political commitment*
- *Awareness*
- *Development priorities*
- *Existing gaps, and needs*



Regional Program and National/ Local Agendas

Regional resources

- *To enhance leadership, implementation and quality of government efforts*
- *Capacity building, TA, analytics, policy advisory and piloting*

Coordination

- *Convene stakeholders: government, private sector, civil society*
- *Share knowledge, policy dialogue, harmonize activities*

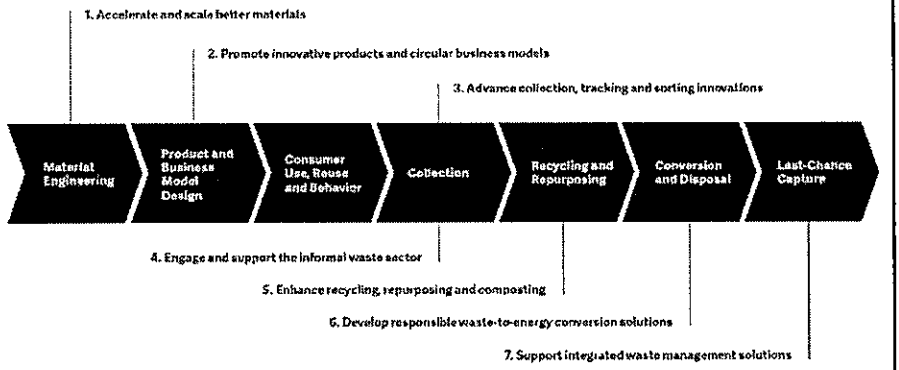
Leverage global financing and expertise

- *Crowding in technical expertise, partnerships and global knowledge*

Different Dimensions

5

Approach to Marine Litter Management



From "Sea of Opportunity: Supply Chain Investment Opportunities to Address Marine Plastic Pollution", Moss E; Eidson A; Jambeck J. http://plasticreport.vulcan.com/download/

Principles:
- Pick solution at appropriate part of the supply chain
- Early interventions better than late ones...
- ...but avoid simplistic 'the earlier the better'

ISWM - Types of Waste Composition by Income Level

Initial focus on marine litter – plastics waste

Income Level	Organic (%)	Paper (%)	Plastic (%)	Glass (%)	Metal (%)	Other (%)
Low Income	64	5	8	3	3	17
Lower Middle Income	59	9	12	3	2	15
Upper Middle Income	54	14	11	5	3	13
High Income	28	31	11	7	6	17

Income Level	Organic (%)	Paper (%)	Plastic (%)	Glass (%)	Metal (%)	Other (%)
Low Income	62	6	9	3	3	17
Lower Middle Income	56	10	13	4	3	15
Upper Middle Income	50	15	12	4	4	15
High Income	28	30	9	7	6	16

- **Plastic Waste:** highest share in LMI followed by UMI and HIC (somehow lower in LI countries). E.g. Philippines 14%; Vietnam 16%

↓

- Highest plastic waste accumulation in LMI and as source for "plastic gyres" in marine areas surrounded by LMIs (e.g. South China Sea)

World Bank engagement

Comparative advantage:
- *Convening power, e.g. round table on marine litter*
- *Strong analytics to support policy, plans, programs*
- *Technical expertise, global networks*
- *Broad country programs in target countries*

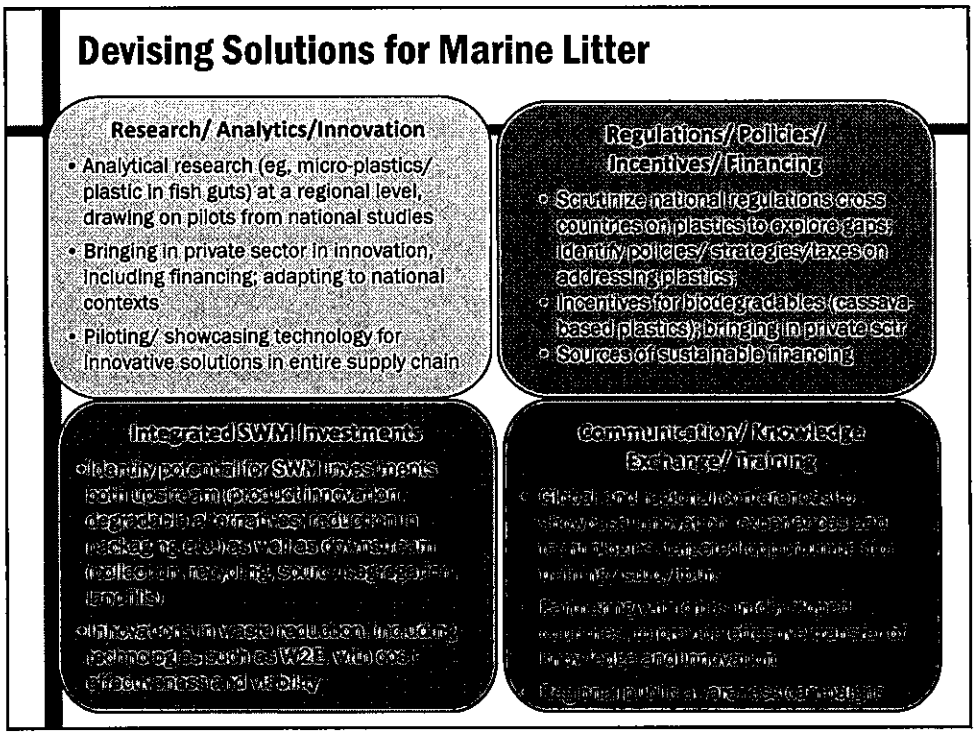
World Bank related
Pipeline and Portfolio in South-East Asia Target countries

- *Broad country programs in target countries*
  - Policy reforms through DPFs (e.g. Vietnam)
  - TA work to advance agenda on ISWM (e.g. Indonesia, Vietnam)
  - Investment operations addressing SWM (e.g. China, Indonesia)
- *Working across sectors (environment, urban, water, climate)*
- *Technical expertise, global conferences*

Marine Litter Management in South-East Asia

- Linked to large national program for Indonesia; and parallel national programs in China, Vietnam, potentially Philippines
- WB activities:
  - *PMEH program to develop regional strategy, focused on South-East Asia Marine Debris Management financed by PMEH donors*
  - *Indonesia potential MDTF focused on country-level analysis and options*
- Develop elements of a **regional and national programs** to:
  - *Understand source structure;*
  - *Estimate quantities and characteristics of marine debris;*
  - *Undertake costing of potential solutions;*
  - *Develop and links to national/local investment plans.*

9


Devising Solutions for Marine Litter
Research/ Analytics/Innovation
• Analytical research (eg. micro-plastics/ plastic in fish guts) at a regional level, drawing on pilots from national studies
• Bringing in private sector in innovation, including financing; adapting to national contexts
• Piloting/ showcasing technology for innovative solutions in entire supply chain
Regulations/ Policies/ Incentives/ Financing
• Scrutinize national regulations cross countries on plastics to explore gaps; identify policies/ strategies/ taxes on addressing plastics;
• Incentives for biodegradables (cassava-based plastics); bringing in private sctr
• Sources of sustainable financing
Integrated SWM Investments
Communication/ Knowledge Exchange/ Training