行政院所屬各機關因公出國人員出國報告書

（出國類別：考察）

# 「赴歐洲交流『碳交易、碳邊境調整機制及其他氣候政策』」出國報告


**服務機關**：環境部

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**派赴國家/地區：德國、比利時、英國**

**出國期間**：113年9月9日至9月18日

**報告日期**：113年12月18日

# 摘　要

本次赴歐係由本部彭啓明部長率同仁曹志弘簡秘書、蔡玲儀署長、郭孟芸組長、梁喬凱科長、葉惠芬科長、洪瑞均技士，以及智庫團隊環科工程顧問股份有限公司余志達副總、莊惠如經理、永智顧問股份有限公司石信智總經理、黃依柔助理，於 2024 年 9 月 9 日至 9 月 18 日赴德國柏林、德國波昂、比利時布魯塞爾與英國倫敦，拜會職掌氣候變遷因應事務之相關政府部門或機構，以完整了解氣候變遷政策推動之情形及方向，作為我國推動氣候變遷相關政策參考借鏡。

此行前往德國排放交易局（Deutsche Emissionshandelsstelle, DEHSt），共同辦理為期 2 日之臺德碳交易研習會議，並以碳定價為主題，與德國排放交易局官員就德國實施國家排放交易制度經驗進行討論，將深化雙方碳訂價機制交流，臺德交流將邁向第二階段。在德國期間亦拜訪德國聯邦環境、自然保護、核安和消費者保護部（The Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection, BMUV）、德國聯邦環境署（Umweltbundesamt, UBA）、德國經濟事務與氣候行動部(Federal Ministry for Economic Affairs and Climate Action, BMWK)、國際碳行動夥伴組織（The International Carbon Action Partnership, ICAP）及歐盟環境智庫 Adelphi，分享我國近期推動碳費制度，並交流氣候變遷因應事務。

在比利時，拜訪歐盟內部市場、產業、創業和中小企業總署（Directorate General for Internal Market, Industry,, Entrepreneurship and SMEs, DG GROW）、歐盟環境總署（Directorate General Environment, DG ENV）、歐盟氣候行動總署（Directorate General Climate Action, DG CLIMA），就氣候變遷、碳交易、空氣品質管理、化學物質管理、塑膠公約及循環經濟等環境議題進行交流，並說明我國已於 8 月底公布碳費 3 項子法，將於明(2025)年度試行碳費申報，後(2026)年正式開徵碳費，也規劃於 4 年內啟動總量管制與排放交易，向國際展現我國落實減碳的具體作法。

本次訪歐最後前往英國，拜訪英國能源安全與淨零部門（Department for Energy Security and Net-Zero, DESNZ）及英國氣候變遷委員會（Climate Change Committee, CCC），就能源脫碳政策、減碳目標及氣候變遷調適政策進行意見交流。

# 目　錄

# 赴歐洲交流「碳交易、碳邊境調整機制及其他氣候政策」出國報告

## 一、目的

我國自西元（下同）2013 年以來，與德國就排放交易經驗議題維持良好合作關係，並於 2018 年 4 月完成《臺德碳交易合作意向書共同宣言》簽署。本署與德國排放交易局（Deutsche Emissionshandelsstelle, DEHSt）每年以互訪機制進行交流，今（2024）年於德國舉辦「臺德碳交易研習會議」，將與德國進行碳交易領域之技術層級交流，延續資訊與經驗分享的合作關係。透過拜會德國執掌氣候變遷因應事務之相關政府部門或機構，包含德國聯邦環境、自然保護、核安和消費者保護部（BMUV）、德國外交部亞太司（Abteilung Asien und Pazifik）、德國聯邦環境署（UBA）、德國經濟事務與氣候行動部（BMWK）、國際碳行動夥伴組織（ICAP）及歐盟環境智庫 Adelphi，以深化臺德雙邊友好關係。

為瞭解歐盟 Fit for 55 溫室氣體減量政策最新進展、歐盟排放交易制度改革及歐盟淨零工業法案最新進展，本次拜會歐盟內部市場、產業、創業和中小企業總署（DG GROW）、歐盟環境總署（DG ENV）及歐盟氣候行動總署（DG CLIMA），有助我國瞭解歐盟排放交易制度，並建立溝通管道。

另為瞭解英國制定碳預算與因應氣候變遷的戰略方式，本次拜會英國能源安全與淨零部門（DESNZ）英國氣候變遷委員會（CCC），有助於我國規劃減碳預算及做為我國氣候變遷對策委員會運作參考。

因我國「碳費徵收辦法」已正式實施，臺灣進入碳定價時代，未來將啟動碳交易機制的測試，本次訪歐拜會國際氣候變遷執掌相關單位，將更彰顯我國碳定價與國際交流的重要性。

## 二、過程

### （一）行程表

2024 年 9 月 9 日（一）至 9 月 18 日（三）前往歐洲，行程如下：

| 日期 | 行程 | 住宿地點 |
|---|---|---|
| 9 月 9 日<br>(一) | ●啟程 | 機上歇夜 |
| 9 月 10 日<br>(二) | ●準備拜會資料 | 德國柏林 |
| 9 月 11 日<br>(三) | ●臺德碳交易研習會議（第 1 日）<br>●拜會德國碳排放交易局（DEHSt） | 德國柏林 |
| 9 月 12 日<br>(四) | ●臺德碳交易研習會議（第 2 日）<br>●拜會德國碳排放交易局（DEHSt）<br>●拜會德國聯邦環境、自然保護、核安和消費者保護部（BMUV）<br>●德國外交部亞太司<br>●拜會德國聯邦環境署（UBA） | 德國柏林 |
| 9 月 13 日<br>(五) | ●拜會國際碳行動夥伴組織（ICAP）秘書處<br>●拜會歐盟智庫 Adelphi<br>●拜會德國經濟事務與氣候行動部（BMWK） | 德國柏林 |
| 9 月 14 日<br>(六) | ●參訪瑞曼迪斯（REMONDIS）德國廠<br>●拜會歐盟綠色數位聯盟(EGDC)及全球永續賦能倡議組織（GeSI）負責人 Luis Neves | 德國波昂 |
| 9 月 15 日<br>(日) | ●彙整出國資料 | 比利時布魯塞爾 |
| 9 月 16 日<br>(一) | ●拜會歐盟內部市場、產業、創業和中小企業總署（DG GROW）<br>●拜會歐盟環境總署（DG ENV）<br>●拜會歐盟氣候行動總署（DG CLIMA） | 比利時布魯塞爾 |
| 9 月 17 日<br>(二) | ●拜會英國能源安全與淨零部門（DESNZ）<br>●拜會英國氣候變遷委員會(CCC)<br>●返程 | 英國倫敦 |
| 9 月 18 日<br>(三) | ●抵達臺灣 | 機上歇夜 |

## （二）行程內容摘述

### 1、臺德碳交易研習會議及拜會德國排放交易局（DEHSt）

此行由本部彭啓明部長率隊，在駐德國代表處特任大使謝志偉陪同下，與本部同仁共同出席臺德碳交易研習會議，本部團員包括曹志弘簡任秘書、蔡玲儀署長、郭孟芸組長、梁喬凱科長、葉惠芬科長和洪瑞均技士，以及駐德國代表處姜予歆秘書、我方智庫永智顧問股份有限公司石信智總經理和黃依柔助理、環科工程顧問股份有限公司余志達副總經理和莊惠如經理。

德國排放交易管理局(DEHSt)為德國聯邦環境署(UBA)下，負責執行歐盟總量管制與排放交易(Emission Trading System, ETS)與德國國家排放交易計畫(nEHS)的主管機關，也是參與 ETS 企業、查驗機構、及民眾的主要溝通窗口。我國自 2018 年 4 月完成《臺德碳交易合作意向書共同宣言》簽署。本署與德國排放交易局每年以互訪機制進行交流，雙方都有很好互動，每年以碳定價或碳市場為主題，共同舉辦研討會或研習訓練課程，一年在臺灣，一年在德國。疫情期間則改為視訊方式辦理，今(2024)年在德國柏林舉辦「臺德碳交易研習會議」，與德國進行碳交易領域之技術層級交流。

本次研習交流會由德國排放交易局局長 Dr. Jürgen Landgrebe 主持，先介紹歐盟及德國氣候政策近期發展、接著由德國排放交易管理局專家分享歐盟 ETS 重要單元（包括排放總量設定、標竿值設定、碳洩漏風險、排放許可配額、排放量申報、登錄、查驗等）、歐盟碳邊境調整機制、國際航空業碳抵換及減量計畫（CORSIA）及歐盟 ETS 2，本部則分享我國碳費制度及實施期程，雙方就各議題進行深度交流討論，交流討論議題摘要如下：

**(1)歐盟與德國氣候政策發展**

歐盟為實現對於《巴黎協定》目標的貢獻，公布《55 套案（Fit for 55）》，具體承諾 2030 年溫室氣體淨排放量比 1990 年減少 55%，此立法涵蓋能源供應、工業、交通、家庭及土地利用等多個領域。為配合歐盟目標，德國在能源部門，計畫於 2038 年逐步淘汰燃煤發電廠；在工業部門，推出國家脫碳計

畫，挹注資金促進工業部門採用低碳技術減少溫室氣體排放；在建築部門，推動新安裝的供暖設備，至少 65%能源須來自再生能源；在農業與土地利用部門，推動有機農業及減少氮肥的使用。德國更進一步訂定 2030 年溫室氣體淨排放量比 1990 年減少 65%之目標，並於 2045 年實現氣候中和（climate neutral）。

**(2)德國監測、報告與驗證(Monitoring, reporting and verification, MRV)制度**

設施若為 ETS 的納管對象，其運營者（Operator）就必須提交監測計畫（Monitoring Plan, MP），經 DEHSt 批准後依監測計畫中的方法編撰年度排放報告，並於每年 3 月 31 日前，將經查驗的年度排放報告提交給 DEHSt，另營運營者必須在每年 9 月 30 日前提交配額（Allowances），由主管機關負責審查後並提出報告改進的相關事項，並透過改善報告來精進監測計畫。此外，設施如有鍋爐更新或燃料更換等，應主動報告並修正監測計畫，而後 DEHSt 會再次審核監測計畫，視需求會進行現場確認。

德國境內實施之監測計畫，以線上方式執行，電子表單內容包含所需申報的溫室氣體排放數據、設施邊界及在設施外非運營者控制部分。DEHSt 已建立數位化及標準化管理工具，以加速審閱監測計畫，如是否已經將聲明發送至聯邦，聯邦是否有任何異議，又或是否有與溫室氣體有關之原物料的排放源，主管機關須取樣或分析什麼項目等。監測計畫除減輕 DEHSt 檢閱年度排放報告的負擔外，更具有較年度排放報告中更多的細節資訊，如數據品質管理和控制等。

**(3)排放交易制度改革及 EU ETS 2**

歐盟 ETS 改革具體措施包含如下：

- 排放交易的範圍將擴展至更多行業，尤其是海運與燃料的碳排放。
- 引入碳邊境調整機制（CBAM），以防止碳洩漏，確保高排放的進口產品承擔應有的碳費。
- 逐步淘汰免費配額，尤其是在航空業等行業，免費配額的減少將促進更多

的市場化調節。

EU ETS 2 針對運輸及建築物於現行 EU ETS 1 外建立一個新的獨立的 ETS，該指令於 2024 年生效、2027 年施行。管制對象為燃料經銷商或供應商，歐盟執委會預計涵蓋事業包含汽電共生設施和建築物的供暖、公路運輸、能源行業及製造業等，但排除 EU ETS 1 對象、生物質、一般及事業廢棄物、農林業及其他運輸等。EU ETS 2 目標為 2030 年前溫室氣體淨排放量比 2005 年減少 43%，透過拍賣進行配額分配，將無免費配額，配額價格交由市場機制而定，並採市場穩定機制（Market Stability Reserve, MSR）及價格抑制機制（price containment mechanisms）避免價格波動過大。

**(4)推動歐盟（Carbon Border Adjustment Mechanism, CBAM）**

EU CBAM 是整合歐盟碳定價與碳洩漏保護的創新機制，逐步替代 EU ETS 中的免費配額，並規劃將於 2034 年完全取代。CBAM 涵蓋列管進口產品包括電力、水泥、熟料、鋼鐵、鋁、肥料和氫氣，在歐盟 CBAM 過渡期期間（2023 年 10 月-2025 年 12 月）進口商須定期申報產品碳含量，無須進行查驗，無須購買 CBAM 憑證，歐盟 CBAM 於 2026 年 1 月進入正式實施期，進口商除定期申報產品碳含量外，產品碳含量須經指定第三方查驗機構查驗，亦須購買足夠的 CBAM 憑證。

德方分享歐盟 CBAM 政策，將強化全球產品碳含量的透明度，並有助於推動國際合作，達成碳排放監測、報告與驗證的協議。CBAM 的實施將促進歐盟內部及第三國的產業升級，減少二氧化碳排放，並通過透明的碳定價機制提高全球對氣候變遷的應對能力。惟對於德國境內中小型進口商而言，調查產品碳含量，須建立 MRV 系統，該系統的建立複雜且耗時，將是適應新的規範和流程的一大挑戰。

碳邊境調整機制（CBAM）是歐盟氣候政策的重要支柱，旨在通過公平的碳定價促進全球範圍內的減碳行動。CBAM 的實施不僅有助於減少碳洩漏，還能促進第三國引入二氧化碳定價，從而在全球範圍內推動減碳行

動。然而，由於 CBAM 的過渡期和正式實施期內有嚴格的時間表，進口商需迅速適應新的監測和報告要求，確保符合歐盟的規範。

**(5)國際航空業碳抵換及減量計畫（Carbon Offsetting and Reduction Scheme for International Aviation , CORSIA）最新發展**

CORSIA 是國際民航組織（International Civil Aviation Organization , ICAO）為應對航空業碳排放問題而設立的全球性機制，旨在確保航空業自 2020 年起達成碳中和增長目標。CORSIA 為全球國際航空減碳措施，分兩階段實施，第一階段 2021 年至 2026 年為自願參與階段，國家可自願選擇加入，並提交國際航空排放報告；第二階段 2027 年至 2035 年為強制參與階段，各國均強制參與。參與國家需每三年履行一次碳抵換義務，並提交國際航空排放報告。

歐盟排放交易系統（EU ETS）是全球首個碳排放交易系統，且已在航空業中應用。EU ETS 適用於歐洲經濟區（European Economic Area, EEA）內及往返英國、瑞士的航班，規定每噸二氧化碳排放量必須持有相應的排放權配額（EU Allowances）。部分國際航班在 EU ETS 與 CORSIA 兩者間有重疊，例如 EEA 內的國際航班。由於 EU ETS 自 2005 年起已開始實施，且對航空業的要求更為嚴格，歐盟對 ICAO 的相關條款提出異議，並將歐盟航班排除在 CORSIA 抵換義務之外，以避免雙重監管。這使得 EU ETS 在處理重疊航班時變得更為複雜，尤其是涉及多個系統的航線。

**(6)我國碳費推動規劃**

本次臺德碳交易研習會議，除由 DEHSt 專家報告國際資訊外，我國與會代表亦分享我國碳費制度，我國碳費徵收對象為具公告應盤查登錄及查驗溫室氣體排放量之排放源，且其全廠（場）之直接排放及使用電力之間接排放，其溫室氣體年排放量合計值達二萬五千公噸二氧化碳當量以上之電力、燃氣供應業及製造業。另碳費費率由本部所設費率審議會，依我國溫室氣體減量現況、排放源類型、溫室氣體排放種類、排放量規模、自主減量情

形及減量效果及其他相關因素審議，送本部核定公告，並定期檢討。

目前我國針對碳費收費對象於計算碳費時，將前一年度之溫室氣體排放量扣除碳費計算起徵量後，乘上中央主管機關公告之收費費率，即可算出應繳納之碳費金額。鼓勵碳費收費對象（大排放源）帶動非碳費收費對象進行減量，優先讓資金留在國內，設定收費對象使用自願減量專案及抵換專案之減量額度扣除收費排放量之比率為 1.2，惟使用減量額度之扣除上限不得超過事業收費排放量的 10%。另外，為肯定業者早期減量努力，也規定非屬高碳洩漏風險之事業得於碳費開徵後之前三年可使用先期專案減量額度扣除排放量之比率為 0.3。碳費是當前臺灣最優先的碳定價工具，未來也將逐步發展排放交易系統。

彭部長於閉幕時表示，感謝德國排放交易局多年與我國在碳定價議題的交流合作，我國碳費制度已於今(2024)年正式上路，臺德雙方碳定價交流將邁向第二階段。期許明年開徵碳費，臺灣進入碳定價時代，未來將啟動碳交易機制的測試，希望在未來四年內可以實施總量管制排放交易。此外目前正透過各部門由下而上，由上而下的程序，盤點並加大減碳目標。為促進雙方合作關係之延續，我方進一步邀請德方於明(2025)年度訪臺，共同舉辦研習會，德方表示非常樂意。

圖 1、碳市場研習課程學員課堂學習情況

圖 2、碳市場研習課程全體學員團體合照

**2、拜會德國聯邦環境、自然保護、核安和消費者保護部（BMUV）、德國外交部亞太司（Abteilung Asien und Pazifik）、德國聯邦環境署（UBA）及德國經濟事務與氣候行動部（BMWK）等德國政府單位**

此行由本部彭啓明部長率隊，在駐德國代表處特任大使謝志偉陪同下，與本部同仁共同出席，本部團員包含曹志弘簡任秘書、蔡玲儀署長及郭孟芸組長、以

及駐德國代表處姜予歆秘書。

**(1) 德國聯邦環境、自然保護、核安和消費者保護部（BMUV）**

聯邦環境、自然保護、核能安全及消費者保護部（BMUV）負責德國在環保、自然保護、核安全和消費者保護方面的政策。該部門的主要工作包括制定相關法律和法規、推動經濟和環保的現代化、以及促進氣候行動和資源政策。此次拜會本部先就我國近期氣候變遷政策推動成果及碳費制度推動情形向德方說明，德方說明聯邦環境部主要業務包括氣候變遷調適，循環經濟、公正轉型、禁用塑膠以及自然為本等，近年更致力於發展德國的能源轉型，包括逐步淘汰核能及燃煤發電，發展再生能源等。雙方針對將 AI 技術運用於環境管理進行交流，並期望未來能有進一步的合作。

**(2) 德國外交部亞太司（Abteilung Asien und Pazifik）**

德國外交部亞太司（Abteilung Asien und Pazifik），是德國外交架構中的一部分，專門負責處理與亞太地區國家的外交事務，此行拜會，雙方就運具電動化推動現況及策略、能源轉型包括各種再生能源，太陽能、風力發電、氫能、海洋能、生質能、地熱推動現況及規劃與對核能態度等交換意見。

**(3) 德國聯邦環境署（UBA）**

德國聯邦環境署（UBA）隸屬於聯邦環境、自然保護、核能安全及消費者保護部（BMUV），是德國的最高環境保護機構，負責執行環境政策、提供科學研究支持，並致力於促進德國的可持續發展和環境保護。此行拜會，德方說明 UBA 執行 BMUV 制定的環境政策、執行環境監測並提供科學研究、技術專業知識和建議來支持環境政策制定。UBA 轄下有環境資訊中心（UIZ）、德國環境監測和環境報告中心（UMR）、德國環境研究所（IUF）、環境科技和創新中心（ZUTI）、廢物管理和資源效率中心（ZARE）及環境教育和宣傳部門（AUEO）等單位，並分享 UBA 運用數位工具推動環境保護和永續發展經驗，本部未來可於環境政策研究、數位工具與環境保護及氣候變遷因應及排放交易等制度，強化與 UBA 之合作。

**(4) 德國聯邦經濟事務與氣候行動部（BMWK）**

德國聯邦經濟事務與氣候行動部（BMWK）負責中小企業的中央創新計畫，與制定和實施與經濟、能源和氣候有關的政策以及部分科技創新政策。BMWK 主要負責內容為中小企業和新創企業的優先事項、創造投資，促進工業公司和中小企業的數位發展。此次拜會，本部說明我國氣候政策、碳費徵收政策及未來規劃實施排放交易等。德方分享目前德國氣候變遷政策主要以再生能源推動為主，除了推動風能及太陽能外，將著重於氫能的開發，目標 2030 年再生能源占比達 80%，亦分享推動再生能源政策，促進產業發展綠色技術所面臨的挑戰及經驗。會中德方表示將於今(2024)年年底訪臺，為促進雙方合作關係之延續，本部代表邀請德方訪臺期間再次進行交流，尋求創新解決方案與合作機會，探討如何邁向低碳轉型，達成淨零排目標。德方表示非常樂意，也期待雙方未來的合作。

**3、拜會歐盟環境智庫 Adelphi 及國際碳行動夥伴組織（International Carbon Action Partnership, ICAP）秘書處**

此行由本部彭啓明部長率隊，在駐德國代表處特任大使謝志偉陪同下，與本部同仁共同出席，本部團員包括曹志弘簡任秘書、蔡玲儀署長、郭孟芸組長、梁喬凱科長、葉惠芬科長和洪瑞均技士，以及駐德國代表處秘書姜予歆、我方智庫永智顧問股份有限公司石信智總經理、環科工程顧問股份有限公司余志達副總經理。

**(1) 歐盟環境智庫 Adelphi**

歐盟環境智庫 Adelphi 專注於氣候變遷、能源轉型和環境發展的國際智庫，其核心目標是透過研究、對話和政策建議來提升全球環境治理，該機構曾與眾多國家及機構合作，參與超過 1,500 個專案，並在碳市場發展方面擁有豐富經驗。

Adelphi 代表首先介紹組織的運作模式與核心領域，特別強調碳定價及碳市場在因應氣候變遷中的重要性，其中以碳市場尤為重要，能夠在與可持續發展目標及其他政策相結合的情況下發揮最大效益，並指出碳定價政策的設計不僅應考慮其經濟效率，也應兼顧社會公平和公共接受度，需要配合其他輔助措施，例如

推動公共交通的發展及促進低碳技術等。在社會公平方面，碳定價政策有可能對不同收入群體產生不同比例的經濟影響，例如歐盟社會氣候基金確保碳市場收入能夠公平地再分配，避免低收入群體受到過大的經濟負擔，因此 Adelphi 提倡設計社會公平的碳市場工具。此外，碳市場的設計應考慮到能源轉型和行業減排的長期目標，尤其是對於鋼鐵和汽車等高排放行業，如何設計合適的政策以推動行業轉型是一大挑戰。

我方說明我國目前正在推動的碳費徵收制度將於 2026 年正式開始，我國碳費徵收對象為具公告應盤查登錄及查驗溫室氣體排放量之排放源，且其全廠（場）之直接排放及使用電力之間接排放，其溫室氣體年排放量合計值達二萬五千公噸二氧化碳當量以上之電力、燃氣供應業及製造業。碳費將依據強制申報之列管事業排放量徵收，對於具有高碳洩漏風險的行業將有特殊費率調整機制，且會逐漸提高，而較低風險的行業則會享受一定的減免。我方強調，國際合作對臺灣碳市場的發展至關重要，未來希望與 Adelphi 在多個領域加強合作，包括碳定價、排放交易系統、氫能技術及巴黎協定第 6 條等議題進行合作交流，來提升自身在氣候變遷領域的國際影響力，並加強與國際社會的聯繫。

圖 3、我方代表與 Adelphi 代表合照

**(2) 國際碳行動夥伴組織（ICAP）**

國際碳行動夥伴組織（ICAP）核心目標為促進碳市場的發展與改進，是由國家與地方政府組成的國際合作平台，主要用於排放交易系統（ETS）知識與經驗的交換，ICAP 提供多樣的資源，包括全球 ETS 狀況報告、網站及社群媒體的資訊更新、ETS 簡報、碳價探索工具等。該組織目前有 34 個正式成員國和 8 個觀察員國，正式成員國包括歐盟、澳洲、德國等，觀察員國包括日本、韓國、智利等。

本次拜會由 ICAP 代表說明，近年分享 ICAP 出版《2024 年全球排放交易狀況報告（ETS Status Report 2024）》，分析全球 ETS 的趨勢和前景；2024 年改版更新碳價探索工具，允許視覺化不同系統的主要及次要市場數據、查詢拍賣配額所得收入的統計資料、匯出特定系統及時間範圍的數據；及 ICAP 於 2024 年與國際排放交易協會(IETA)及其他合作夥伴合作，在於歐洲、拉丁美洲、北美及亞太區域舉辦氣候峰會，並以淨零排放與清潔能源為主題，提供淨零能力建設與技術對話，協助全球各國達成氣候目標。

我方代表說明，我國目前推動碳費徵收制度，希望未來也能建立 ETS 制度，並於會中提出希望以觀察員的身份加入 ICAP，促進我國與其他國家交流。ICAP 代表表示，基於技術合作，成員國可以自願分享其在全球推行 ETS 的經驗，ICAP 代表表示將通知 ICAP 主席，表達我國希冀與 ICAP 加強合作的意圖。

**4、拜會歐洲綠色與數位聯盟（European Green Digital Coalition, EGDC）暨全球永續賦能倡議組織（Global enabling Sustainability Initiative, GeSI）及瑞曼迪斯(Remondis)德國廠**

此行由本部彭啓明部長率隊，與本部同仁共同出席，本部團員包括曹志弘簡任秘書、蔡玲儀署長、郭孟芸組長及梁喬凱科長。

**(1) 歐洲綠色與數位聯盟（EGDC）暨全球永續賦能倡議組織（GeSI）**

歐洲綠色數位聯盟（EGDC）是根據歐盟理事會的要求在歐盟委員會和歐洲議會的支持下由企業發起的一項倡議，旨在利用數位解決方案發現各行業的減排潛力。全球永續賦能倡議組織（GeSI）是以資訊與通信技術（ICT）產業領袖組成

的全球聯盟，致力於運用數位科技來加速實現聯合國永續發展目標 (SDGs)。

本次係拜會 EGDC 秘書處召集人暨 GeSI 執行長 Luis Neves，雙方針對如何利用創新科技如 ICT 等支持永續發展、推動永續供應鏈管理、歐盟綠色和數位轉型及綠色數位基礎設施的發展交換意見。會中執行長表示將於今(2024)年年底訪臺，為促進雙方合作關係之延續，本部代表邀請執行長訪臺期間再次進行交流，進行洽談數位和綠色雙軸轉型，應用數位化方式減碳，建立我國綠色數位轉型方式。執行長表示非常樂意，也期待雙方未來的合作。

**(2) 瑞曼迪斯(Remondis)德國廠**

瑞曼迪斯（Remondis）是歐洲最大的資源回收和廢物管理公司之一，總部位於德國，本次參訪該公司利柏廠，瑞曼迪斯利伯廠為歐洲最大的循環園區，以工業化回收中心的規模運作，有助於保護環境資源和對抗氣候變遷，該廠總面積約 230 公頃，每年約可回收剩餘資材進料約 140 萬公噸，每年能源節省約 336,900MWh，並減少約 488,000 公噸 $CO_2e$。本次參訪高效的自動化設備和綠色技術，如下：

(1) 金屬渣加工：以生產高級鋼的爐渣及廢耐火材/銅工業的廢耐火材料為原料，經加工製成優質鋼及非鐵金屬顆粒，用於生產高級鋼和銅製品的原料。

(2) 有機廢棄物處理（包含土壤改良）：以花園/公園的植物和樹木殘枝、有機廢棄物為原料，經處理製成堆肥產品，用於有機氮磷鉀肥料、土壤改良劑、植物基質、覆蓋物基質、土壤覆蓋物。另於製程中，亦同時產生電力、蒸汽等能源，併入電網以供電並滿足設施本身用電需求，達到節能的目的。

(3) 黏合劑的生產：以來自燃煤發電廠的脫硫石膏為原料，經廠內製程，製成添加劑和黏合劑，用於石膏基產品被加工成液體砂漿和多孔混凝土、肥料和水泥以及牙科材料。

(4) 流體化床發電廠：以廢棄物衍生燃料，如消毒後肉醬、動物粉、化學和製藥產業廢棄物、下水道污泥等為原料，產生電力、製程蒸汽和壓縮空氣等，為廠內生產設施提供能源。

(5) 廢木材加工和生質能發電廠：以來自房屋翻修與大型廢棄家俱之廢木材為原料，製成廢棄物衍生燃料，在生質能發電廠中發電，併入電網節省廠內設施能源。

(6) 塑膠回收：以油桶、桶子、瓶子、管子、水桶、容器、生產廢品、模製零件、冰箱/冰櫃拆解作業中的混合塑膠為原料，生產塑膠顆粒及化合物，用於塑膠產品生產之原料，如風扇、開關盒、通風系統、車輛零件、壁栓和電器外殼等。

(7) 廢電子電機設備回收：以廢電氣和電子設備，包含冰箱和篩網為原料，經加工製成生產非鐵金屬、鐵金屬、玻璃、塑膠，用於金屬加工廠、破碎機廠、煉鐵廠、鋁廠、塑膠加工廠的原料。

透過本次參訪，瞭解該公司為促進產業鏈結共生，提高生產流程能資源效率，促進能源回收，以達到減碳目標，該公司經驗可作為我國學習借鏡，透過公私協力方式推動循環經濟，從零廢棄到零碳排推動綠色經濟發展。


圖 4、我方參訪瑞曼迪斯(Remondis)德國廠情形

**5、拜會歐盟內部市場、產業、創業和中小企業總署(Directorate General for Internal Market, Industry, Entrepreneurship and SMEs, DG GROW)、拜會歐盟環境總署**

**（Directorate-General Environment, DG ENV）、拜會歐盟氣候行動總署（Directorate-General Climate Action, DG CLIMA）**

此行由本部彭啓明部長率隊，在駐歐盟及比利時代表處李淳大使陪同下，與本部同仁共同出席，本部團員包括蔡玲儀署長、郭孟芸組長、梁喬凱科長，以及駐歐盟兼駐比利時代表處周慶龍公使、劉昆豪副參事、許莉美組長及黃奕婷秘書。

**(1) 歐盟內部市場、產業、創業和中小企業總署(DG GROW)**

歐盟內部市場、產業、創業和中小企業總署(DG GROW)隸屬於歐盟執委會，該署專注於透過開放和彈性的單一市場（Single Market）的力量和解決歐盟供應鏈中的依賴性，提升歐洲工業在不同生態系統中的領導地位。此外，DG GROW針對中小企業(medium sized enterprises, SME) ，推動扶植創業和成長的政策，並實施數位化和脫碳策略，為歐盟境內中小企業獲得融資並進入全球市場提供助力。我方分享說明我國碳定價推動現況，並說明未來將成立綠色成長基金。歐盟代表分享於 2024 年 6 月 28 日公告的「產業淨零法案 (Net-Zero Industry Act, NZIA)」，該法案旨在透過建立改善內部市場的運作之框架，減少對單一國家的依賴，以確保歐盟獲得安全與永續的淨零技術供應，該法案將吸引及支持脫碳相關技術與項目的投資，有助於以更快的方式建造更多淨零技術生產設施，並將促進符合歐洲永續性與韌性的產品進入市場。亦透過淨零監管沙盒(net-zero regulatory sandboxes)支持創新技術之發展，提升歐盟監測與緩解淨零技術相關之供應鏈風險的能力等措施。

**(2) 歐盟環境總署（DG ENV）**

歐盟環境總署（DG ENV）隸屬於歐盟執委會，專責制定及執行歐盟環境政策，其核心使命是促進環境保護與永續發展，確保自然資源得以有效管理與長期利用。DG ENV 在氣候變遷、空氣與水質保護、生物多樣性保護、廢棄物管理、循環經濟等多個領域推動政策，旨在提升歐洲整體環境品質並應對全球環境挑戰。DG ENV 的主要職責包括監督成員國遵循歐盟環保法規，確保各國能夠達成歐盟設立的環境標準，並積極推動創新環保技術與解決方案。DG ENV 在國際舞

台上亦扮演領導角色，積極參與全球氣候變遷與環境保護協議的談判及履行，展現其在全球環境治理中的關鍵作用。我方說明我國願景及當前重要環境政策目標外，盼能拓展與 DG ENV 在循環經濟、廢棄物管理、空氣污染防制及減塑等領域之交流。歐盟代表表示歡迎，強調樂願與我方共同探索交流議題，建立定期交流。

**(3) 歐盟氣候行動總署（DG CLIMA）**

歐盟氣候行動總署（DG CLIMA），隸屬於歐盟執委會，專責領導歐盟在應對氣候變遷方面的政策制定與實施，其主要目標是透過推動減少溫室氣體排放、加強適應氣候變遷的能力，並促進氣候及經濟轉型，來確保歐盟實現《巴黎協定》所設定的國際承諾以及長期的氣候中和目標。DG CLIMA 在歐盟排放交易系統、推動國家層面的減碳目標、增進能源效率以及擴大再生能源的使用政策領域扮演核心角色。歐盟於 2005 年所建立碳排放交易系統（Emission Trading System，ETS）是目前國際上最大且運作最成熟的碳排放交易市場，也是 DG CLIMA 的關鍵政策工具之一，目的在透過市場機制引導企業減少排放，並確保歐盟向氣候中和的過渡過程能夠有序進行。我方分享我國「綠色成長基金」，將結合民間資金共同投入，透過創新技術應用，加速減碳，提升韌性，同時創造就業機會，另規劃「綠色金融創新」，使金融業投資投資我國徹產業的深度節能等，另為促進雙方合作關係之延續，我方建議我國與歐盟建立碳定價外交溝通平台，定期舉辦雙邊交流對話。本次歐盟代表分享《歐洲綠色新政（Green Deal）》，該新政涵蓋層面廣泛，透過明確揭示政策指標與策略路徑，鼓勵全民參與、加速綠色轉型與財務融資、促進經濟成長與資源耗用脫鉤，強調經濟社會發展需兼顧環境生態平衡，並提出 2030 年的要比 1990 年減少至少 50~55%排放量，2050 年達到歐盟淨零排放的氣候目標。歐盟代表亦分享 Fit for 55 計畫減少了溫室氣體排放，也創造了可觀的收入，經由碳定價、法規和資金的結合是成功必要基礎，預計 2027 年，歐洲 75-80%的排放量將納入 ETS 體系。隨著歐盟逐期設定更嚴格的總量上限並降低免費配額比率，歐盟也對進口產品啟動碳邊境調整機制（CBAM），目前還在過渡期間，本次交流中確定我國碳費可扣抵應繳交的歐盟 CBAM 憑證數量，扣抵的詳

細規定將於明(2025)年中「第三國支付的碳定價如何扣減」及「EU ETS 之下免費核配與 CBAM 制度調和」等細則公布，歐盟現已啟動碳定價外交，並與第三國進行合作機制，歐盟表示非常樂意與我方建立溝通橋樑，協助企業因應歐盟規定。

**6、拜會英國能源安全與淨零部（Department for Energy Security and Net-Zero , DESNZ）及英國氣候變遷委員會（Climate Change Committee, CCC）**

此行由本部彭啓明部長率隊，在駐英國代表處姚金祥大使協助下，接洽本部同仁拜會相關英方單位，本部團員包括蔡玲儀署長、郭孟芸組長、梁喬凱科長，以及駐英國代表處許瓊方秘書。

**(1) 英國能源安全與淨零部（DESNZ）**

英國能源安全與淨零部（DESNZ）主要職責包括確保英國的能源供應穩定、制定和執行減少溫室氣體排放的政策、推動可再生能源的發展、推進綠色技術和創新及與國際合作共同應對氣候變化和全球能源挑戰。我國代表分享我國最新之氣候變遷政策推動情形，並詢及英國 CBAM 及再生能源推動情形。英方表示英國 CBAM 是由英國能源安全與淨零部（DESNZ）與財政部共同推動，規劃於 2027 年 1 月 1 日開始實施，該法規仍在國際諮詢階段，英方也強調執行 CBAM 關鍵在於如何建立標準化盤查/量測系統，以公平比較各國產品碳排放量；英方代表亦分享近期透過創建具競爭力的投資結構，鼓勵企業建立離岸風力發電機，以降低設置成本，加速推動英國再生能源發展，並規劃於 2030 年實現離岸風電裝置容量達到 40 GW，並推動浮動式風電達到 1 GW 的目標；在脫碳戰略部分，目前仍在評估國內對於氫氣的需求，嘗試以氫氣作為家庭供暖之能源等試驗，並持續支持碳捕捉和封存（CCS）技術。

**(2) 英國氣候變遷委員會（CCC）**

英國氣候變遷委員會（CCC），為依據《氣候變遷法案(Climate Change Act)》成立的獨立法定之專家技術諮詢機構，其主要任務為向議會提出英國政府推動氣候變遷減緩（mitigation）及調適（adaptation）工作之專業意見，包括國家自定貢獻目標（Nationally Determined Contributions, NDC）、碳預算編製、執行及報告、

監控減排進展、為氣候變遷科學、經濟及政策研究分析等。英方代表說明，為確保長期減排目標的達成，CCC 定期提出英國碳預算（Carbon Budgets），即排放上限，並每年發布報告，評估英國政府在減排和氣候調適方面的進展，並提出建議。另英方表示樂意協助向國際氣候委員組織（International Climate Councils Network, ICCN）引薦我國，爭取我國以觀察員身分加入 ICCN，提升我國國際參與度。我方表示感謝，亦建議規劃指派環境部同仁前往 CCC 研習，促進交流並提升同仁專業能力，英方表示歡迎。

## 三、心得及建議

### （一） 心得

本次訪歐行程主要目的為與德國進行碳交易領域技術交流，以深化臺德雙邊友好關係，並拜會德國、歐盟及英國職掌氣候變遷因應事務之相關政府部門或機構，以完整了解國際氣候變遷政策推動之情形及方向，本次訪歐心得如下：

1、臺德雙方於 2018 年簽署臺德碳交易合作意向書，多年來雙方持續就碳定價議題進行交流。今年於德國舉辦「臺德碳交易研習會」，由德國排放交易局專家介紹歐盟及德國氣候政策近期發展、歐盟 ETS 重要單元（包括排放總量設定、標竿值設定、碳洩漏風險、排放許可配額、排放量申報、登錄、查驗等）、歐盟碳邊境調整機制（EU CBAM）、國際航空業碳抵換及減量計畫（CORSIA）及歐盟 ETS 2；我國亦分享碳費制度及實施期程。因我國「碳費徵收辦法」已正式實施，明年開徵碳費，臺灣進入碳定價時代，未來將啟動碳交易機制的測試，臺德雙方碳定價交流將邁向第二階段，更彰顯我國碳定價與國際交流的重要性。

2、初探我國排放交易制度規劃：歐盟於 2005 年所建立碳排放交易系統（ETS）是國際上運作最成熟，也是目前全球最大的碳排放交易市場，具有相當豐富執行經驗。歐盟排放交易制度相關作法包括排放監測計畫、排放量盤查、查驗、總量設定、排放配額分配與拍賣、交易市場建構、排放

配額繳交及基金支用等。另歐盟 ETS 透過拍賣排放配額銷售收入，成立創新基金(Innovation Fund)及現代化基金(Modernization Fund)，其中新創基金支用於創新低碳技術發展、建設工業解決方案以及再生能源、儲能和碳捕捉利用和封存技術的應用；現代化基金則支用於援助低收入歐盟成員國對能源系統的投資，實現能源系統現代化、提高能源效率並協助社會向碳中和過渡。另將於 2027 年上路的歐盟 ETS 2 則設立社會氣候基金(Social Climate Fund)，該基金可支用於援助歐盟成員國提升能源效率、翻新建築、以清潔能源供暖和製冷、整合再生能源以及零排放和低排放交通解決方案，也可用於暫時性直接補貼弱勢族群的碳價成本。本次出訪與高階官員交流發現，歐盟排放交易制度相關配套作法涉及多項專業且利害關係者眾多，已有「碳定價外交戰略」趨勢，值得我國重視。

3、瞭解歐盟碳邊境調整機制最新進展：有關國內產業擔心歐盟 CBAM 正式實施後，國內的碳定價如何與歐盟接軌。目前歐盟 CBAM 還在過渡期間，我國受影響的主要對象為金屬扣件業（如螺絲、螺釘等）、鋼鐵及鋁等相關產業，國內業者在政府充分輔導下都能順利完成相關申報作業。本次拜訪歐盟經面對面交流中確定我國碳費可扣抵應繳交的歐盟 CBAM 憑證數量，歐盟將在明(2025)年中公布「第三國支付的碳定價如何扣減」及「EU ETS 之下免費核配與 CBAM 制度調和」等細則，將可利我國碳費扣減歐盟 CBAM 憑證制度銜接。

4、建立我國與國際組織及機構氣候變遷相關溝通平台：本次出訪與氣候變遷因應事務之相關政府部門或機構高階專家交流，包含德國聯邦環境、自然保護、核安和消費者保護部（BMUV）、德國聯邦環境署（UBA）、德國排放交易局（DEHSt）、德國經濟事務與氣候行動部(BMWK) 、國際碳行動夥伴組織（ICAP）、歐盟內部市場、產業、創業和中小企業總署（DG GROW）、歐盟環境總署（DG ENV）、歐盟氣候行動總署（DG CLIMA）、英國能源安全與淨零部門（DESNZ）及英國氣候變遷委員會（CCC）等；透過本次拜訪已建立起於德方、歐盟及英方溝通管道，未來將有利我國瞭解國際發展趨勢，也讓國際更能掌握臺灣身為全球科技供應鏈的重要性，

並凸顯我國氣候變遷努力的企圖心。

## （二） 建議

1、 為因應國際氣候變遷政策推展，持續維持與國際氣候變遷相關政府部門或機構交流及溝通平台。建議定期舉辦雙邊交流對話、可透過由我方產業、環保團體與專家學者共同前往歐洲交流研習或邀請國際專家來臺進行交流分享經驗。

2、 我國與德國雙方具良好互動，每年以碳定價或碳市場為主題，一年在臺灣一年在德國方式，共同舉辦研討會或研習訓練課程，建議後續可聘請德國相關專家擔任顧問，以分享德國氣候政策及排放交易制度設計與執行經驗，協助臺灣推動總量管制排放交易制度。

3、 建議我國持續爭取以觀察員身分加入國際碳行動夥伴組織（ICAP）及國際氣候委員組織(ICCN)，促進我國與其他國家交流。

4、 建議可與國際組織與機構，共同合作研擬我國排放交易相關制度及因應歐盟 CBAM 研究分析。

5、 全球永續發展倡議 (GeSI) 致力於透過資訊和通訊技術整合社會和環境永續發展，建議應持續與 GeSI 合作，藉由 GeSI 的專業知識和資源來加強我國減碳策略。

# 四、附錄

(一)德國 DEHSTs 碳交易研習會議簡報資料

(二)我國碳費徵收規劃簡報資料

環境部氣候變遷署
Climate Change Administration
Ministry of Environment

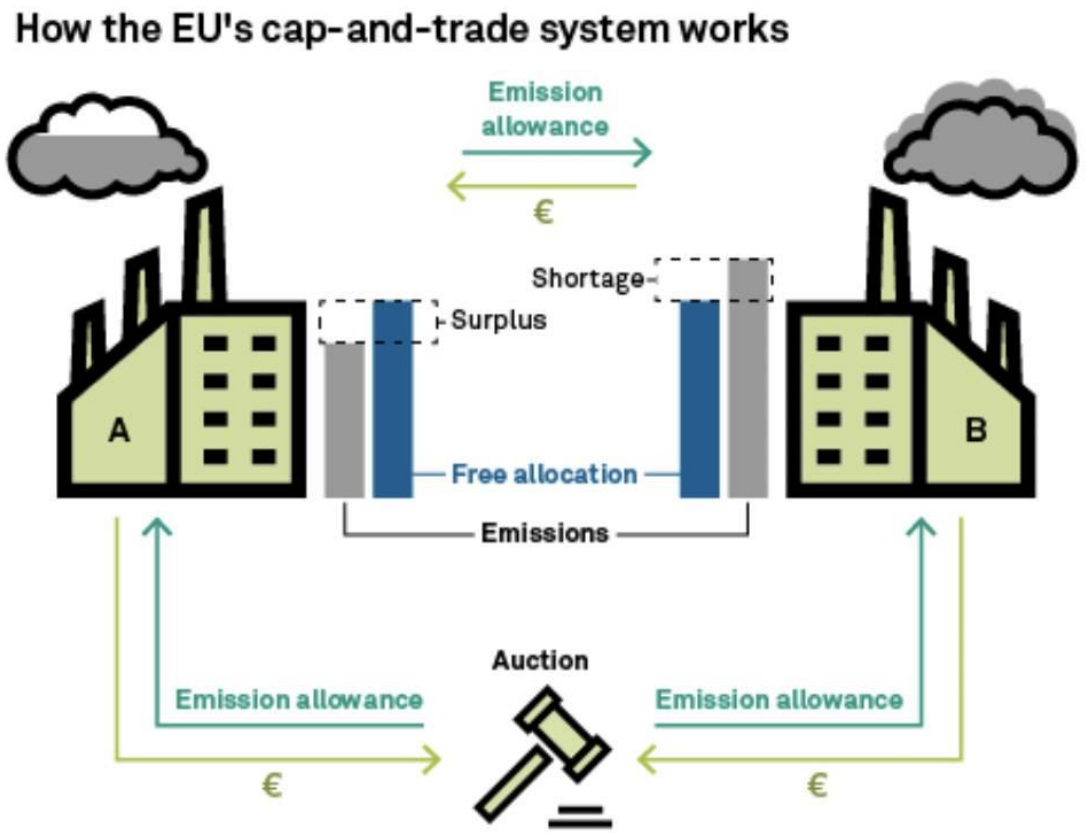
# 德國排放交易管理局
# 簡報重點彙整

# Content

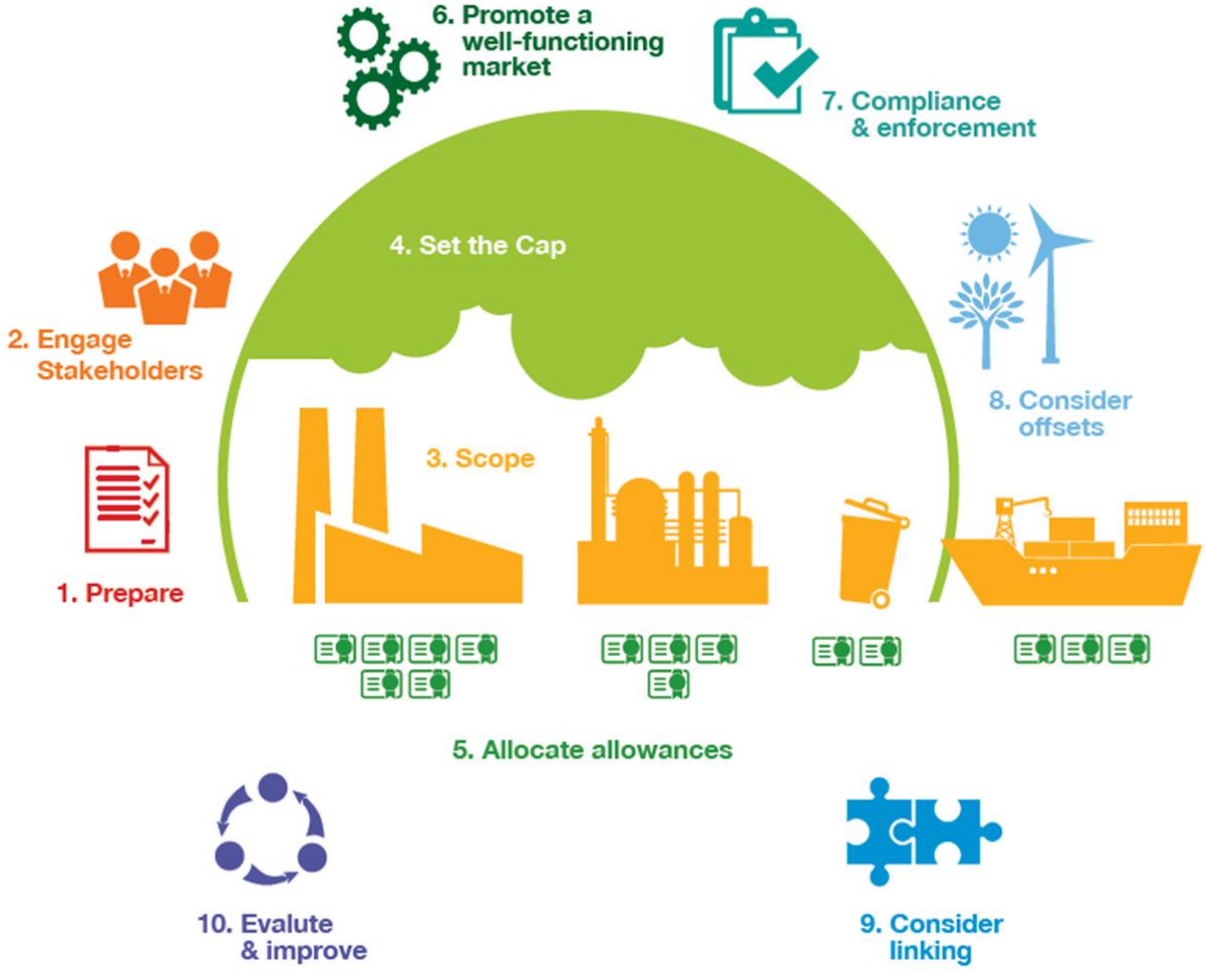
1. EU ETS & EU and German climate policy developments
2. EU ETS Elements: Cap Setting, Allocation and Benchmarking, MRV
3. German National ETS (nEHS) and EU ETS 2 for buildings, road transport & other sectors
4. Carbon Border Adjustment Mechanism (CBAM)
5. CORSIA & Interaction with EU ETS and Non-$CO_2$-Emissions
6. Korea Emissions Trading System and Electricity Market

# 1. EU ETS & EU and German climate policy developments

# How EU ETS works, ETS design in 10 steps



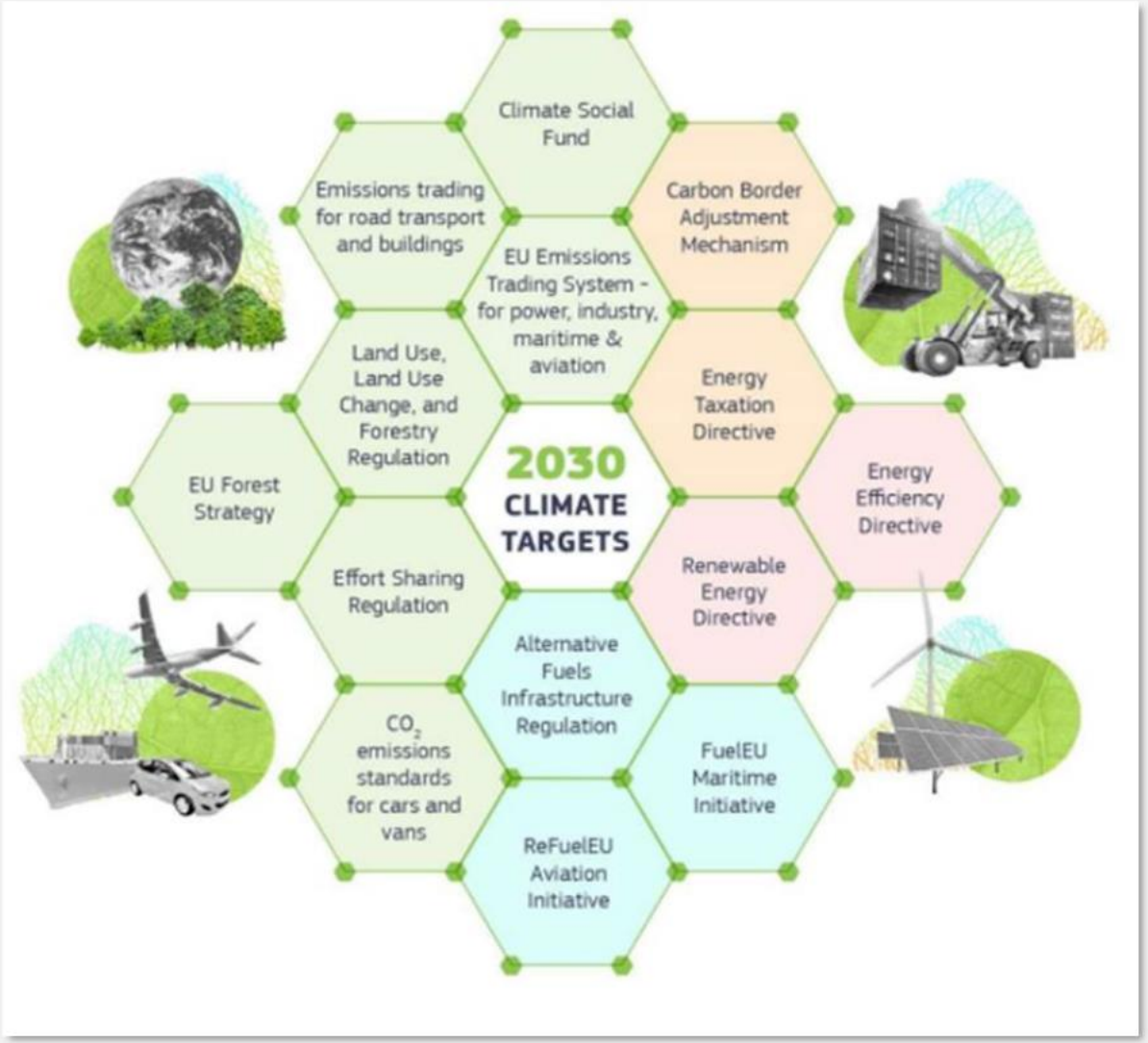

Source: European Commission, 2015




Source: Emissions Trading in Practice: A Handbook on Design and Implementation. ( World Bank, 2021)

# The "Fit for 55" legislative package

- **Set of legislative proposals and strategies**: broad range of policies for energy supply, industry, transport, households, and LULUCF
- Aligning energy and climate policy with the new EU climate policy goal for 2030 (at least minus 55 % in GHG emissions compared to 1990).
- Also includes very extensive changes and adjustments to the EU ETS
- Formal adoption by Council / EP and entering into force: May 2023
- 2024 marked by the implementation of Ff55 and the debate on climate protection architecture post-2030




source: EU COM

# Overview on the ETS Dossiers under the Fit for 55 Package

## Substantial reform of the existing EU ETS and significant extension of the scope

### Carbon Leakage Protection

Introduction of a CBAM

Reform of free allocation

### Ambition

Cap reduction

Market Stability Reserve (MSR)

### Funds and revenue recycling

100% of revenues utilized for climate and social purposes

Strengthening and creation of new EU funds

### Aviation

Scope remains for intra EWR flights

Phase out of free allocation

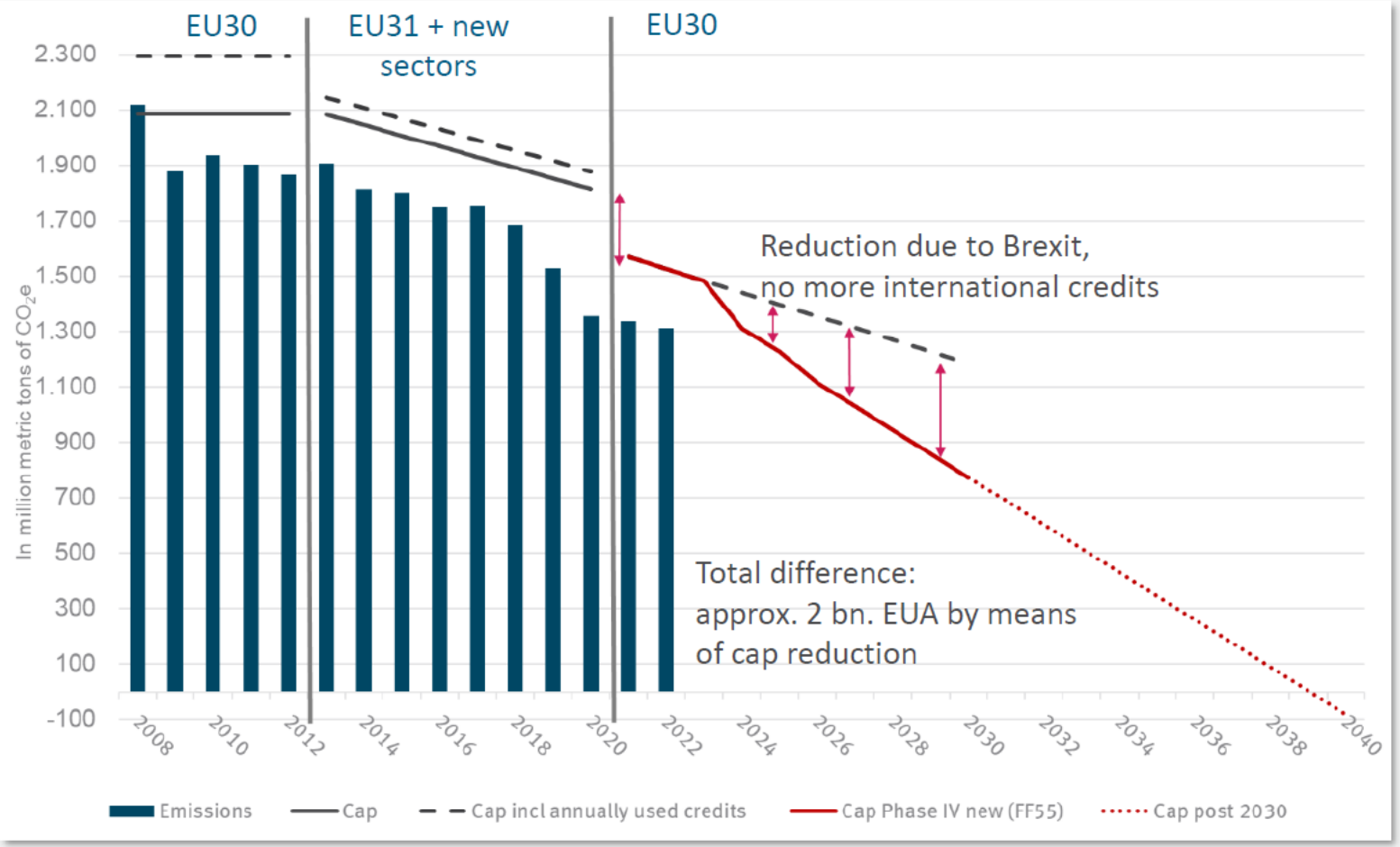
### Maritime

Inclusion in the EU ETS 1

### EU fuel ETS

Creation of a new upstream ETS for fuel emissions (EU ETS 2)

# Structural mismatch of cap and emissions




**Significant increase in ambition through FF55:**

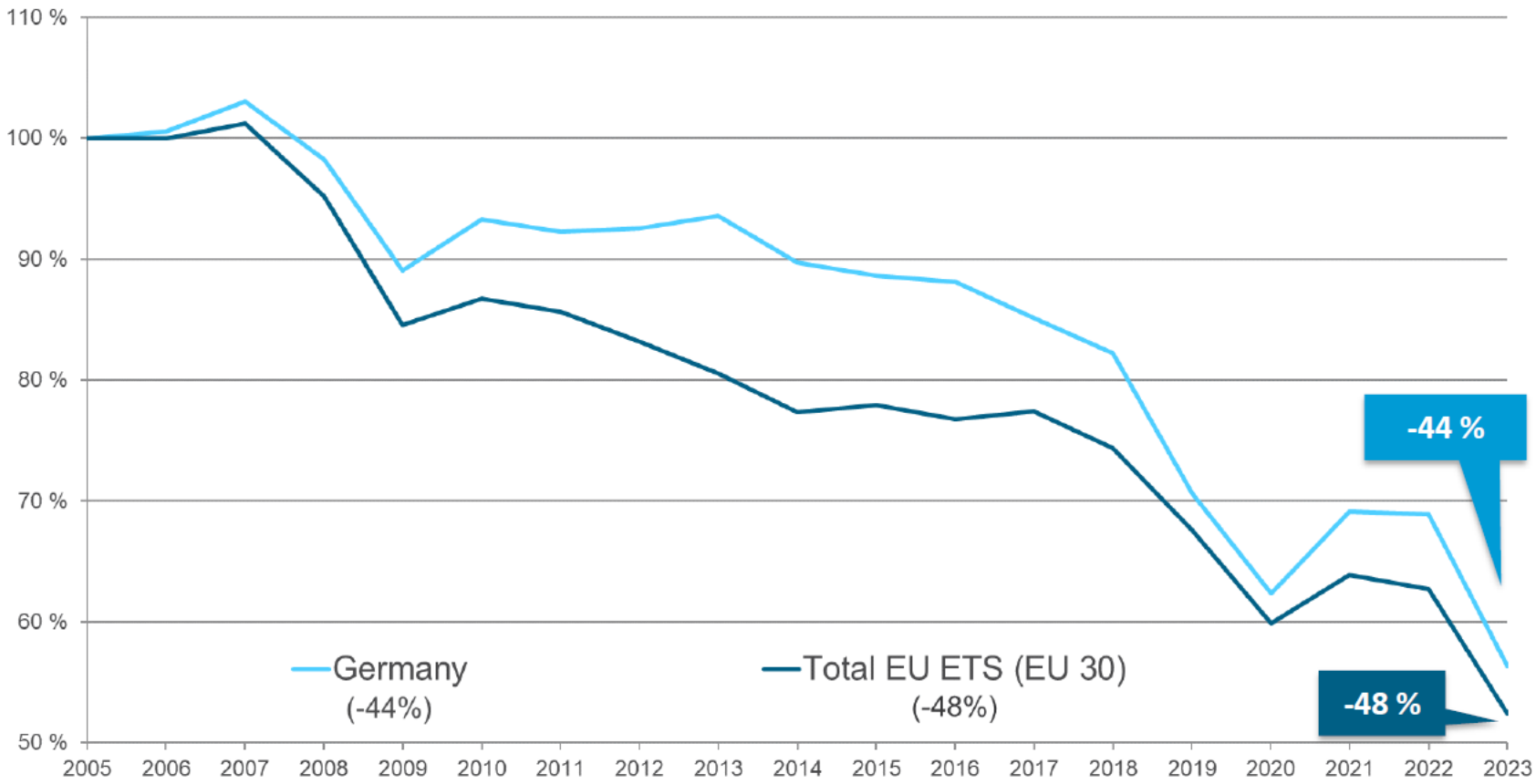
- - 62% (vs 2005), previously: - 43%
- LRF: 4.3% from 2024, 4.4% from 2028 (previously: 2.2%)
- Ff55 reduces the cap in phase 4 cumulatively by around 2 billion EUA

Source: DEHSt Calculations based on data from the European Environment Agency (EEA) and the European Commission.

**If the LRF of 4.4% is continued, the stationary cap will be zero in 2040!**

# GHG Emission Reductions in EU ETS since 2005

## EU 30 and Germany




**Reduction target 2030** (vs 2005):

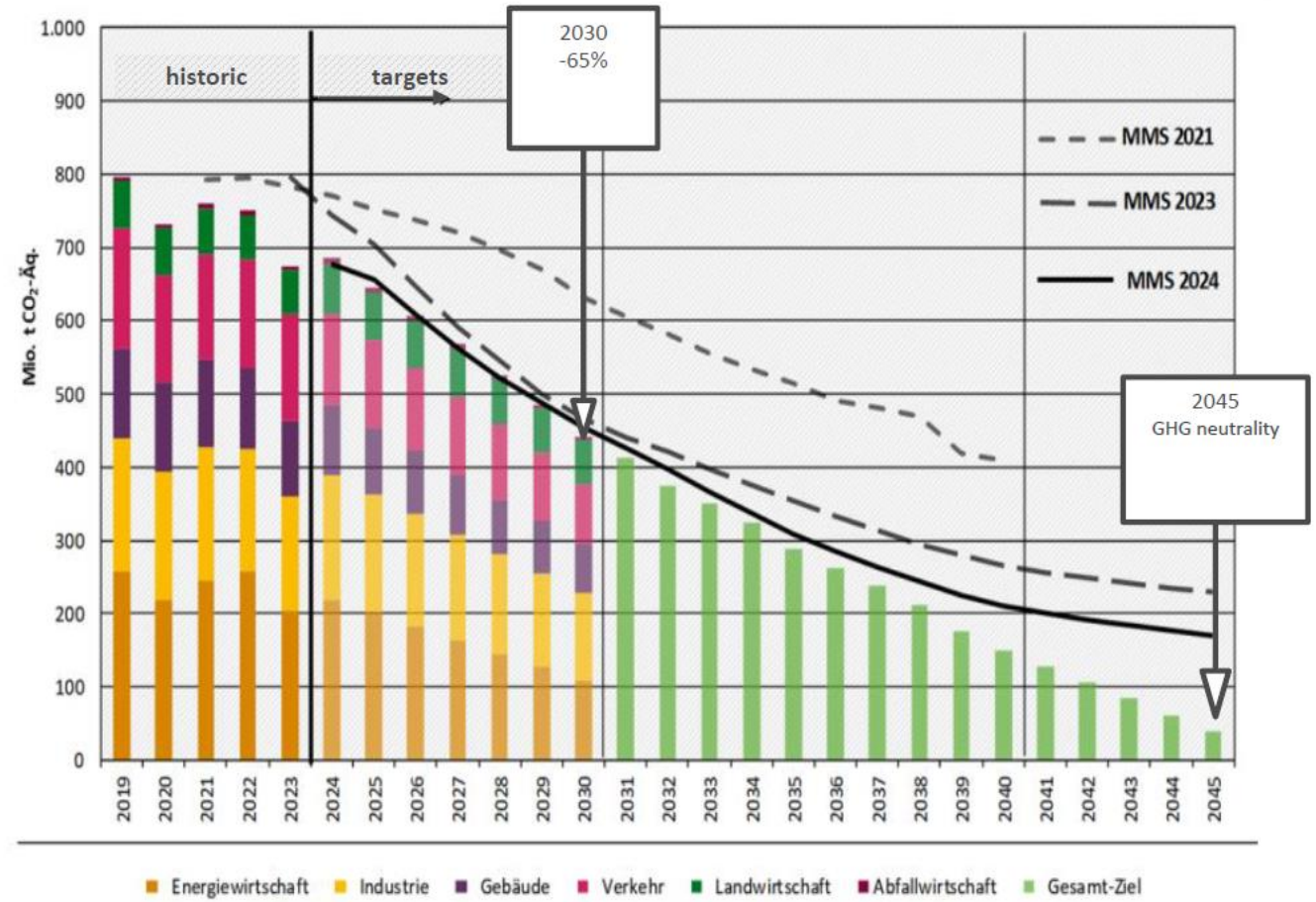
so far - 43 %

new - **62 %** (increased ambitions within the „Fit for 55“-decision)

10 Source: DEHSt calculations based on data from the European Environmental Agency (as of: 17/05/2024). Emissions between 2005 and 2012 include an estimation of historical emissions for the scope of the third trading period.

# Climate policies and measures in Germany: Historic emissions and targets until 2045

**Abbildung 1: Entwicklung der gesamten Treibhausgasemissionen nach Quellbereichen (2019–2045)**




Source: Own illustration German Environment Agency based on historic GHG inventory; Projections: Öko-Institut, Fraunhofer-ISI, IREES, Thünen-Institut

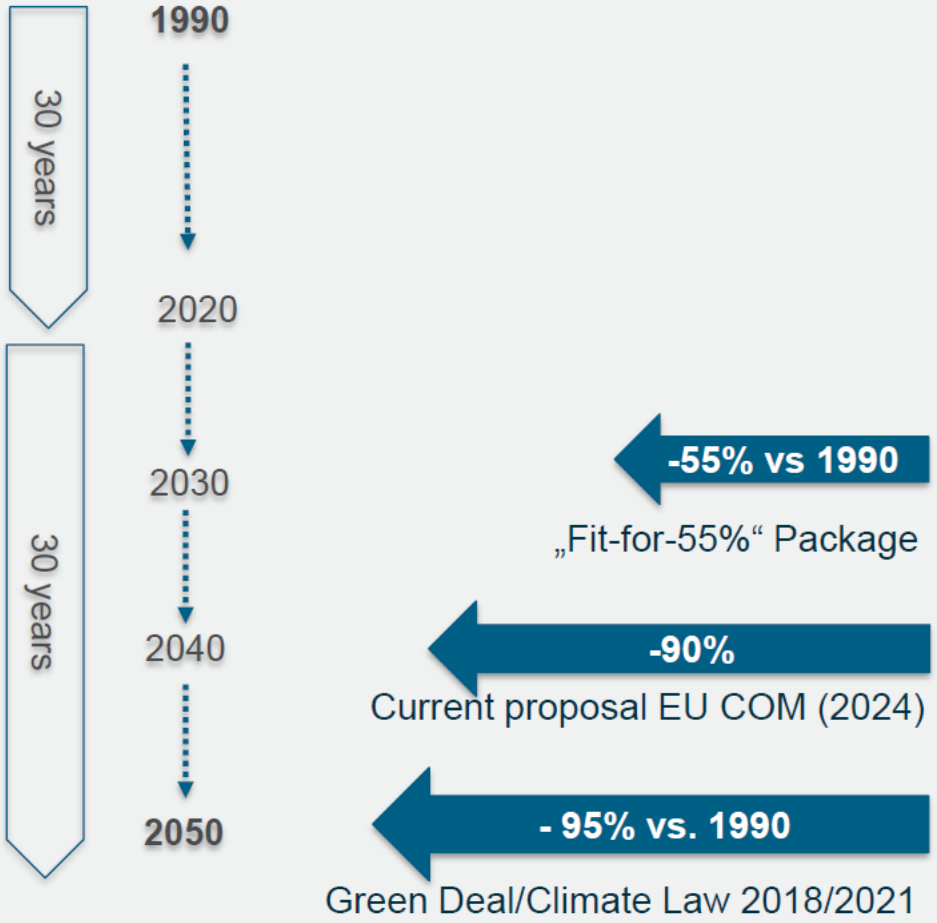
## National GHG targets:

- 2030: -65% (vs 1990)
- 2045: net zero GHG emissions

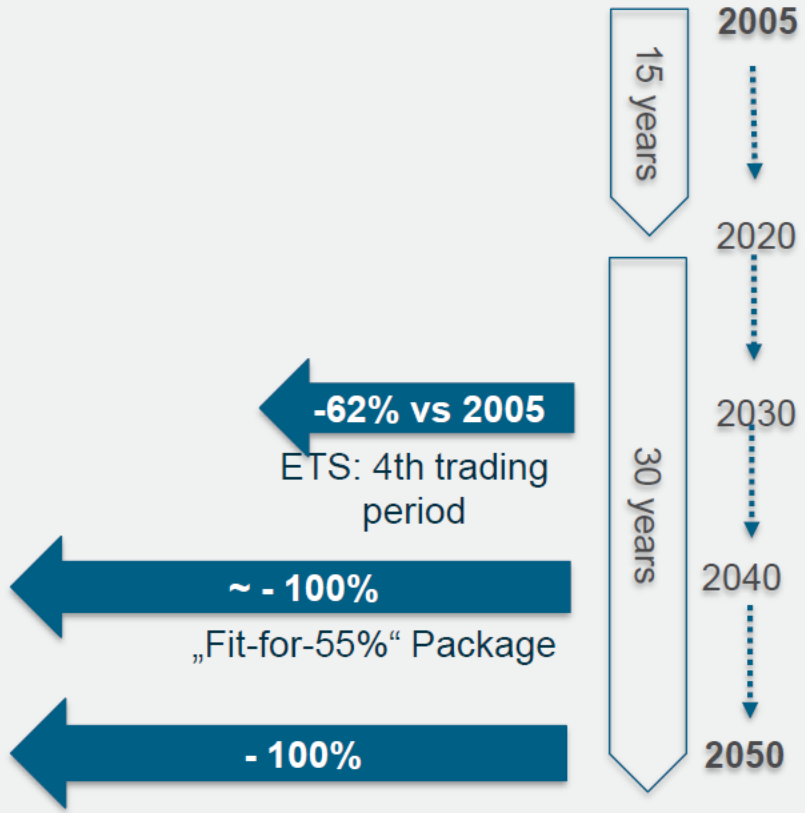
# 2. EU ETS Elements: Cap Setting, Allocation & Benchmarking, MRV

# Cap-setting: economy Wide Climate Targets and ETS Targets

## Economy-wide Targets




## ETS Targets



# Key considerations for setting the cap

- **Align ETS cap** with overall mitigation target (**NDC;** but **also long-term strategy**)
- Cap has to be **stringent** in order to provide abatement incentive (**scarcity**!)
- It is advisable to start with **short cap periods,** to allow for adjustments
- Take into account **interactions** with other energy and climate policies (RE, EE)
- Collect and analyse **(verified) data on historical emissions** of covered entities
- Assess sectoral emission projections and **abatement potentials**
- Offsets (if eligible) must *not* come on top of the cap
  (in EU ETS 2008-12, offsets came on top of the cap → even though a limit on their use was set, they were in effect a major factor for the surplus that existed until ca. 2020)

# General options for deriving the ETS-cap from overall GHG reduction targets

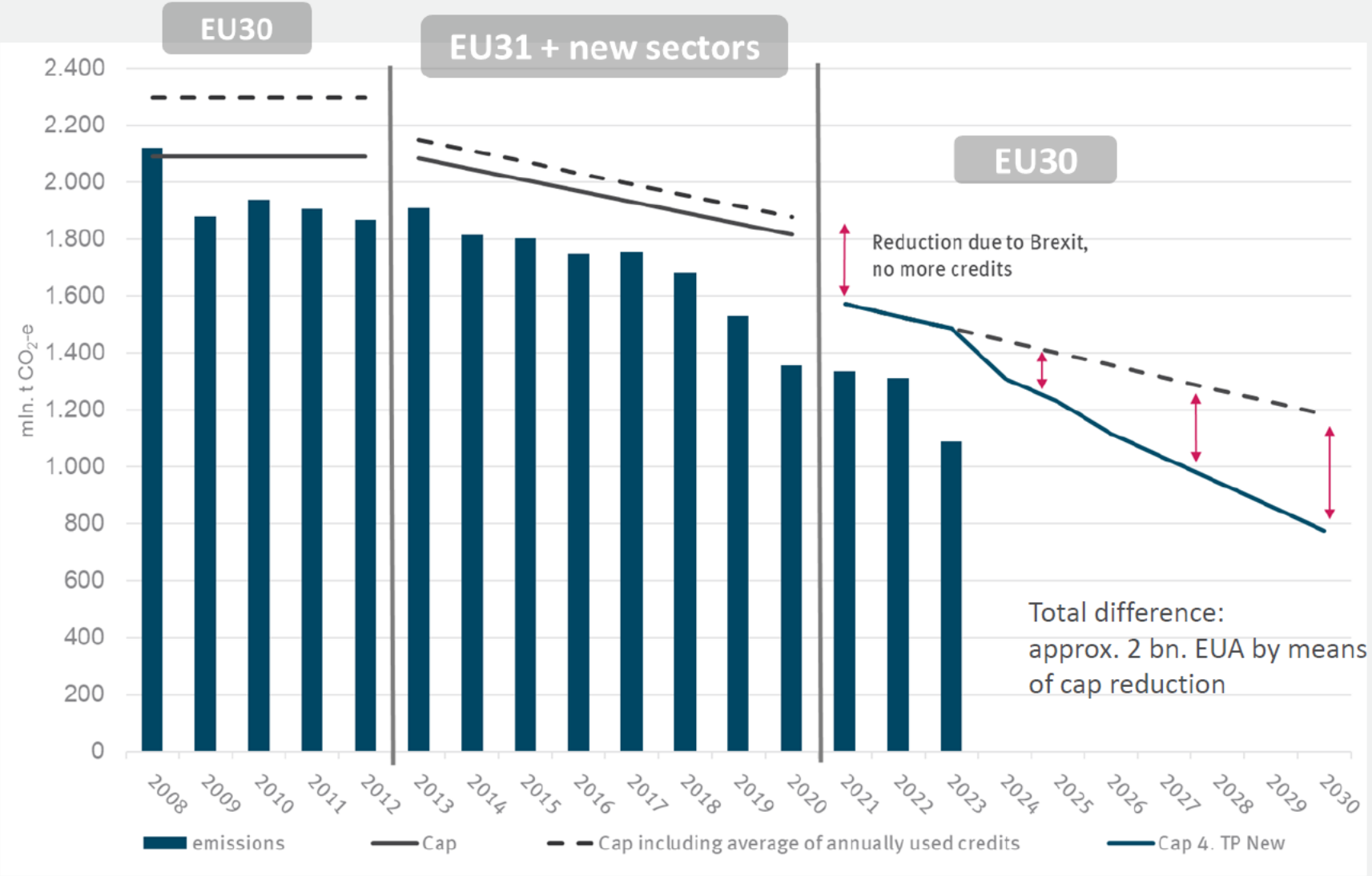
**In the EU ETS, the cap has been derived from EU wide/Member States climate goals by a combination of…**

1. Reductions according to **projected abatement costs**
   (so that marginal abatement costs in both groups are at the same level, and at the same time abatement in both sectors together meets the reduction requirement),
2. **Equal percentage reductions in ETS and Non-ETS sectors**,
   - either from **respective current emissions**,
   - or **from projected business-as-usual emissions**.
     (In this case, sectors with higher projected emission growth are in effect assigned smaller reduction requirements than in the case where contributions are based on current emissions);
3. Reductions in the ETS sectors **according to (other) political decisions** (for example based on **existing voluntary reduction agreements** with industry associations).

Further information:

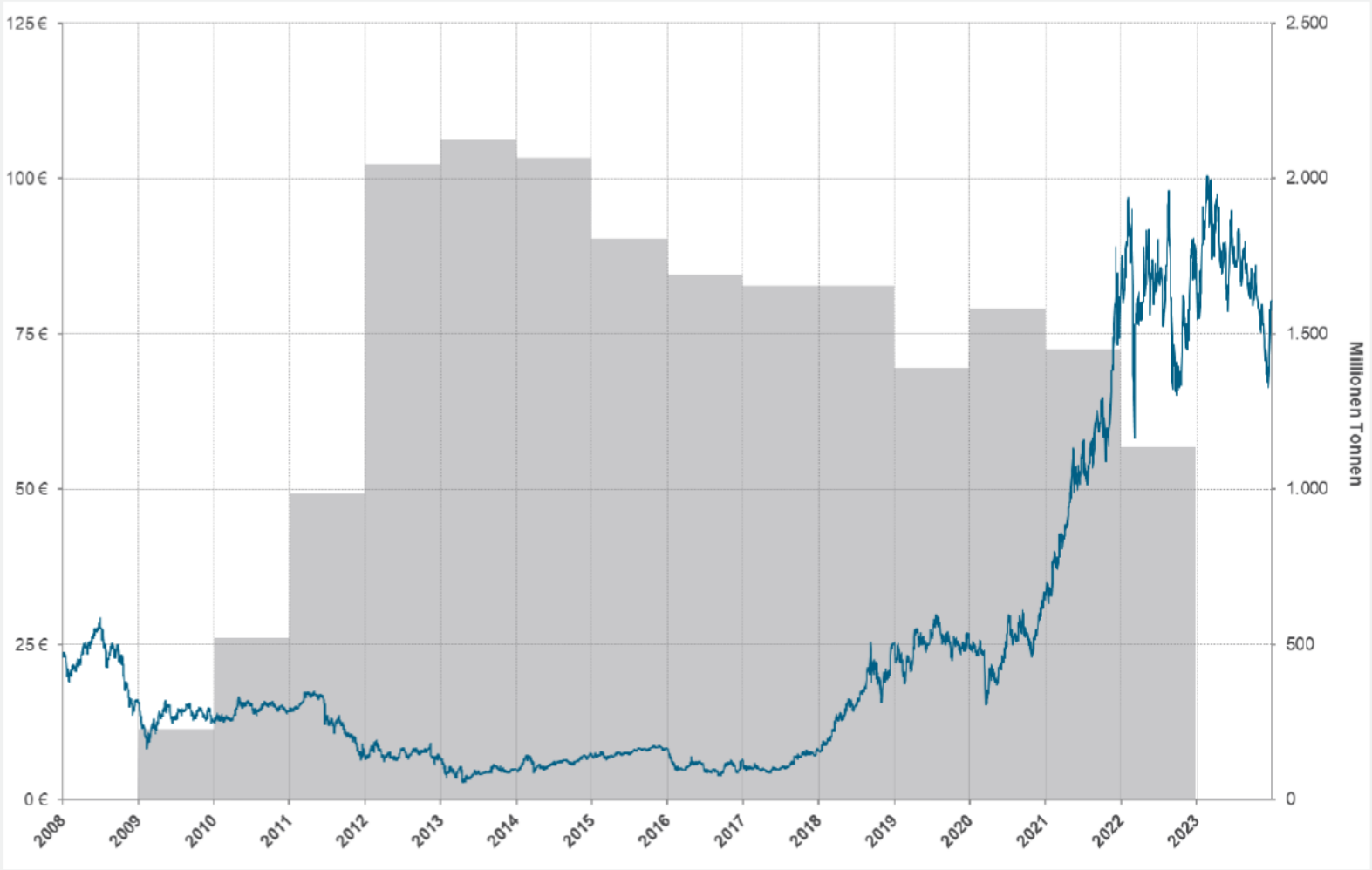
1. https://www.carbonknowledgehub.com/pdf/stories/ICAP-story-2.pdf, Step 4: Set the cap
2. DEHSt Report: Emissions Trading in Kazachstan – Recommendations for Cap Setting, chapter 3.4.1

# Strong need for action: Structural mismatch of cap and emissions




Source: DEHSt Calculations based on data from the European Environment Agency (EEA) and the European Commission.

# Surplus development and EUA-price in the EU ETS




Source: Own calculations based on data from Refinitiv Eikon, ICE, EU COM (As of: 10/09/2019)

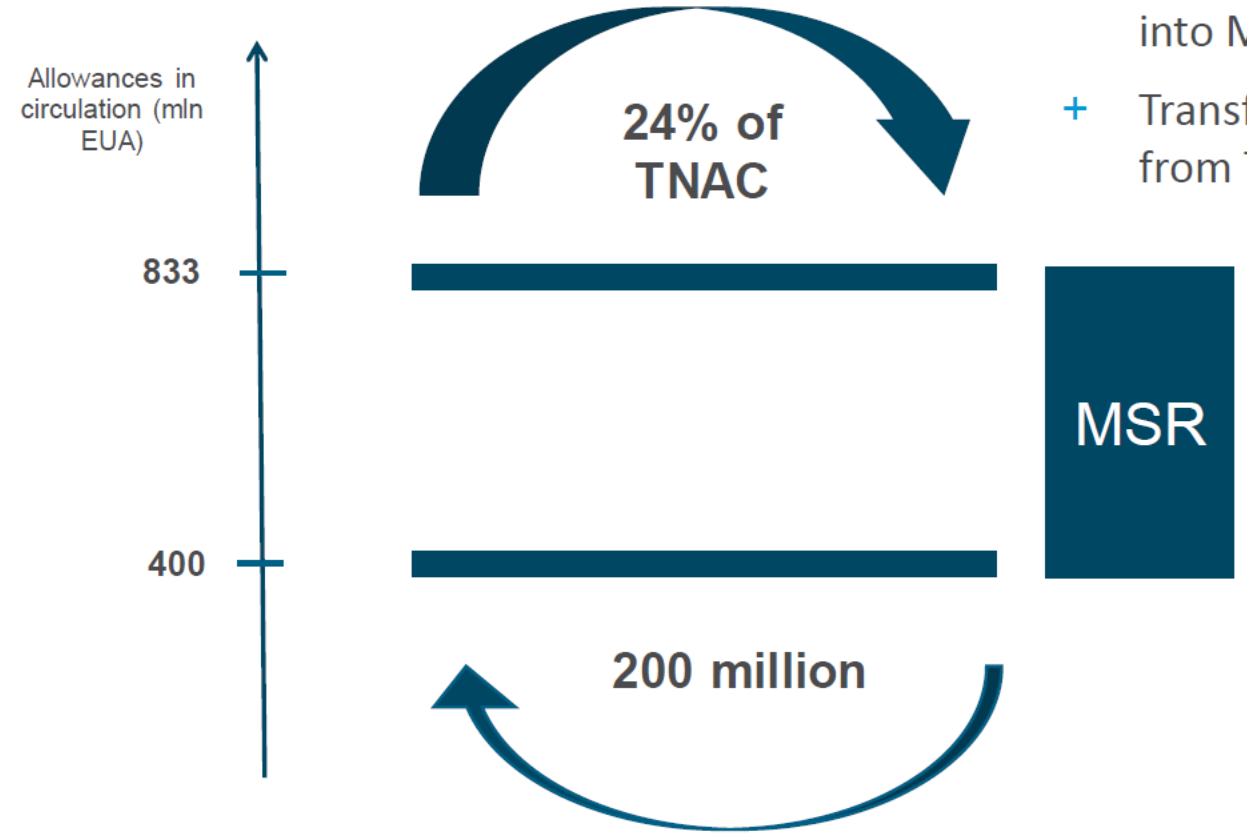
- low $CO_2$-price during almost 10 years
- Price hike beginning in 2018 ➔ **reform of EU ETS Directive brings back confidence**
- Downward correction of price since beginning of 2023; stabilisation in 2024
- "Real" market surplus reduced by policy interventions: TNAC* down from >2 bln to 1.1 bln EU allowances

* TNAC = Total number of allowances in circulation

# Structural reform of the EU ETS: cutting auctioning volumes

- **“Quick fix”: Backloading 2014-2016**: 900 million EUA were taken out of the market
- **“Long-term solution”: Market Stability Reserve (MSR)**
  - To **deal with the current oversupply** and **stabilize the market balance in the future**
  - **Rule based mechanism** for **adjusting annual auction volumes** depending on size of market surplus (volume based supply management)

# Functionality of the MSR (as from 2019 on)



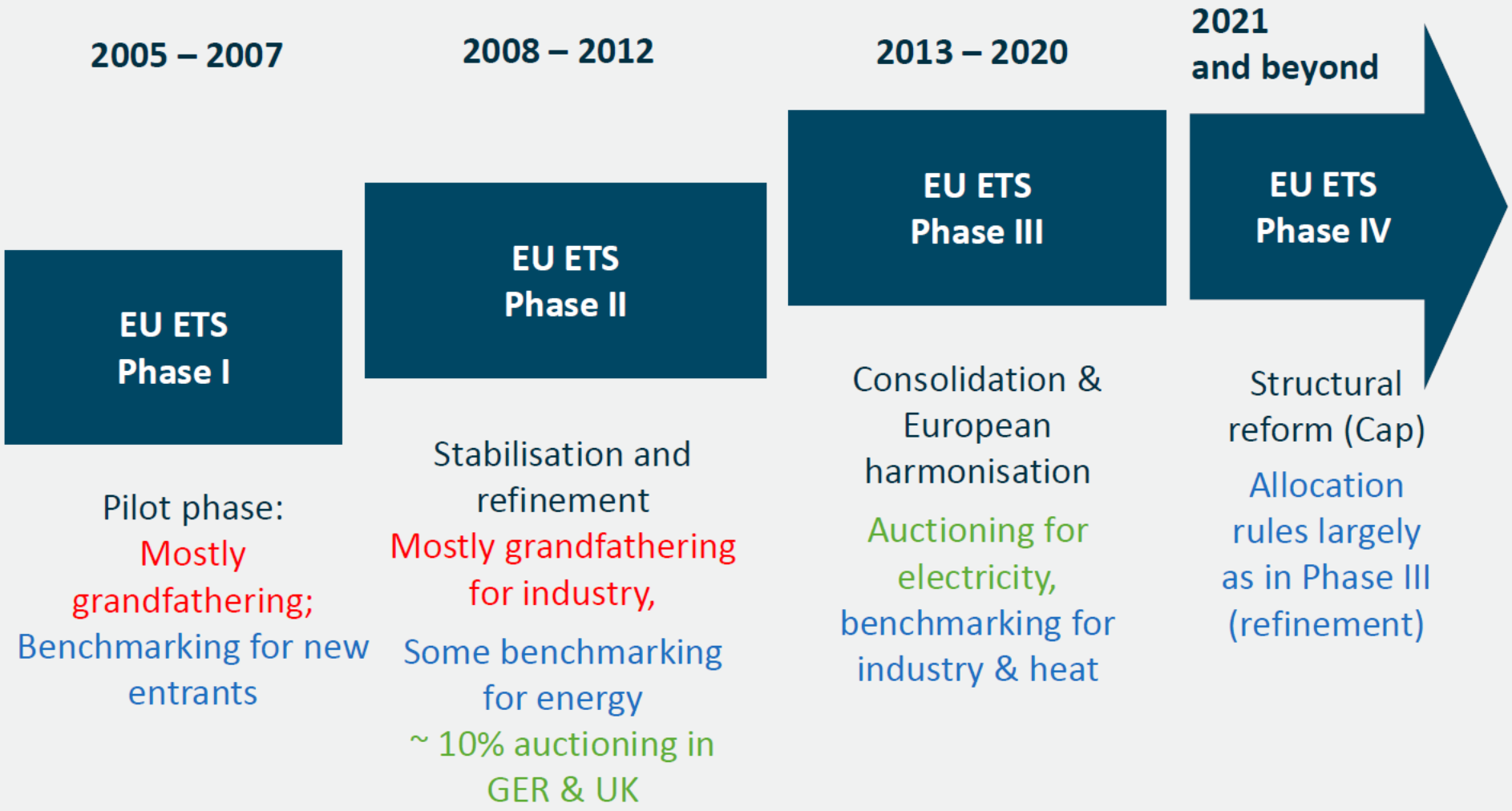

+ Transfer of **backloading amounts** into MSR (900 mln)
+ Transfer of **unallocated EUA** from TP3 (800 – 1,000 mln)

**MSR intake** in 9/2024-08/2025:
approx. 270 mln EUA

**auction volume**
before MSR: approx. 720 mln EUA
after MSR: approx. 450 mln EUA

**Cancellation from 2023 on:** if allowances in MSR are higher than auction volume in previous year, they are cancelled → 2.5 bln EUA cancelled in 2023!

# Steps within EU ETS – Changes in allocation rules



# Why free allocation anyway?

- Introduction of instrument “ETS” → gives firms time to adapt
- Wins political support by industry stakeholders
- Shields from „**carbon leakage**“ if internationally large carbon price differences
- **Auctioning** preferable (in economic theory):
  - secures price signal across the economy
  - avoids „windfall profits“
  - avoids wrong incentives to invest in carbon intensive technologies (stranded assets)
  - raises money that can be refunded directly or support R&D of low-carbon techniques
- CBAM (Carbon Border Adjustment Mechanism): step-by-step reduction of allocation from 2026 ff for some products (see resp. presentation)

# Methods for free allocation: grandfathering vs. benchmarking

## Grandfathering: 1st + 2nd trading period (industry, partly energy)

**Allocation**

=

**Historical emissions in base period**

(e.g., average 2000-2005)

x

cross-sectional correction factor

(to meet the cap)

## Benchmarking: since 3rd trading period

**Allocation**

=

**Benchmark**

(e.g., 0.766 EUA

per ton of cement clinker)

x

**Historical Activity Level in base period**

(e.g., 800,000 t cement clinker p.a.)

x

Carbon Leakage factor

x

cross-sectional correction factor

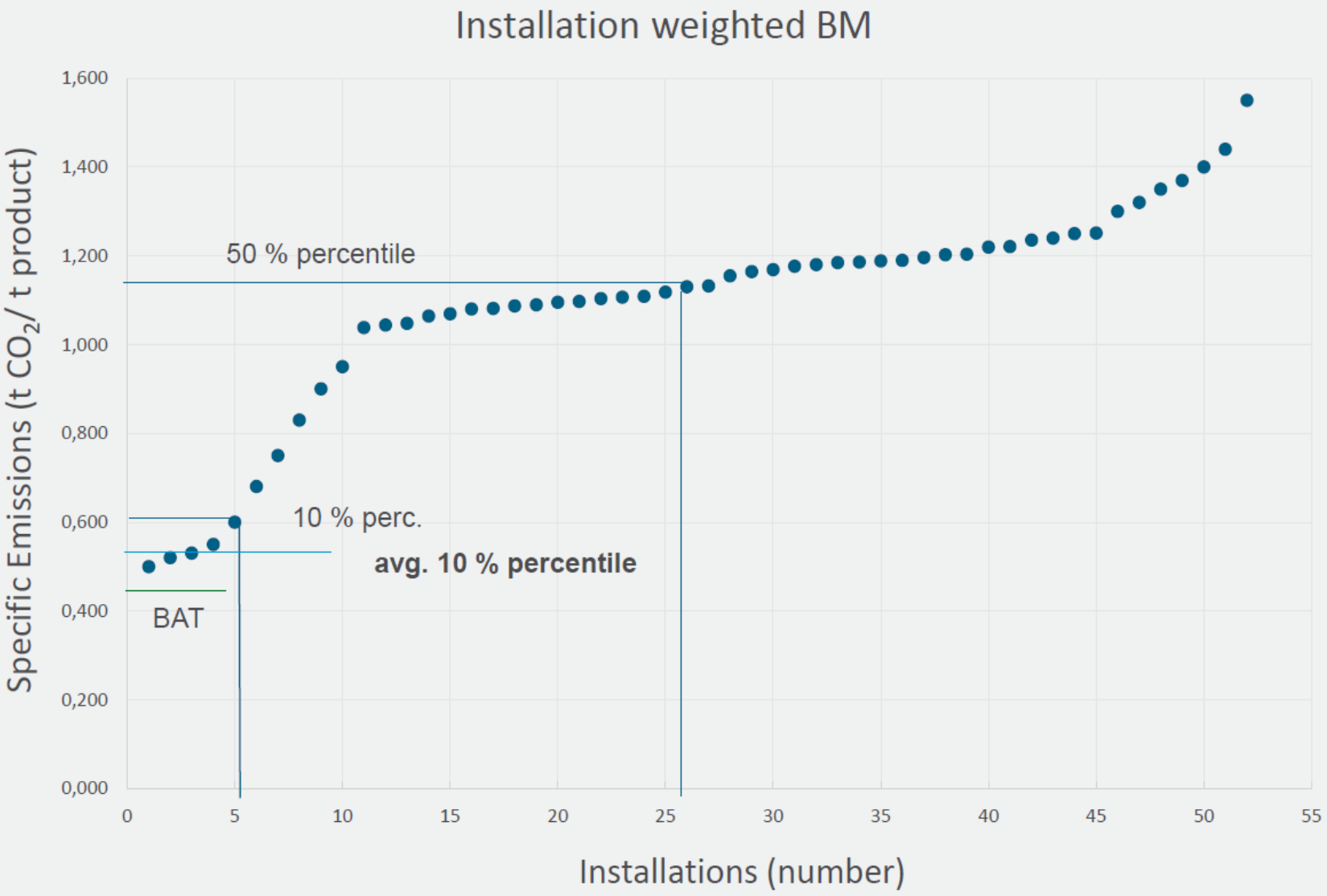
# Allocation rules in 3rd and 4th trading period

## Hierarchy of benchmark allocation rules

- **Product benchmarks** (BM) for 52 products, defined as the average of the 10th percentile of the most greenhouse gas efficient installations at EU level in the years 2007-2008 (3rd period) resp. 2016-2017 (4th period, 2021-2025) and 2021-2022 (4th period, 2026-2030)
- Otherwise „**fallback**“ approaches in the following hierarchy:
  - **Heat benchmark** on measurable heat used for production (= 62.3 allowances / TJ in 3rd period)
  - **Fuel benchmark** (= 56.1 allowances / TJ in 3rd period),
  - **Process emissions** outside of BM products (list of specific processes) (= historical emissions x factor 0.97 in 3rd period)
- Improving rates for BM in 4th period (2021-2025) from 3% to 24% for levelling of BM ambition (data collection within allocation process)

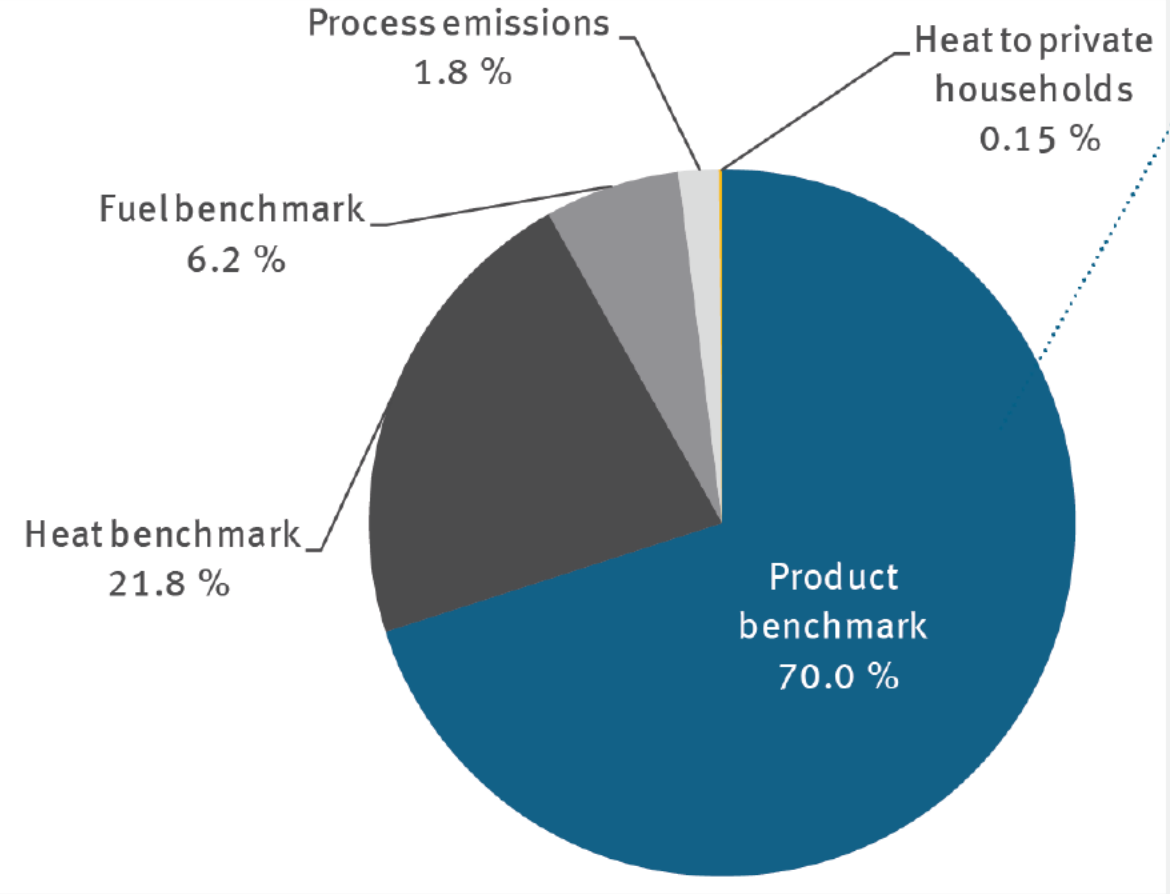
→ Installation to be split up into **sub-installations** to correctly apply the methodology in the right order (all inputs, outputs and corresponding emissions related; ≠ boundaries of physical process units)

# Approaches for BM definition




Source: DEHSt

# Distribution of allocation 2013-2020 in Germany




| Product benchmark | 2013-2020 share of total allocation |
|---|---|
| Hot metal | 22.2 % |
| Grey cement clinker | 11.2 % |
| Refinery products | 10,7 % |
| Steam cracking | 3.9 % |
| Lime | 3.6 % |
| Sintered ore | 2.9 % |
| Ammonia | 2.0 % |
| Coke | 1.3 % |
| Hydrogen | 1.3 % |
| Remaining 40 product BM | 10.9 % |
| Total | 70.0 % |

Source: Allocation 2013-2020: Results of Free Allocation of Emission Allowances to Incumbent Installations, DEHSt, 2016

# Benchmarking in Phase III and IV – lessons learnt (1)

- Benchmarks (BM) are applied **EU-wide** – to avoid distortions of $CO_2$ price signal within Member States and competitors
- Derivation of product benchmarks is time-consuming, but BM allocation is easy and fair compared to fall-back approaches (heat, fuel, process) → **high coverage of product BM allocation recommended**
- Principle: **one product (group) – one BM** → no differentiation of BM for similar usage of products (e.g. coloured vs. white container glass, coated vs. uncoated paper) or similar raw materials (e.g. grey vs. white cement clinker) → **no unnecessary differentiation recommended**
- If relevant differences in product specification within a sector ("quality of product") → more than one BM (to decide: what is "relevant"?)
- Differentiation within a BM should be avoided, e.g. not for technology, plant age & size, raw material, site-specific factors, or cross-media effects
- Pre-requisite for benchmarking: Harmonised **definition of activities and clear product definition** (like EU-PRODCOM number system); if necessary, uniform reference values (e.g. for moisture content)

# Benchmarking in Phase III and IV – lessons learnt (2)

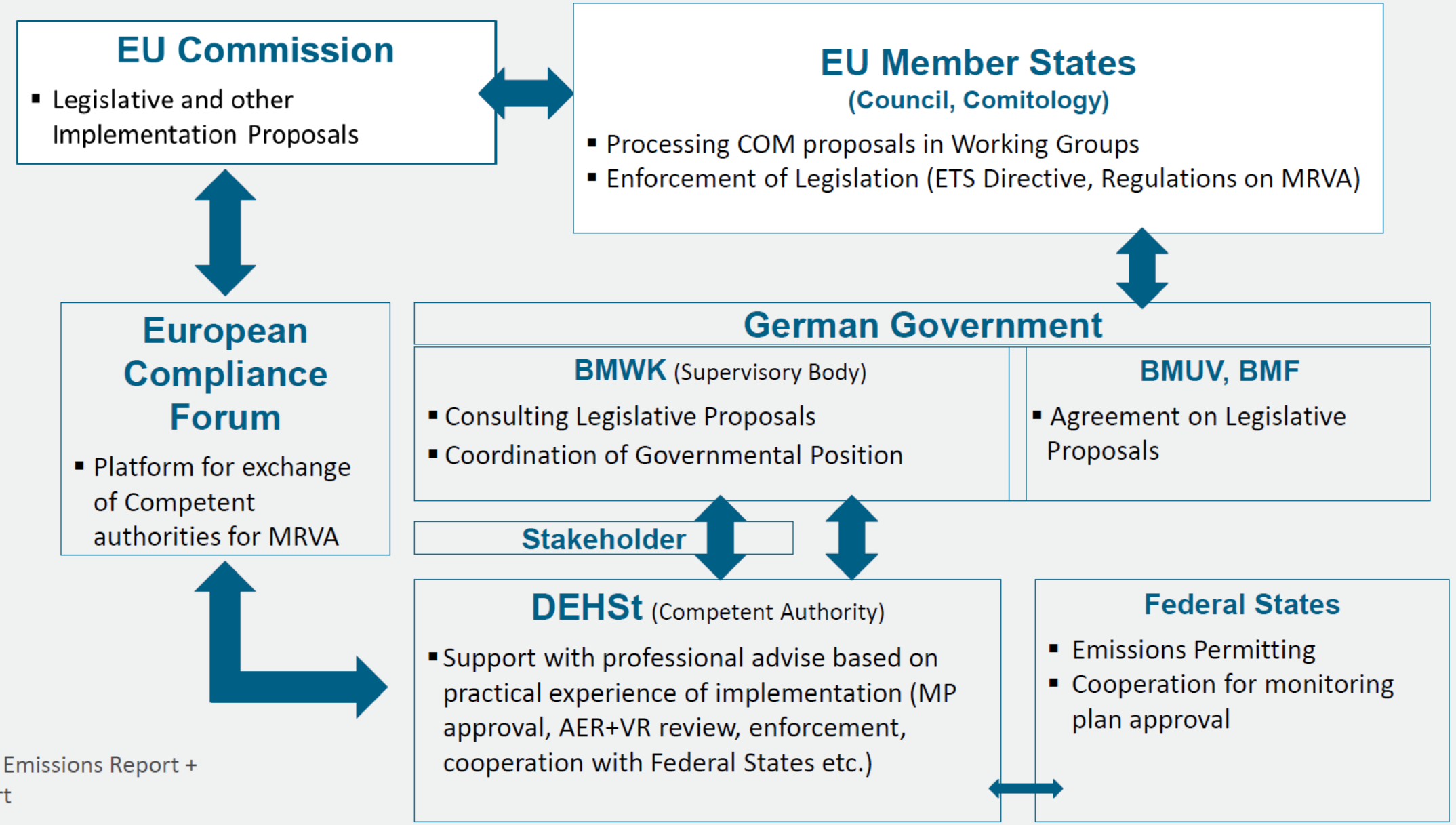
- Data needs: **verified** historical data of emissions, energy consumption and production at sub-installation level (and in case of exchangeability of heat/power: electricity consumption)
- **Same ambition level for all BM** within all sectors should be achieved → Phase IV (2021-2025): higher (maximum) adjustment for heat and fuel BM and many product BM (-24%) compared to other BM (-3%)
- Phase IV: allocation to (almost) decarbonised products from 2026-2030, e.g. $H_2$ from electrolysis or BM products with electricity based process heat → **incentive for transformation techniques**
- Phase IV: ex-post allocation adjustment if production increases or decreases more than 15 % compared to historical „production“ (activity level) → high share of administrative burden

→ **Keep it simple!**

**Valuable literature:**

- EU Guidance, studies, documentation, FAQ to benchmarking process: https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/free-allocation_en#studies
- BM curve factsheets: https://ec.europa.eu/clima/system/files/2021-10/policy_ets_allowances_bm_curve_factsheets_en.pdf
- Emissions trading in practice: https://www.carbonknowledgehub.com/pdf/stories/ICAP-story-2.pdf

# MRVA system organisational structure in the EU ETS/Germany




AER+VR – Annual Emissions Report + Verification Report

# Activities and GHG Gases under EU ETS

**Participation on ETS depends on the activity, and in many cases on capacity thresholds:**

- All combustion installation with a total rated thermal input > 20 MW,
  Exceptions:
  - Installation with exclusive combustion of dangerous or municipal waste => **municipal waste incineration plants will be included as of 2026**
  - Installations using only biomass => **from 2026 onwards >95% Rule sustainable biomass**
- Industries i.e. Coke production, Refinery, Iron and Steel, Metal roasting and Sintering, Cement, Lime, Glass, Pulp and Paper, Ceramic, Ferrous and Non-ferrous metals, Bulk organic Chemicals, Primary Aluminum, Gypsum Products and Plaster boards, Carbon Black, Ammonia, Hydrogen and Synthesis Gas, Soda ash/bicarbonate
  - largely with varying thresholds for each sectors (> 20 MW or based on exceeding a certain production or melting capacity per day/hour)
- Aviation with threshold 10,000t $CO_2$/yr, aircraft with take-off mass > 5,700 kg
- ***Direct emissions*** **of GHG gases:** $CO_2$ and
  - $N_2O$ from chemical activities
  - PFC from production of primary aluminum

# Installation and GHG Emissions Permit

- EU ETS based on installation level, i.e. stationary technical unit/facility/site
- 'Installation' means a stationary technical unit where one or more ETS activities are carried out and any other directly associated activities which could have an effect on emissions;
- GHG emissions permit necessary, e.g. site specific, unit specific
- IED foresees the GHG permit and the Monitoring Plan as unity but allows other solutions
- **GERMANY:**

  *Federal states* are responsible for issuing GHG permits in context of the overall approval process of an installation (DEHSt hearing before permitting), GHG permits are revisited after 5 years;

  *DEHSt* responsible for Monitoring Plan approval (Federal State hearing before approval)

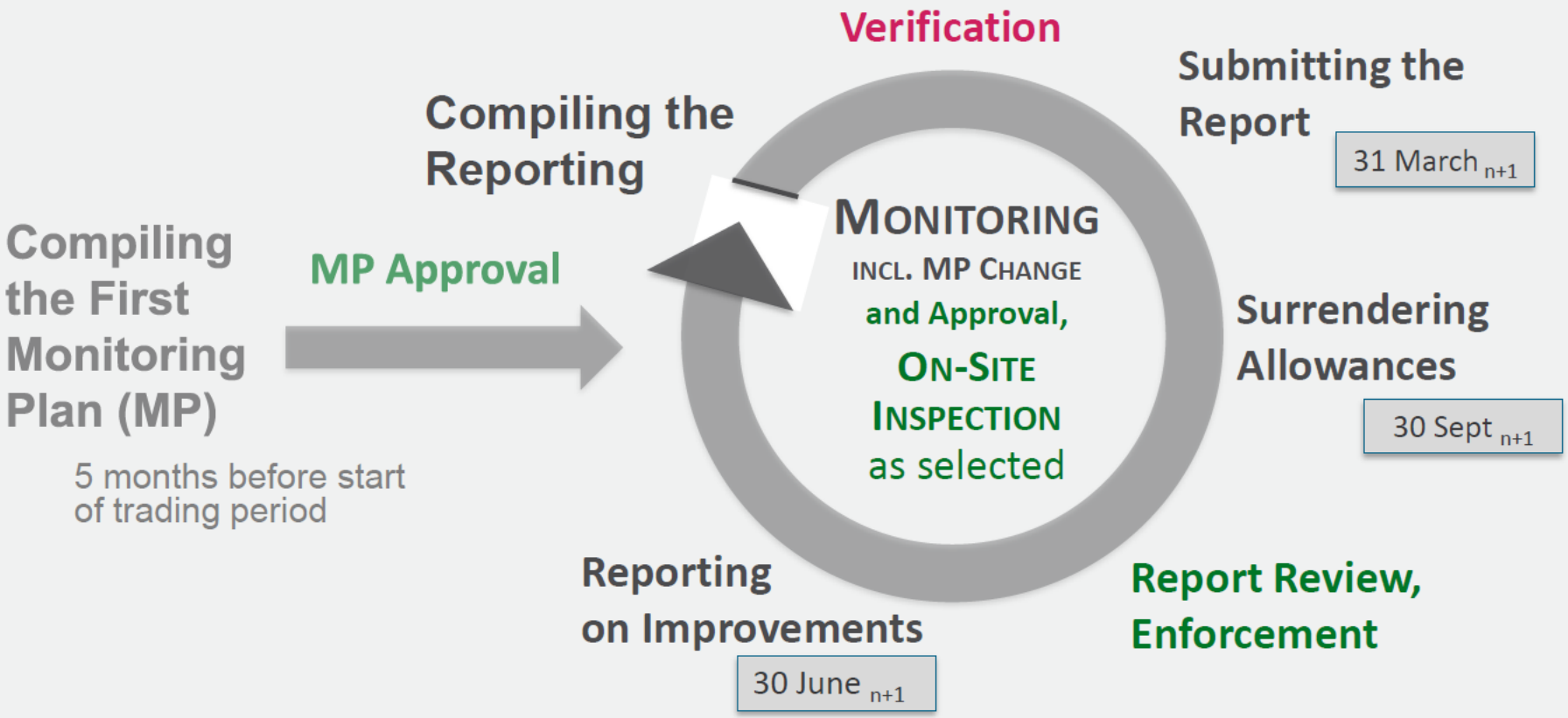
# EU ETS in Germany: Scope in “Numbers”

## Setting of priorities

| Installations size | Number of installations in Germany | | Total annual emissions amount | |
|---|---|---|---|---|
| **Category C**<br>**> 500 kt $CO_{2(Äq)}$** | **128** | 7% | **277 Mio. t $CO_{2(Äq)}$** | **78%** |
| Category B<br>> 50 kt $CO_{2(Äq)}$ | 408 | 23% | 61 Mio. t $CO_{2(Äq)}$ | 17% |
| Category A<br>< 50 kt $CO_{2(Äq)}$ | 1.220 | 70% | 18 Mio. t $CO_{2(Äq)}$ | 5% |
| including<br>< 25 kt $CO_{2(Äq)}$ | 951 | 54% | 8 Mio. t $CO_{2(Äq)}$ | 2% |

Emissions in the year 2021

# EU ETS Compliance Cycle for Monitoring, Reporting and Verification

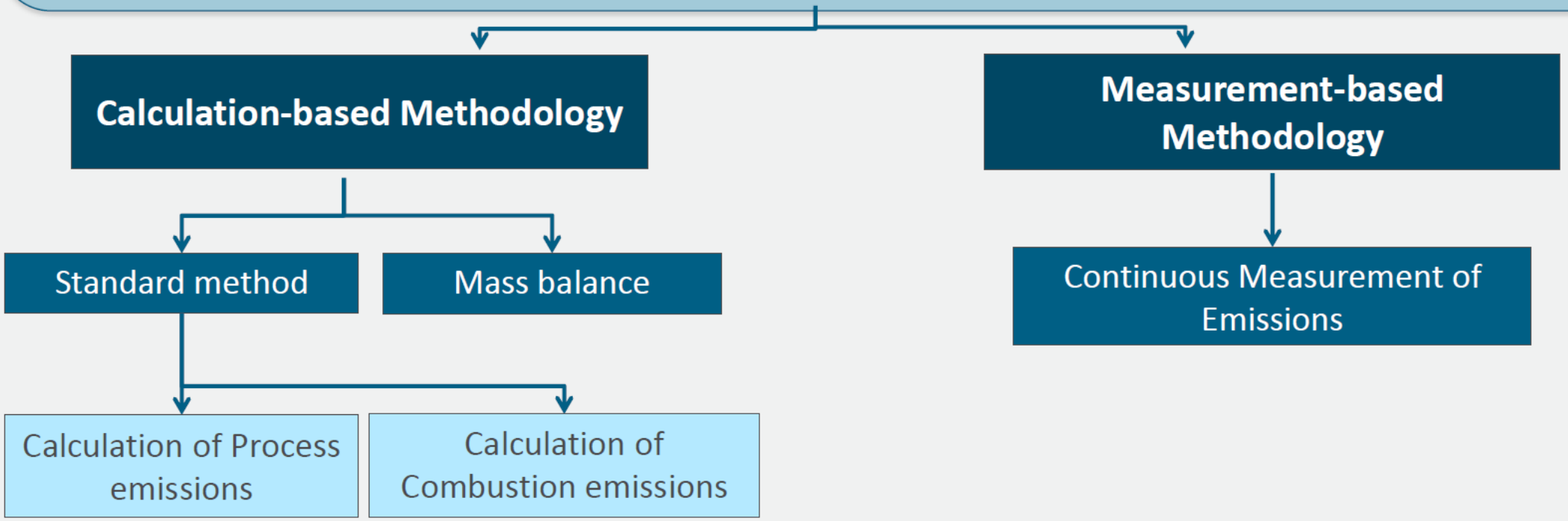



black: Operator's tasks
green: Authority's tasks
red: Verifier's tasks

# Principles and Methodologies for determination of emissions

**Monitoring and Reporting based on**

- Completeness,
- Consistency, Comparability, Transparency,
- Accuracy,
- Integrity of the methodology and the emissions report,
- Continuous improvement,
- Coordination.



# Content of a Monitoring Plan (I)

MP describes all relevant data and monitoring methods for the installation

- Installation boundaries (description, flow chart)
- Technical processes of the installation (combustion, production of chemicals,…)
- List of all source streams

  That means

  - all fuels in case of combustion installations or
  - e.g. all carbon containing input and output streams for chemical installations.
- For each source stream the expected emission amount has to be declared. The installations emissions are relevant for the category of the installation and therefore for the requirements for each single source stream.

# Content of a Monitoring Plan (II)

- For each source stream the operator has to describe how the amount and the relevant calculation factors are estimated:

  Source stream amount:

  - Measuring devices inclusive quality control and uncertainty assessment
  - Conservative estimations

  Calculation Factors (net calorific value, emissions factor, biomass content,…):

  - Sampling plan
  - Analysis frequency
  - Applied norms for analyses
  - Accreditaiton of laborities
  - Usage of standard factors
  - Conservative estimations

- The legal requirements base upon the amount of installations emissions: the more GHG are emitted, the higher are the requirements

# Summary MP

- An approved Monitoring Plan (MP) improves transparency and guarantees legal security for the operator => Methods are accepted and should be used for Emissions Report.
- A Monitoring Plan reduce the burden to check methodologies for each operator every time the Emissions Report (ER) is submitted.
- A clear structure of the content of a Monitoring Plan helps to avoid missing relevant data for the Emissions Report and to comply with the Monitoring and Reporting Regulation (MRR).
- Good methods for quality data management and control will reduce mistakes in your reports
- The better the MP the better the ER.

# Verification principles

- The **objective** of verification in an MRV-System is **to ensure** that
  - **emissions have been monitored** in accordance with
    - the legal requirements
    - i.e. the (**approved) monitoring plan**
  - **reliable and correct emissions data** are **reported**
    - reported data is in congruency with monitored data
  - reassurance of “a ton emitted must be a ton reported”

# Requirements for accreditation bodies

- **Accreditation bodies** are usually **monitored** by the affiliated Member State
- **Accreditation bodies are subject to Peer Evaluation** organised by regional umbrella organisations

**Mutual recognition: Accreditation certificates could be considered valid in other countries if accredited NAB has successfully undergone peer evaluation**

# Surveillance of verification bodies

- The accreditation body may as administrative measures **suspend, reduce or withdraw the accreditation** in cases of non-compliance of a verification body
  - Applicable administrative measure depend on **scope and extent** of the non-compliance
  - In most cases the accreditation body might demand measures to prevent the detected non-compliance in the future, such as additional training of auditors. If the verification body fulfills the NABs expectations the accreditation will not be affected.

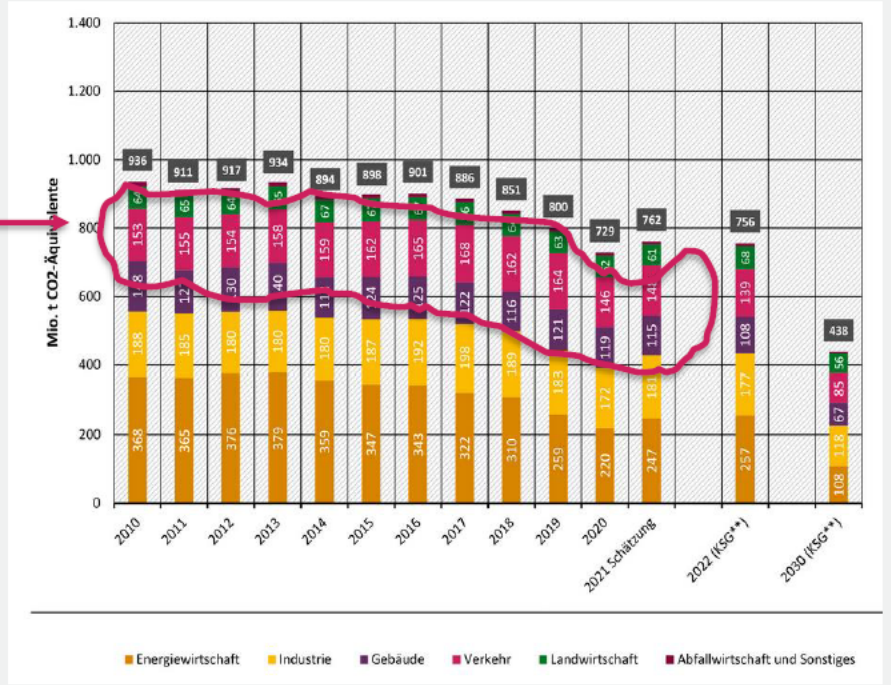
**Authorities may submit complaints to the NAB to seek administrative measures**

# 3. German National ETS (nEHS) and EU ETS 2 for buildings, road transport & other sectors

# Starting Point: The introduction on the national ETS in Germany

- **2019: "Climate Action Programme 2030" initiated**
  - **Main reductions so far** achieved in **sectors covered by the EU ETS 1**
  - **Emissions reduction trend sobering,** especially in the German **transport** but also the **buildings sector**
  - **Additional** policies and **measures required**

- **December 2019: Fuels Emissions Trading Act (BEHG)** was adopted; **$CO_2$ pricing for sectors outside the EU ETS 1**
  - … **to be launched in 2021**
  - … should provide for a steering instrument to **contribute to achieving Germany's climate targets**
  - … to **refinance other climate protection measures** via revenue recycling (e.g. today Climate and Transformation Fund)
  - … to be **established** also **on European Level perspectively**

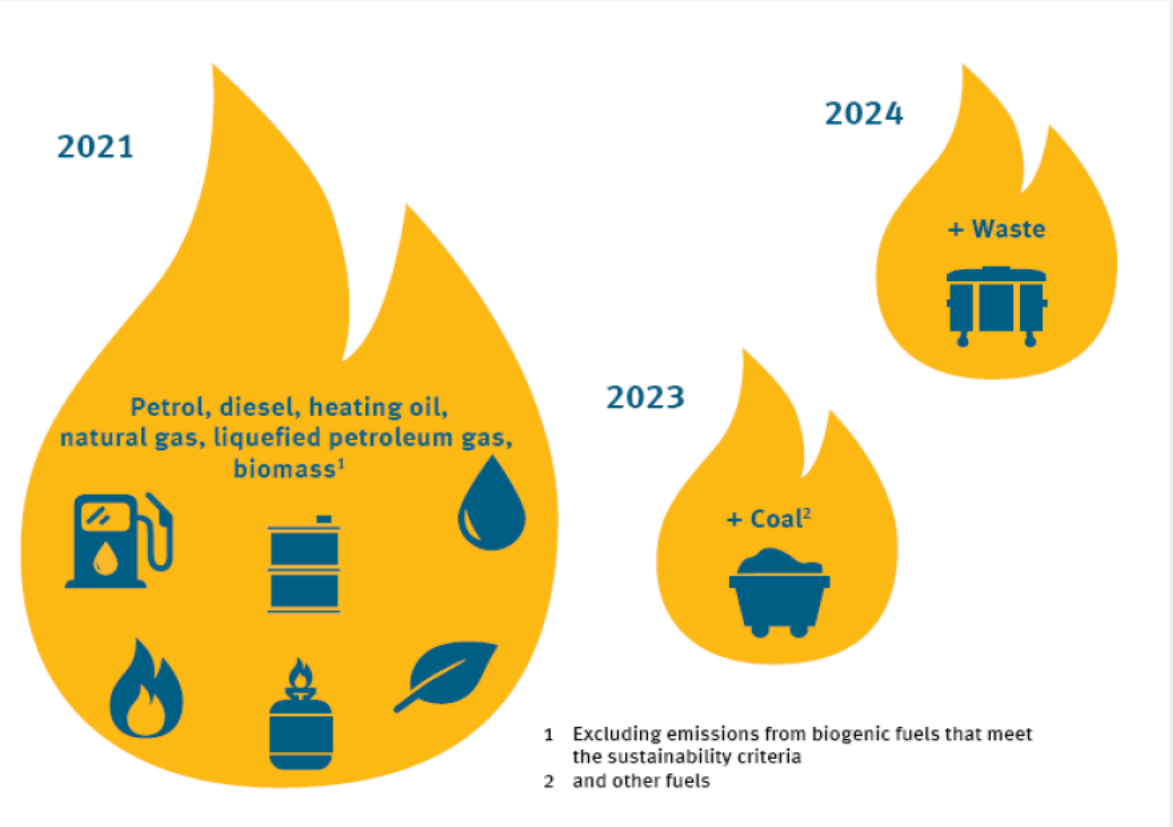



Source: UBA 2022

# Basics of the German national ETS (nEHS)

## What fuels are subject to the nEHS?

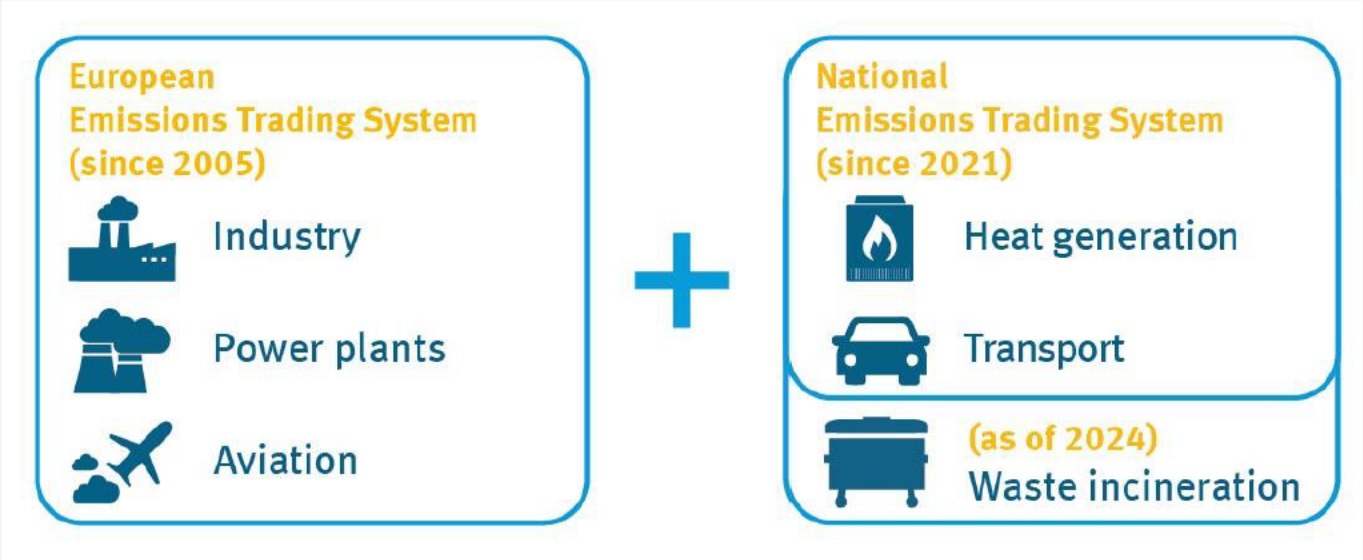
- BEHG applies to fuels distributed as listed in Annex 1 BEHG
  - **All fuels** whose combustion **have the potential to cause $CO_2$ emissions**
  - Corresponds to energy products pursuant to **Energy Tax Act** (EnergieStG)



# Basics of the German national ETS (nEHS)

## Scope of the nEHS

- **nEHS applies to a broad scope**
- Scope dresses mainly emissions of the **heating/building and transport sectors**
- **(Small) industries** outside the EU ETS 1 scope are also included and the **combustion of fuels in other sectors** as well



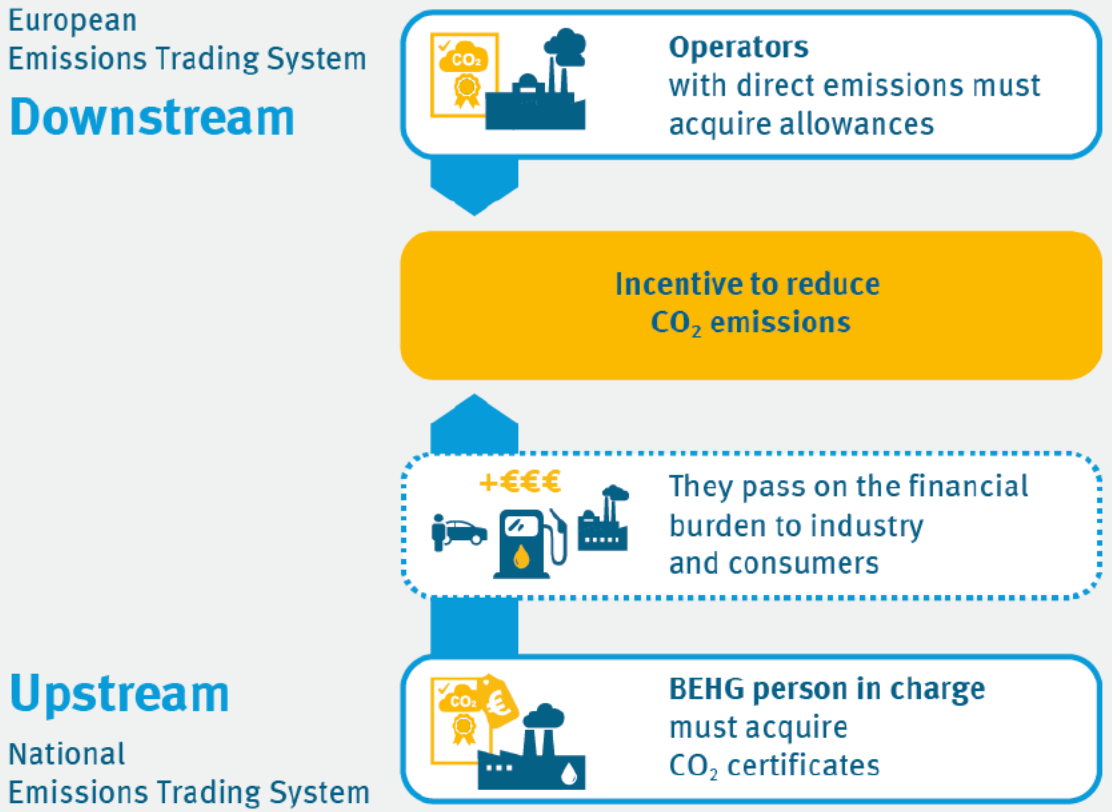

Source: own illustration; German Enviroment Agency

# Basics of the German national ETS (nEHS)

## Different approaches between nEHS & EU ETS 1

- **EU-ETS 1: Operators** report on **direct emissions** obliges the fuel distributor (**downstream**)

- **nEHS: Fuel distributors/wholesaler** report on **potential** ($CO_2$) **emissions** which (may) arise during combustion of the fuel




Source: own illustration; German Enviroment Agency

# Basics of the German national ETS (nEHS)

## What is the $CO_2$ price in the nEHS?

- **Fixed/Regulated prices** in the **initial phase** of the nEHS 2021 - 2026
  - Allocation via sale/auctioning of all allowances
  - 2026: regulated price formation within a price corridor
- **From 2027:**
  - **Price formation on the market**, application of a fixed cap was **planned**
  - Due to the **start of the EU ETS 2 in 2027**, the **nEHS has to be transitioned**

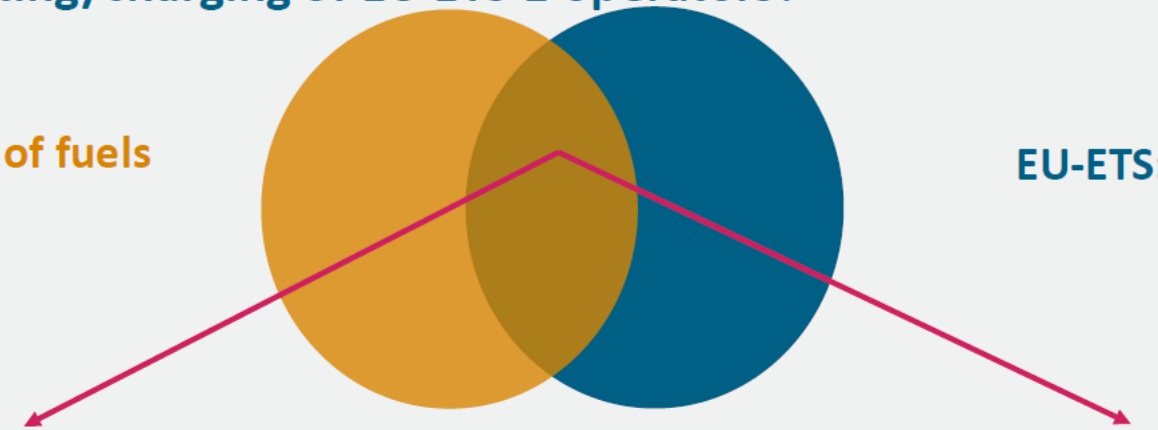

Source: own illustration; German Enviroment Agency

- 30 euros/t CO2: approx. **7 ct/l gasoline** or 0.6 ct/kWh heat (natural gas)
- 45 euros/t CO2: approx. **11 ct/l gasoline** or 0.8 ct/kWh heat (natural gas)

# Basics of the German national ETS (nEHS)

## How to avoid double counting/charging of EU ETS 1 operators?

nEHS: Distribution of fuels



EU-ETS: Use/combustion of fuels

**Avoiding double charging through the avoidance of costs in advance (ex ante)**

**Application:**
The distributor (the obligated party as per BEHG) gets a *confirmation of use* by the EU ETS installation operator,
→ Fuels can be delivered without the costs for nEHS certificates

**Refunding by a subsequent compensation of the fuels, which have been charged twice (ex post)**

**Application:**
The avoidance of costs in advance was not possible (e.g. due to multiple intermediaries)
→ The costs for nEHS certificates have been transferred to an EU ETS Installation

**In both cases, the acquisition of data takes place in the emissions report of the EU ETS**

# Overview on the EU ETS 2 starting in 2027

## Point of Regulation, Scope and Coverage

- EU ETS 2 will be established as an **upstream system similar to** the German **nEHS**
- Regulated entities: **fuel distributors/suppliers;** EU Commission expects > 11.500 entities to be covered
- Covered **activity**: „**release for the consumption of fuels** in the ***buildings, road transport and additional sectors***"

| Included Sectors | Excluded Sectors |
|---|---|
| CHP & Heat Production for Buildings | EU ETS 1 activities |
| Road Transportation | Sustainable Biomass |
| Energy Industries | Hazardous or municipal waste |
| Manufacturing Industries | Forestry & Agriculture |
| | Remaining Transportation |

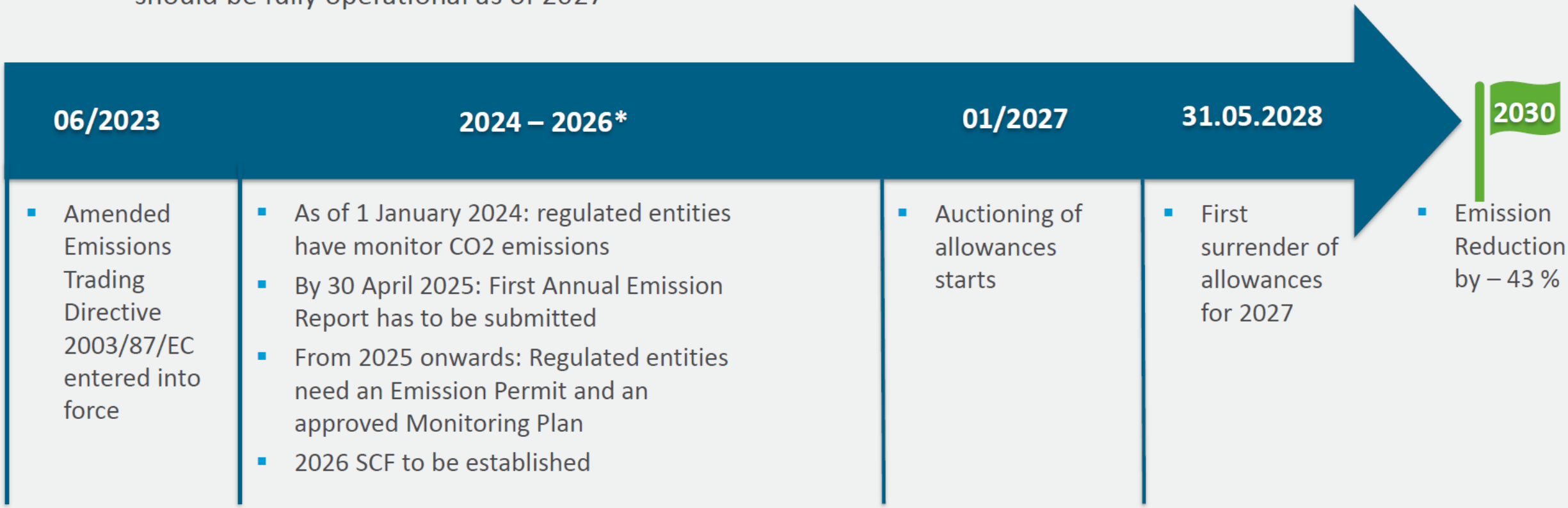
**Narrower Scope** compared to the German nEHS

**Member States may** unilaterally **opt-in additional sectors**

# Overview on the EU ETS 2 starting in 2027

## Wrap-up: Timeline for the introduction of the EU ETS 2

- EU ETS 2
  - will be phased-in stepwise
  - should be fully operational as of 2027




*Art. 30 k ETD, introdcution of the system may be postponed to 2028, if gas and oil prices are deemed „too high“ in 2026

# Transition from nEHS to EU ETS 2: from fixed/regulated prices to market prices

## Introduction

- **Recap: EU ETS 2** sets an **ambitious reduction target (- 43 % by 2030 compared to 2005)**
  - **Annual emission reduction** in covered sectors **has to quadruple**!
  - Although price expectations vary, **significant high prices are to be expected**

- **Mechanism** will be applied **to curb price hikes and to avoid excessive price fluctuations** (Frontloading, Market Stability Reserve)

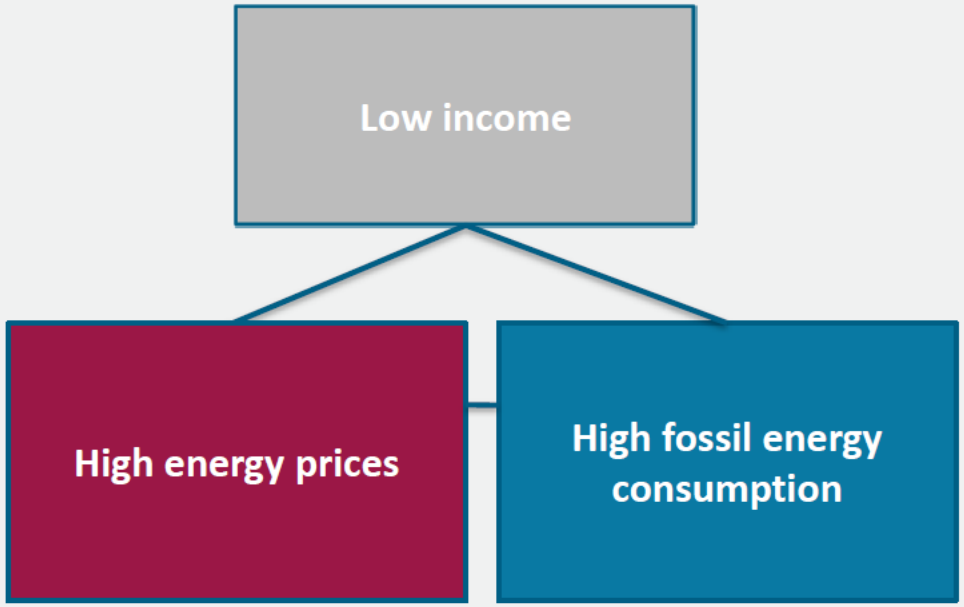
- **Additional Measures** will be needed with a special focus on social impacts to **gain and maintain the acceptance of the EU ETS 2**
  - **Social Climate Fund**
  - **Supporting policies and measures (policy mix)**
  - **Avoidance of Carbon Leakage (?)**

# Transition from nEHS to EU ETS 2: from fixed/regulated prices to market prices

## How to address potential negative social impacts/distributional effects appropriately?

- What are **„vulnerable housholds“?**

**Causes of high energy cost burdens**




- **Low scope for adaptation** (e.g., lack of capital for adaptation investments/lack of decision-making power) **keeps vulnerable households trapped in high energy costs**
  - (Vulnerable) households **must be given** significantly **more scope to respond to CO2 pricing**
- **Reduction of fossil energy consumption** as an environmental and social "**first best option**" of a socially acceptable climate policy
  - ✓ Reduce GHG emissions
  - ✓ Reduce energy costs sustainably
  - ✓ Reduce public spending on social benefits (e.g., heating costs in public housing)
  - ✓ Strengthen the resilience of vulnerable and low-income households against future fossil fuel price shocks

# 4. Carbon Border Adjustment Mechanism (CBAM)

# The idea: Combining carbon leakage protection and effective $CO_2$ pricing

Equal $CO_2$ price for imported and EU-manufactured products (basic industrial materials)

Political agreement on 13/12/2022
Approval in Committee on 08/02/2023
Formal adoption in Plenary and Council 10/05/2023

Protection against Carbon Leakage (CL)

Incentives for Climate Change Mitigation

**Replacing free allocation as instrument for carbon leakage protection:**

- ✓ Reducing competitive disadvantages vis-à-vis third countries and thus
- ✓ Avoiding relocation of industrial production

**Gradual phasing out of free allocation in EU:**

- ✓ Rising auction revenues
- ✓ Passing on the $CO_2$ price signal

**Incentives for third countries:**

- ✓ Introducing $CO_2$ pricing for industry
- ✓ Strengthening GHG MRV capacities

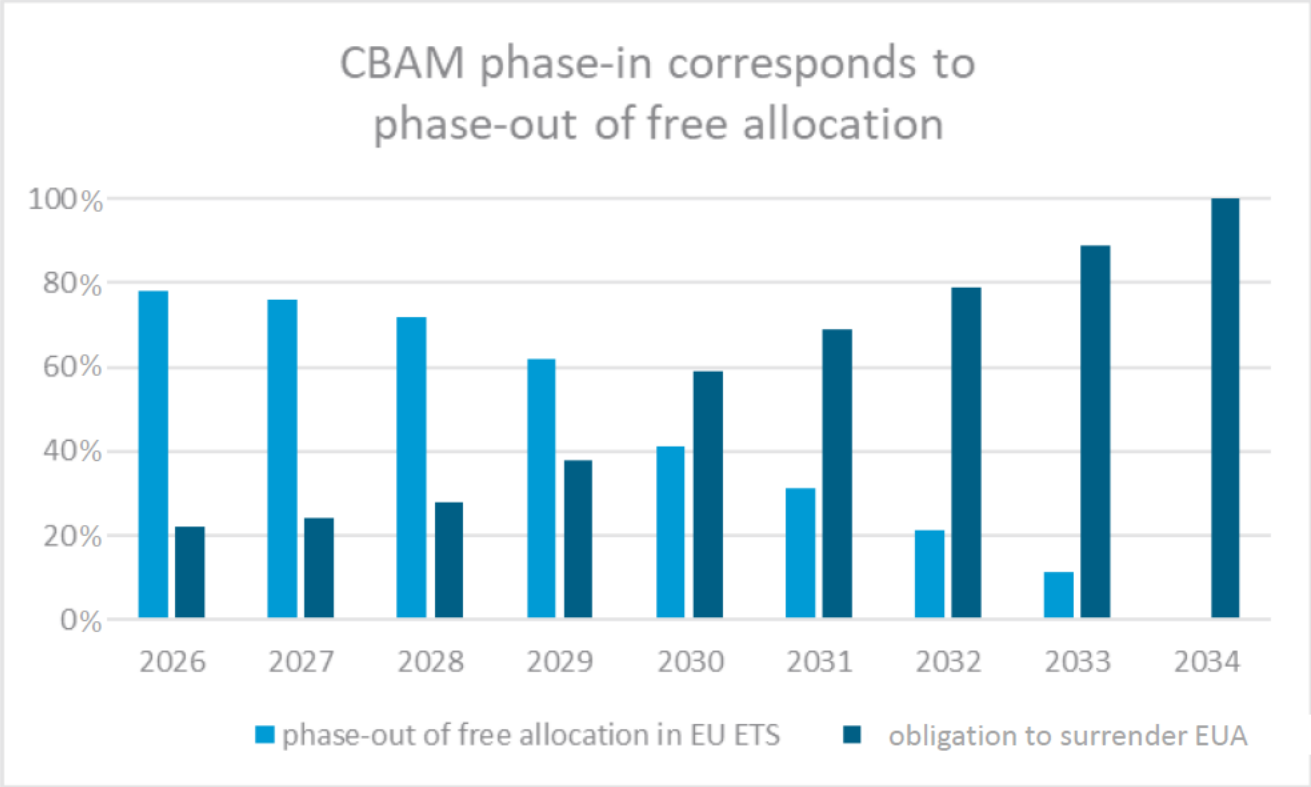
# Phase-out of free allocation in EU ETS corresponds to phase-in of CBAM

Free allocation in EU ETS is based on benchmarks ratio free allocation/emissions in industry: approx. 80 % in Germany

Phase out of free allocation in EU ETS by applying a CBAM factor to the benchmark allocation

From 2034 on, there will be no more free allocation for CBAM goods produced in EU

CBAM Obligation (as of 2026):
100% of embedded emissions
minus free allocation in EU ETS
minus no. of certificates for which carbon price was already paid
multiplied with average carbon price in EU ETS




The graph shows the estimated average share of emissions for DE for which there is free allocation (light blue) or for which there is an obligation to surrender EU allowances (dark blue).

# CBAM: General functioning and overview

**Electricity**

**Cement and clinker**

**Products of iron and steel**

**Aluminium-produkte**

**Fertilisers**

**Hydrogen**

Possibility of extending the scope

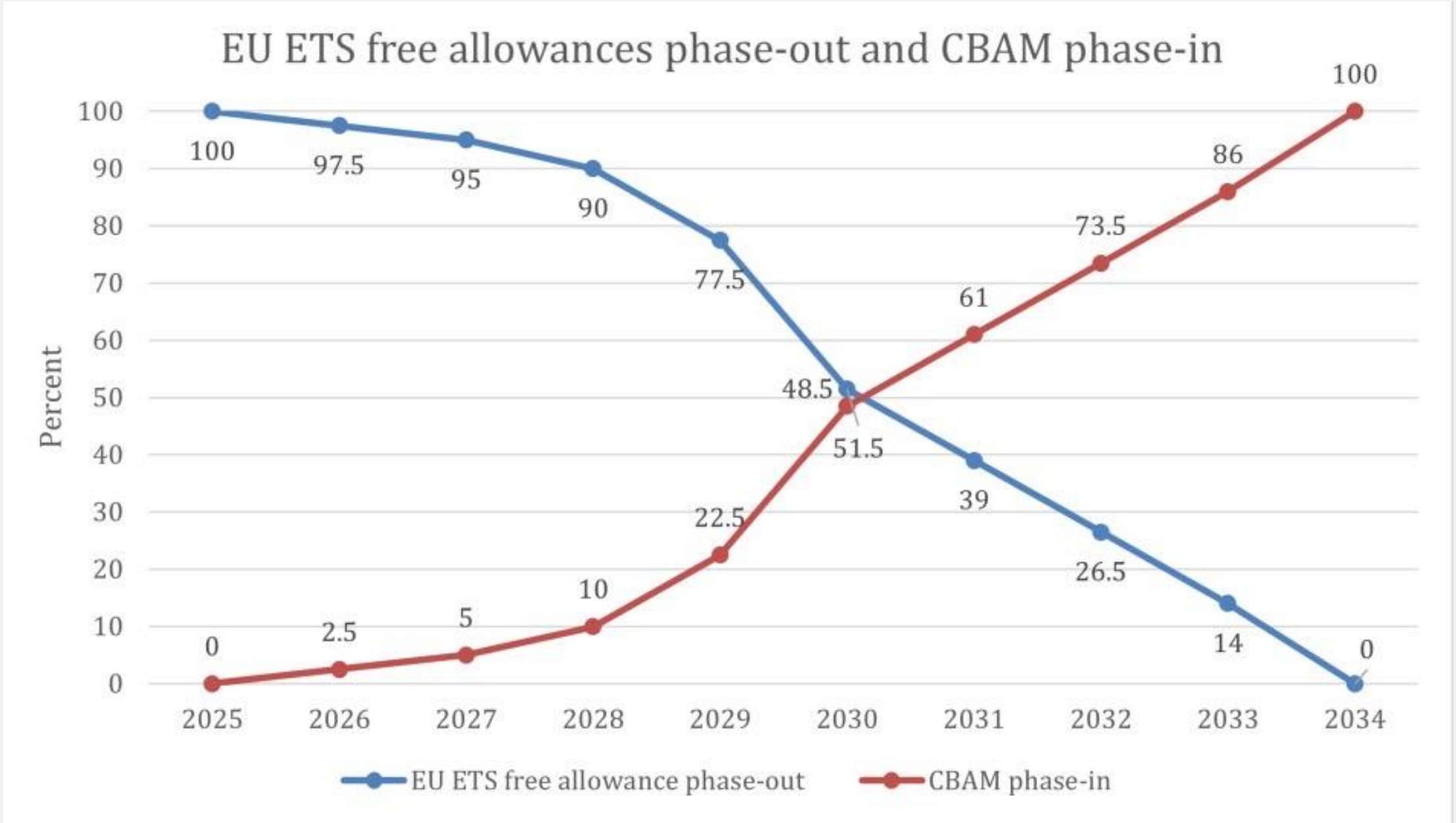
Importers („Declarants“): Annual declaration on embedded emissions of imported goods

In the beginning only direct emissions and emissions from heat/cooling, indirect emissions from electricity consumption only for cement / fertilisers

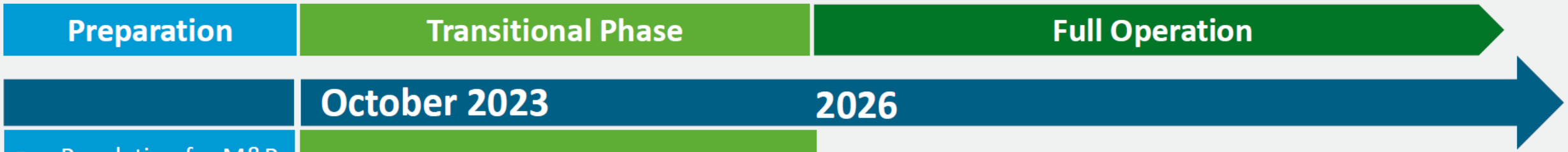
Purchase + Surrendering of CBAM certificates

CBAM obligation accounts for free allocation in EU ETS

Recognition of carbon price paid in third countries, CBAM obligation is reduced accordingly


EU ETS free allowances phase-out and CBAM phase-in
Percent
100
90
80
70
60
50
40
30
20
10
0
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
100
97.5
95
90
77.5
48.5
39
26.5
14
0
0
2.5
5
10
22.5
51.5
61
73.5
86
100
EU ETS free allowance phase-out
CBAM phase-in

# Introduction of the CBAM in two phases




- Regulation for M&R
- IT-Infrastructure
- Communication & Information

Simplified reporting, no verification, no surrendering of certificates

As of 2025: Authorisation of importers

As of 2026: Sale of CBAM **certificates**; authorisation required for import of CBAM goods

As of May 2027: Annual submission of CBAM declaration + surrendering of certificates

As of 2034: full $CO_2$ price in EU and for imports

- Rules for regular operation (accounting for free allocation and third-country carbon prices), build-up of MRV system
- Register, sales platform
- 2024/25 Reviews concerning exports, indirect emissions, extension of scope

# CBAM: What does it mean for importers of CBAM goods into EU?

**2023** — **2026** — **2034**

## Transitional Period

- Regulated entity is the importer located in EU
- Quarterly reporting of embedded direct + indirect emissions to EU Commission (common platform), no verification
- Customs authorities report amounts and types of imported CBAM goods, importers and country of origin to EU Commission
- nCAs implement correction procedure in case of non-compliance (after notification by the EU Commission)

## Full Operation of CBAM

- Importers of CBAM goods have to be authorised as CBAM declarants
- Annual submission of CBAM declaration and CBAM certificates (31/05)
  - Verified embedded emissions of imported goods
  - Minus free allocation in EU ETS
  - Minus carbon price paid in third country => no double pricing!
  - Copy of verification report

**Free allocation is phased out**

**→ Full carbon price is charged**

# Overview of the responsibilities in the implementation of CBAM

| | |
|---|---|
| European Commission (DG TAXUD) | • Provision of the CBAM transitional registry and technical maintenance<br>• Information and training material<br>• First evaluation of submitted reports and identification of no-shows and incorrect reports<br>• Further development of CBAM for the definitive phase (data studies, delegated acts) |
| DEHSt (NCA) | • Initiation of correction procedures based on first evaluation by the COM<br>• Initiation of procedures for the imposition of penalties<br>• Preparation and implementation of the authorization process for the main phase |
| German Custom Authority | • Registration of reporting CBAM declarants for access to the CBAM portal as part of the transitional registry via the customs portal<br>• Transmission of customs data to the Commission |

# Reporting in the transitional phase

| | |
|---|---|
| CBAM Transitional Registry | • Registration for German CBAM declarants via Customs Portal<br>• CBAM reports are submitted via the European Commission‘s Transitional Registry |
| Reporting | • Quarterly<br>• Actual total gray (direct and indirect) emissions of each type of product |
| Flexibilities | • Until July 31, 2024: Possibility of using standard values for reporting and CBAM reports for the first two reporting periods can be modified<br>• Short-term introduction of the option to extend the first submission deadline (January 31, 2024) via the request delay button |

# Chances and challenges of CBAM

**Chances for climate protection:**

- End of free allocation within Europe
- Pass on the carbon price along the value chain
- Incentive to lower $CO_2$ and other relevant emissions during the production process worldwide
- Enhance transparency on embedded emissions of goods, basis for international agreements on MRV of embedded emissions

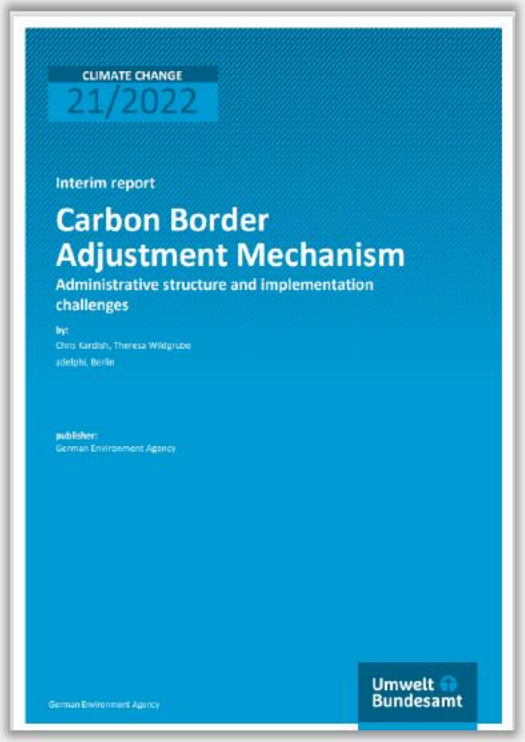
**Building of robust governance structures and processes:**
to ensure a fair and equal treatment

**Addressing international questions and concerns:** cooperation and communication, capacity building ➔ **enhanced climate action towards a climate alliance**

**Challenges**:

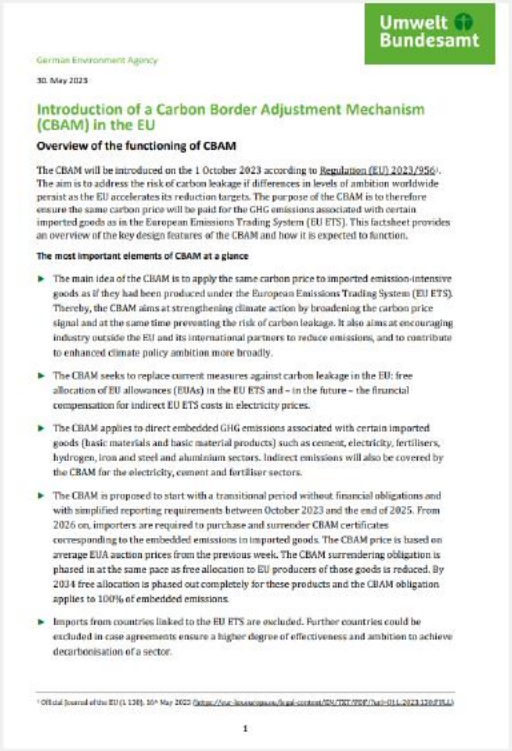
- Time pressure (transitional phase starts already in October 2023, full system running by January 2026)
- Building of robust MRV systems and structures challenging within such a short time period
- Special burden for small and medium sized CBAM declarants

# UBA publications on CBAM



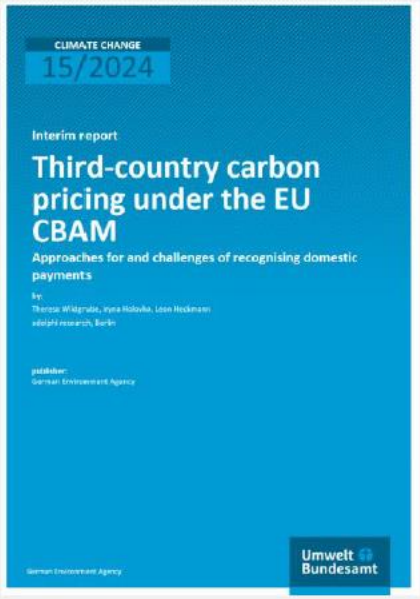

**Climate Change: CBAM – Administrative structure and implementation challenges**

https://www.umweltbundesamt.de/publikationen/carbon-border-adjustment-mechanism




**UBA Factsheet: Introduction of a carbon border adjustment mechanism (CBAM) in EU**

https://www.umweltbundesamt.de/publikationen/introduction-of-a-carbon-border-adjustment




**Third-country carbon pricing under the EU CBAM: Approaches for and challenges of recognising domestic payments**

https://www.umweltbundesamt.de/sites/default/files/medien/11850/publikationen/15_2024_cc_carbon_pricing_cbam.pdf

# 5. CORSIA & Interaction with EU ETS and Non-$CO_2$-Emissions

# 1. CORSIA

## Objective

- Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)
- The element in the basket of measures to ensure that the mid-term goal CNG 2020 is met (global aspirational goal of carbon neutral growth from 2020)

## Regulatory Approach

- International aviation only
- Monitoring of all international emissions already began in 2019
- Duration 2021 to 2035 (option for extension)
- Three year compliance cycle to cancel offsets
  - 2021-2026: the first two cycles are voluntary, 2027-2035: mandatory
  - Voluntary/mandatory: it is up to the State to decide (not up to the operators)
- Offsetting system (eligible emissions units are identified by the Technical Advisory Body and agreed/adopted by the ICAO Council)

# 1.1 State of Play

## Participation in voluntary phase

- Own assessment: **Medium**
- As of August 2024, 128 Volunteer States will be participating from January 2025
  - Out of the 128 volunteer States, 56 States are classified as Small Island Developing States (SIDS), least developed countries (LDCs), or landlocked developing countries (LLDCs)
- Still missing: China and India

## Compliance with requirements

- Own assessment: **High**
- More than 97% of global CORSIA $CO_2$ emissions are submitted annually by States through the CORSIA Central Registry (CCR)
- The remaining 3% are being estimated by the ICAO Secretariat

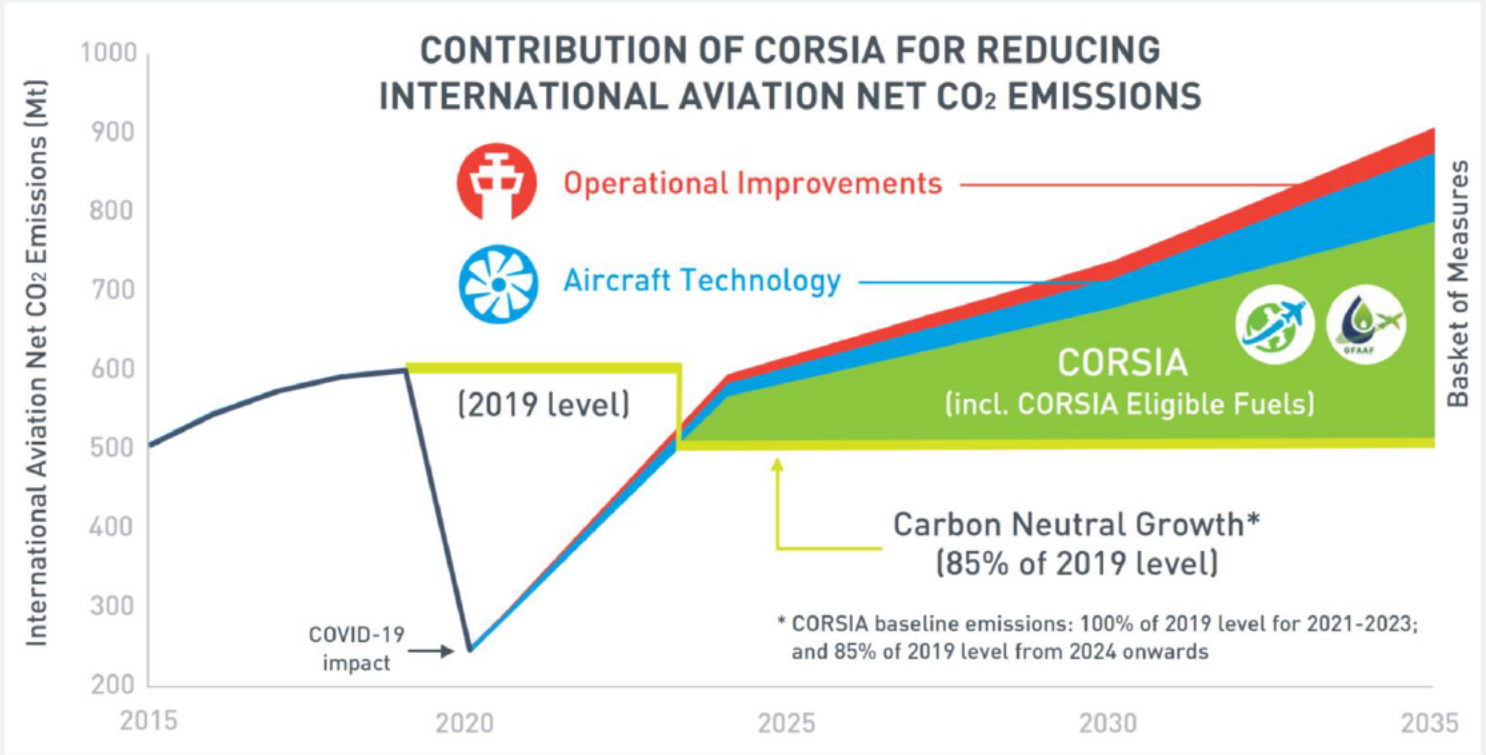
# 1.2 Updated CORSIA Provisions

## CORSIA SARPs, Annex 16, Volume IV (2nd edition)

- Became applicable on 1 January 2024
- Doc 9501, Environmental Technical Manual, Volume IV (3rd edition) is available since November 2023

## Major updates (1st --> 2nd edition of Annex 16, Volume IV)

- More stringent baseline
- Pre-Covid-19: 2019/2020
- New: 2021-2023: 2019 level
- New: 2024-2025: 85% of 2019 level
- First offsetting obligation for 2024

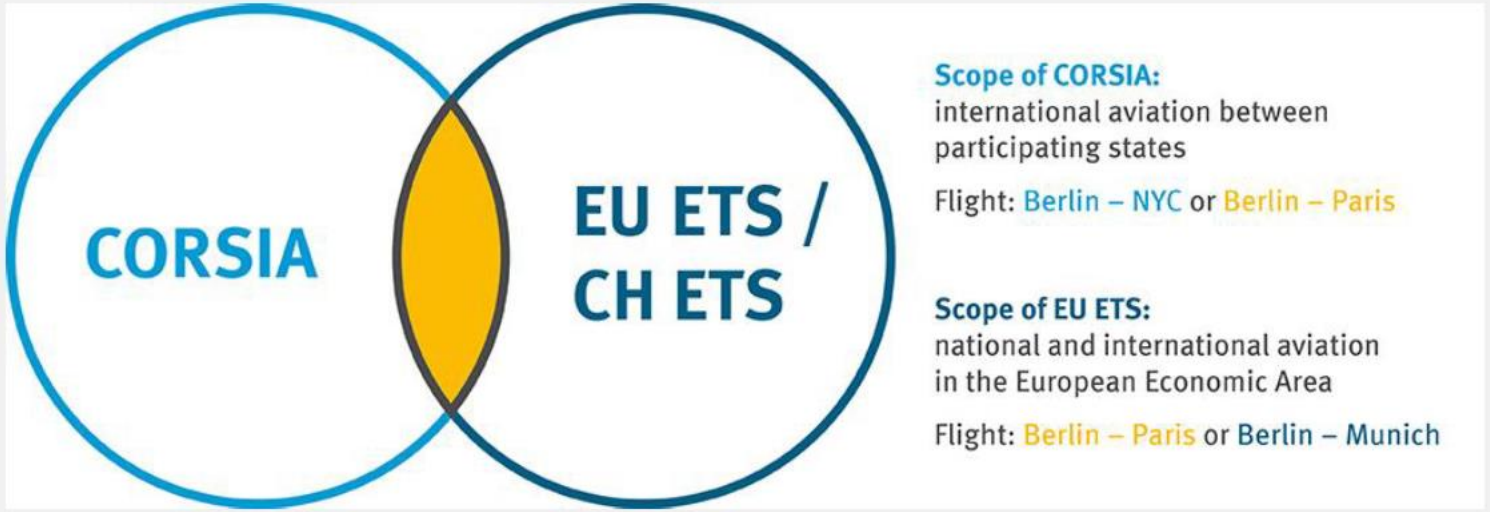



Source: ICAO CORSIA Implementation Plan, 2023

# 2.1 Interaction with EU ETS Aviation

## Complex situation

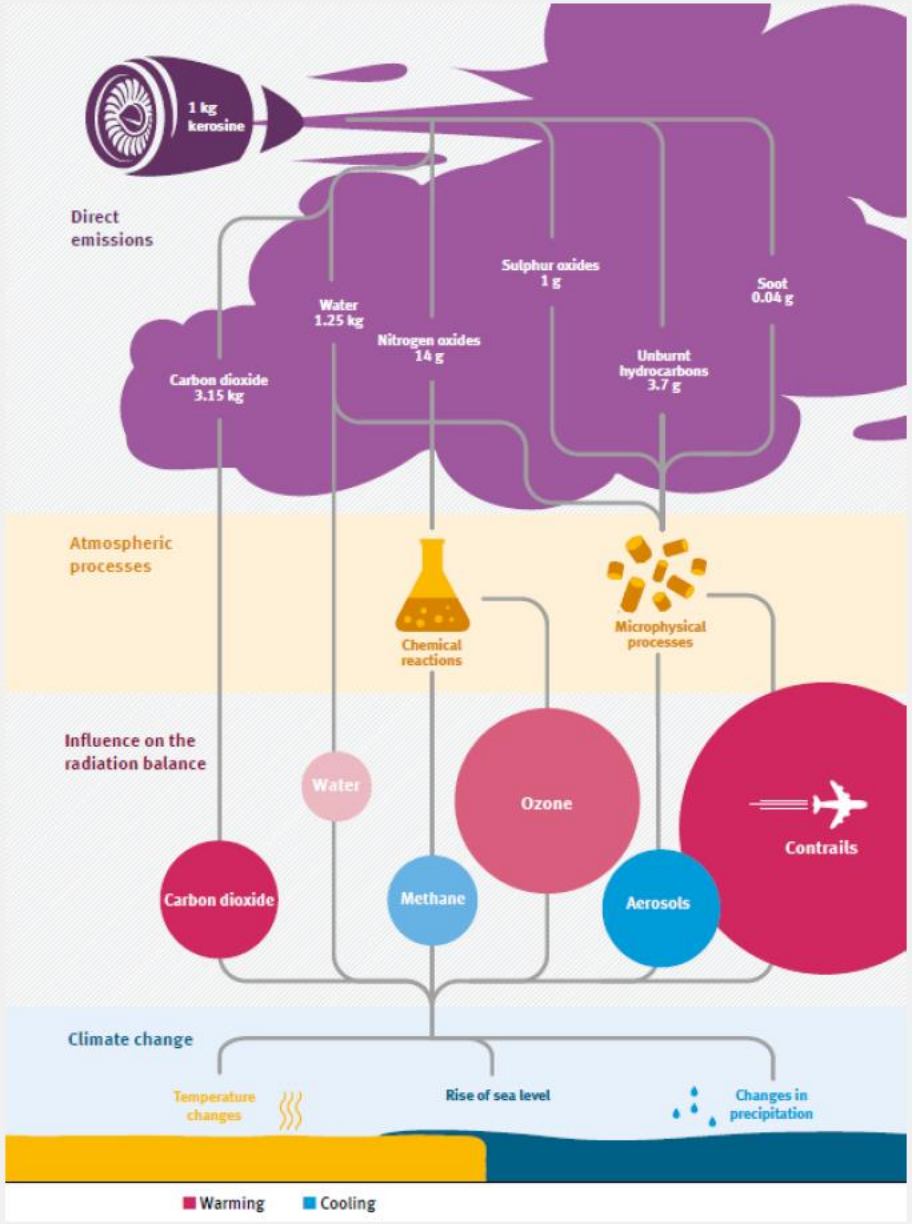
- EU continues to apply EU ETS for all operators (EU and Non EU)
- No backsliding (EU ETS older and more ambitious scheme)
- Scope of the schemes overlap (international flights within EEA, to UK, to CH)
- EU has filed a difference against ICAO Annex 16, Volume IV
- EU operators are excluded from a CORSIA offsetting obligation on those routes (no double regulation)



# 2.2 Updated EU ETS Provisions

## Non-$CO_2$ effects of aviation

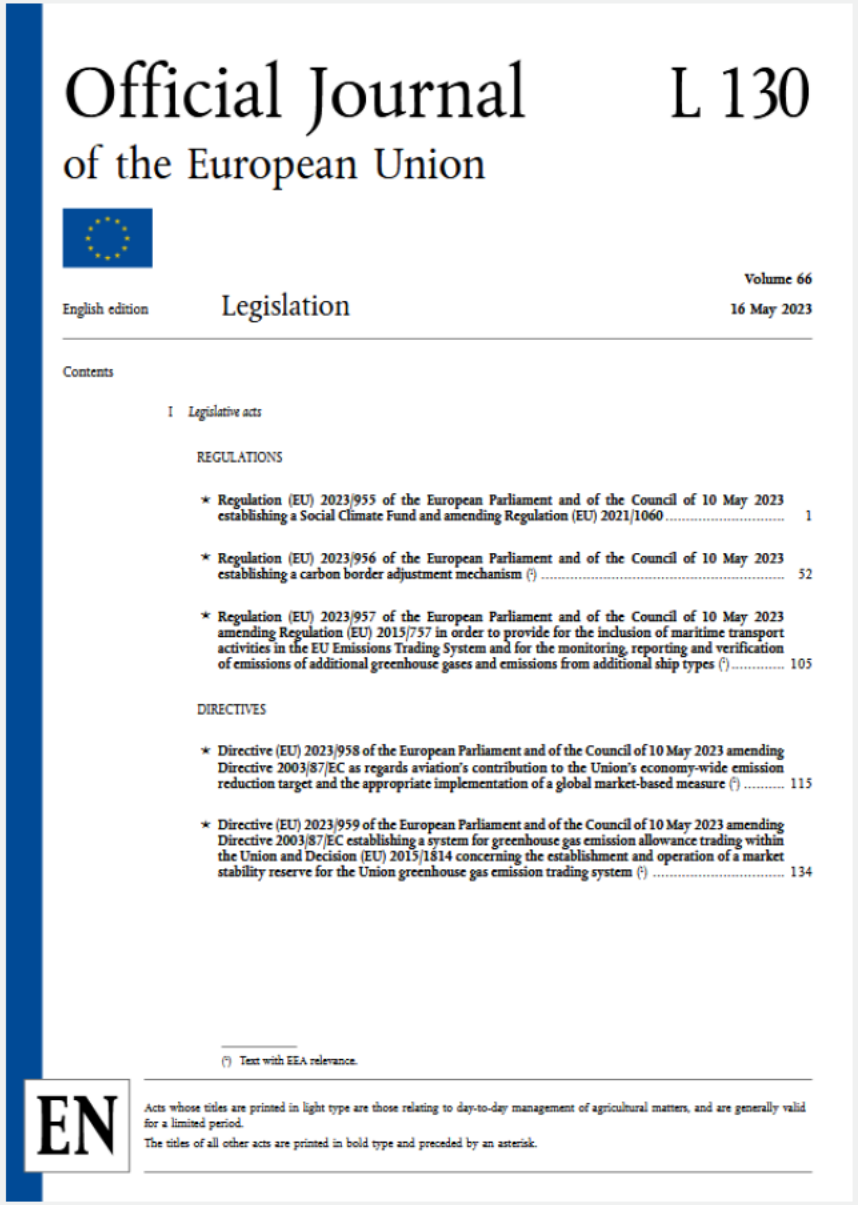
- Warming
  - $CO_2$ emissions
  - Water vapour
  - $NO_x$ emissions (sum of warming and cooling)
  - Soot
  - Contrails and contrail cirrus (Total over the day-night cycle)
- Cooling
  - Aerosols
- Non-$CO_2$ climate effects of aviation
  - Characteristic for aviation, as only at cruise flight levels
  - Global: in total about two times the climate impact of $CO_2$ from aviation



# 2.2 Updated EU ETS Provisions

## Non-$CO_2$ effects of aviation – integration into EU ETS

- Amendment of European Emissions Trading Directive
  - Published in May 2023
  - from 2025 Monitoring, Reporting and Verification (MRV) system for all flights departing from or arriving in the EEA, initially without a surrender obligation
  - 2026: Commission to publish first reporting results
  - Proposal for full integration by the end of 2027 by COM
- Amendment of Monitoring & Reporting Regulation (MRR)
  - Adopted in August 2024
  - defines the specific technical rules for the MRV
  - allows an exception in the geographical scope for the years 2025 and 2026
- Amendment of Accreditation & Verification Regulation (AVR)
  - Work in progress



Official Journal of the European Union

L 130

English edition

Legislation

Volume 66

16 May 2023

Contents

I Legislative acts

REGULATIONS

* Regulation (EU) 2023/955 of the European Parliament and of the Council of 10 May 2023 establishing a Social Climate Fund and amending Regulation (EU) 2021/1060 ..... 1

* Regulation (EU) 2023/956 of the European Parliament and of the Council of 10 May 2023 establishing a carbon border adjustment mechanism (1) ..... 52

* Regulation (EU) 2023/957 of the European Parliament and of the Council of 10 May 2023 amending Regulation (EU) 2015/757 in order to provide for the inclusion of maritime transport activities in the EU Emissions Trading System and for the monitoring, reporting and verification of emissions of additional greenhouse gases and emissions from additional ship types (1) ..... 105

DIRECTIVES

* Directive (EU) 2023/958 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC as regards aviation's contribution to the Union's economy-wide emission reduction target and the appropriate implementation of a global market-based measure (1) ..... 115

* Directive (EU) 2023/959 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union and Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading system (1) ..... 134

(1) Text with EEA relevance.

EN

Acts whose titles are printed in light type are those relating to day-to-day management of agricultural matters, and are generally valid for a limited period.

The titles of all other acts are printed in bold type and preceded by an asterisk.

# 6. Korea Emissions Trading System and Electricity Market

# Introduction

- The generation mix in the two jurisdictions, Taiwan and Korea, is dominated by thermal plants and the power sector contributes more than 50% of energy-related $CO_2$ emissions.

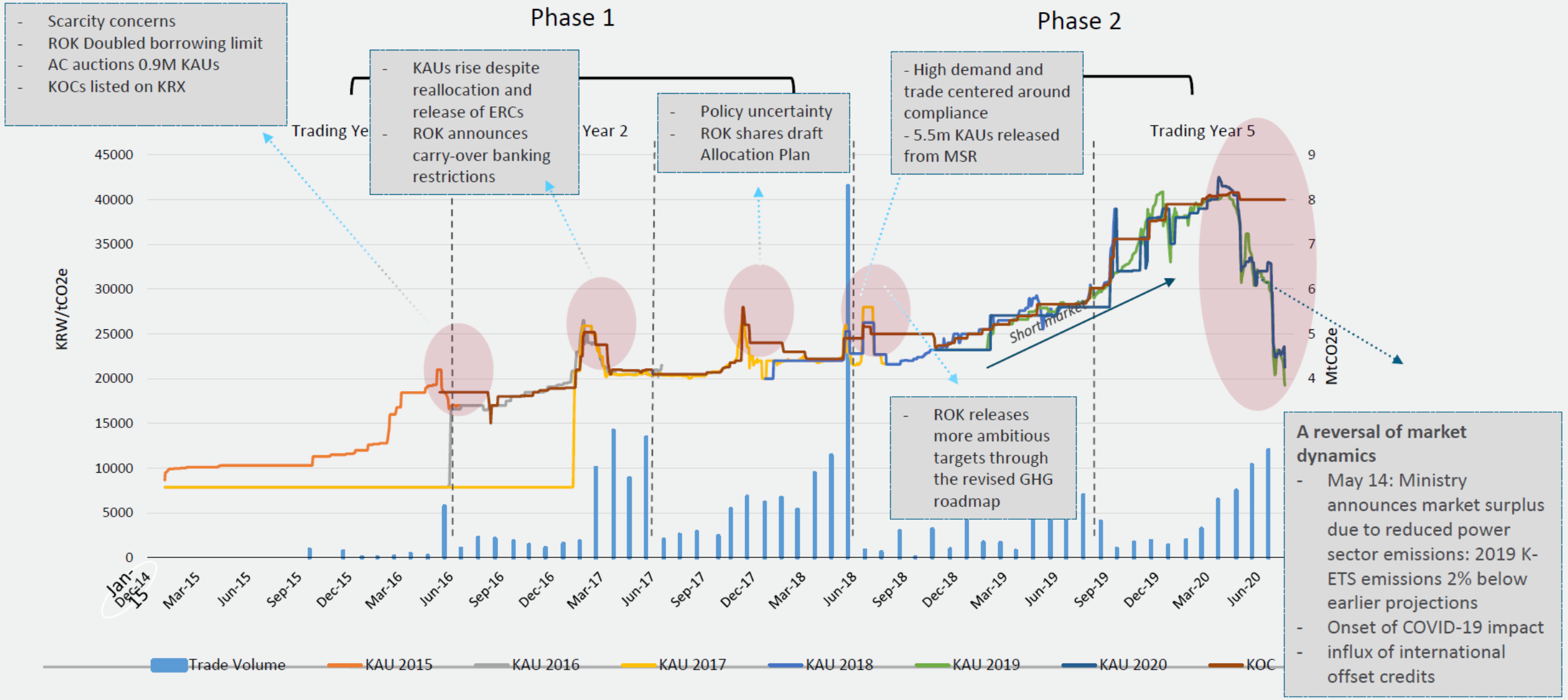
- While Taiwan is implementing a carbon fee, it is actively studying moving towards an ETS in the future. Therefore, Korea's experience (e.g. around price volatility; low pass through) can be relevant.

# K-ETS Design Overview

| Feature | K-ETS Design | Comment |
|---|---|---|
| Allowance cap | • Phase 1 (2015–2017): 1687 $MtCO_2e$<br>• Phase 2 (2018–2020): 1,796 $MtCO_2e$<br>• Phase 3 (2021–2025): 3,048 MtCO2e | • Phase 1: including market stability reserve of 88 $MtCO_2e$.<br>• Phase 2: incl. 14 million KAUs for market stabilisation, 5 million for Market Makers and 134 million for new entrants |
| Long-term target | 37% below BAU by 2030. Representing 22% reduction from 2012 GHG levels | Net-zero target for 2050 has been announced |
| Primary allocation —in electricity sector | Phase 1: GP, BM<br>Phase 2: GP, BM, 3% auctioning<br>Phase 3: GP, BM (60%), auctioning (10%) | Auctioning will increase to over 10% during Phase Three (2021–2025) |
| (1) Banking<br>(2) Borrowing | (1) Allowed<br>(2) Allowed | (1) Limitations within and across phases<br>(2) Within phases w/ limitations |
| Additional sources of supply | Phase 2: Offsets up to 10% of entities' compliance obligation<br>Phase 3: Capped at 5% | • Phase 2: Korea Offset Credits (KOCs); International credits (CERs from Korean origin) up<br>• to 5%Phase 3: no separate limit for international credits |
| Market stability mechanism | • Auction Reserve Price<br>• Reserve for market stability and discretionary measures | • Changes – set by formula<br>• ~5% of annual budget<br>• Decided by Allocation Committee |

| Feature | K-ETS Design | Comment |
|---|---|---|
| Voluntary cancellation | n.a. | n.a. |
| Coverage | 73.5% of GHG emissions. Heat and power, industry, buildings, domestic aviation, waste and public services sectors. These are disaggregated into 69 subsectors in Phase 3 | Covers $CO_2$, $CH_4$, $N_2O$, PFCs, HFCs, $SF_6$ |
| Market participation | Phase 2: Limited to covered entities and three policy banks.<br>Phase 3: Market open to third-party participation | "Market makers": The Korea Development Bank; Industrial Bank of Korea; Korean Export- Import Bank |
| Legal nature of allowance | Property right | Art. 345 of the Korean Civil Law |
| Fiscal nature | • KAUs are VAT exempted and currently not regulated under financial market law. | Capital gains on KAUs are subject to corporate tax |
| Market place | OTC, spot (KRX) | |

# Price Developments in the K-ETS




**A reversal of market dynamics**

- May 14: Ministry announces market surplus due to reduced power sector emissions: 2019 K-ETS emissions 2% below earlier projections
- Onset of COVID-19 impact
- influx of international offset credits

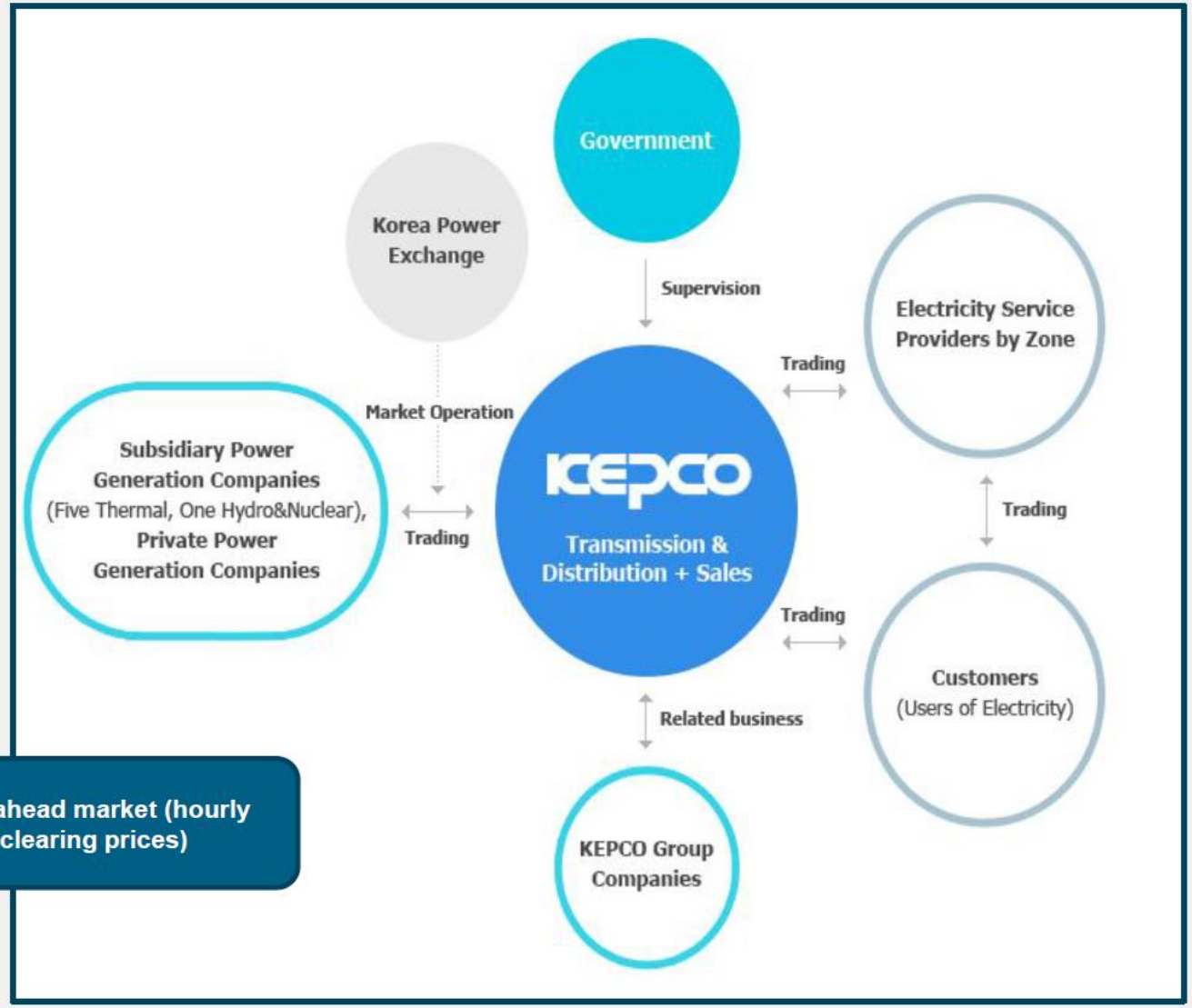
# Korean Electricity Sector – Market Design Features

Single-buyer model

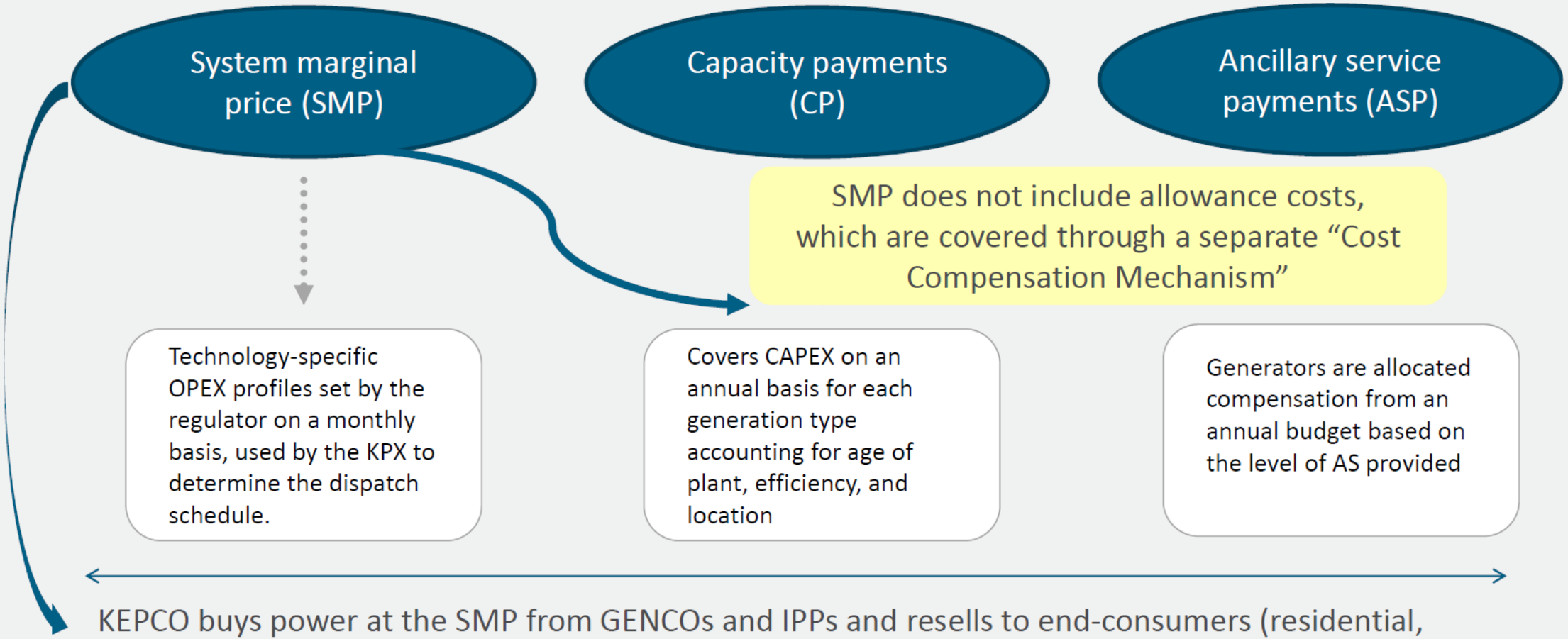
Cost-based pool

Limited wholesale competition in a regulated price environment

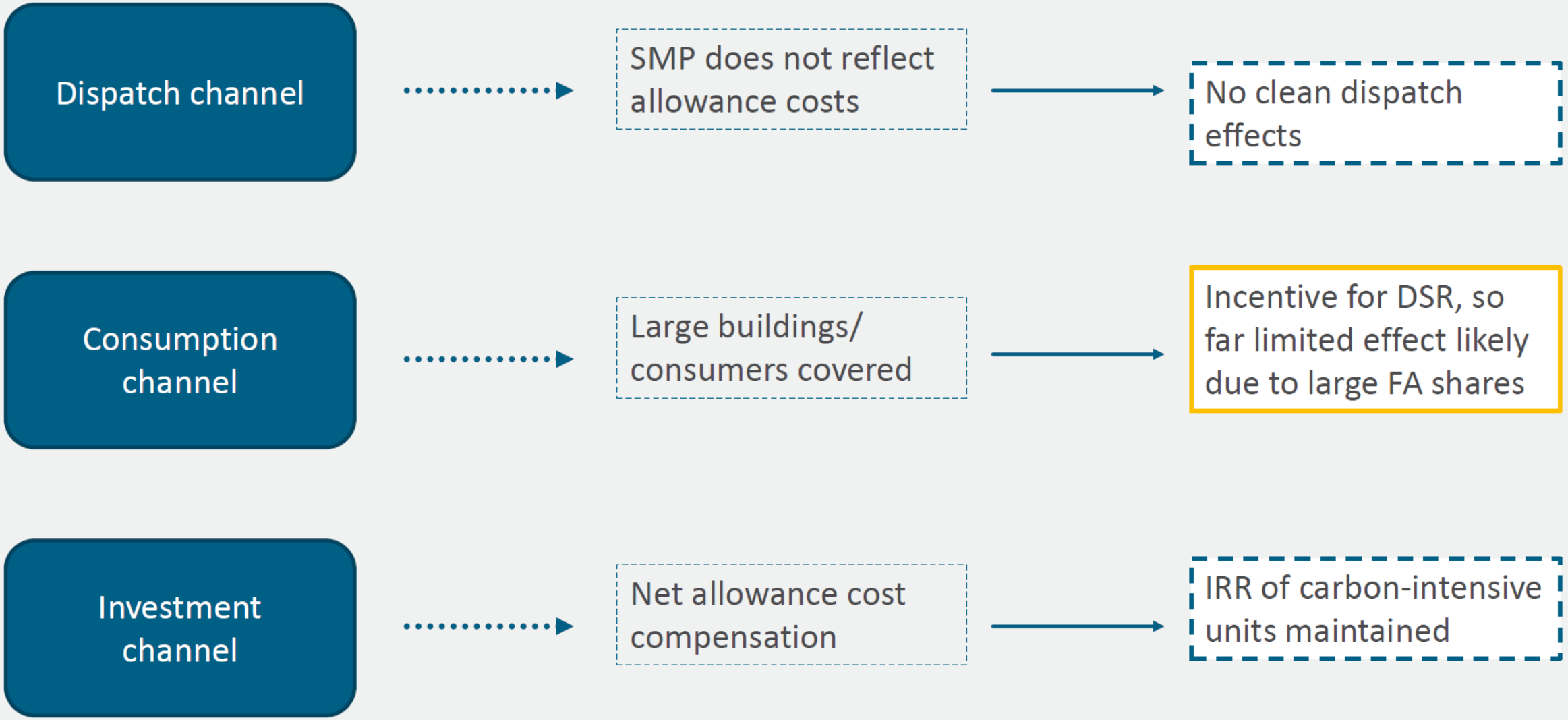
Day-ahead market (hourly clearing prices)



# Korean Electricity Sector – Pricing Structure



# K-ETS and Electricity Sector Abatement – Current Regulations



# Latest Developments in the K-ETS

- Korea has struggled with a **low level of liquidity** and a **low carbon price** (around $7 in 2024) for some time. Therefore, adoption of several changes
- In September 2023:
  - **Raised holding limits** of Korean Allowance Units (KAUs) for third parties
  - **Relaxed restrictions on the carryover** of unused allowances
  - In 2024, the monthly auctioned volume depends on the previous month's auction results to **steer supply depending on current demand developments**
  - Consignment trading is to be introduced to the market.
- In addition, recent announcements to become effective in February 2025:
  - To extend participation in the ETS by opening up the market to a **wider group of financial institutions**, including asset managers, banks, and insurers;
  - To lay the foundations for **participation by individuals**;
  - To **revise some of the criteria for market stabilisation** to ensure a stable carbon price formation;
  - To **curb permit surplus** by scraping excess carbon credits through the tightening of the regulations for cancelling emission allowances;

# Reflections

- Case study confirms:
  - Importance of liquidity on ETS for quality of price signal
  - Risk of banking and borrowing distorting the price signal under market uncertainty and discretionary MSM
  - Allocation methods are crucial for abatement effects in a regulated electricity market as opportunity costs are often not reflected in price structures
  - Distortionary effects of a closed-market system

- Case study indicates that electricity market regulations can have a major impact on the quality of the price signal and the opportunities for sectoral abatement under the ETS
  - Wholesale prices: cost-recovery guarantee, through ad hoc compensation, did not incentivize abatement and, possibly, drove carbon prices up
  - Capacity remuneration: fuel switching factor remunerates use of environmentally friendly technology, independently of actual generation
  - Dispatch: regulated prices + dispatch neutralize merit order effect, protect coal
  - Retail prices: no pass through with regulated prices and free allocation, and need for government subsidies to cover tariff gap
  - Companion policies: direct regulation of investments in emission reductions (forced closure of coal + promotion of RE), impact of environmental policies (fine particulates), and role of CHP impacts the role for the ETS.

# 感謝聆聽

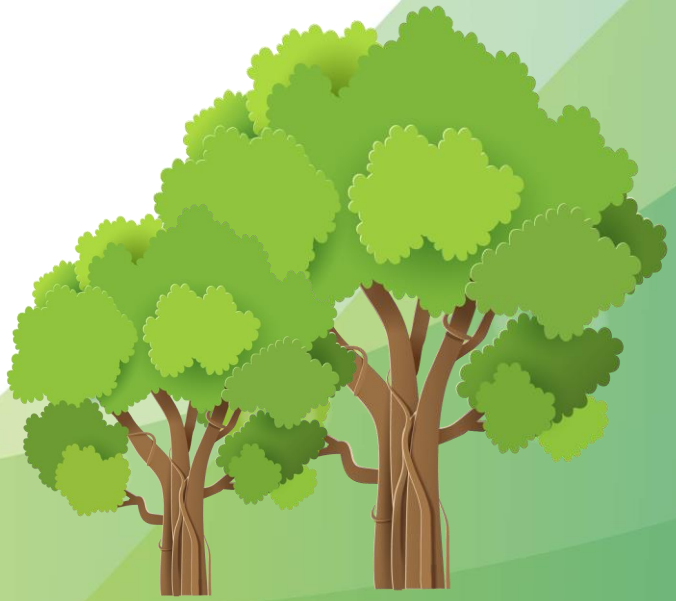
環境部氣候變遷署
Climate Change Administration
Ministry of Environment

環境部
Ministry of Environment



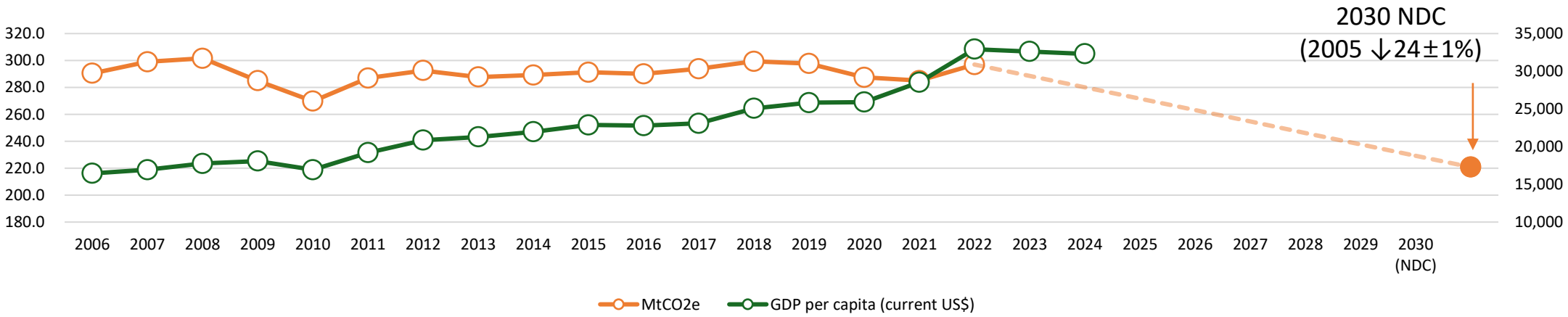
# Taiwan's carbon fee and carbon pricing plans

*Hui-Fen, YEH*
*Carbon Fee Promotion Division, Climate Change Administration,*
*Ministry of Environment, R.O.C. (Taiwan)*



12 September, 2024

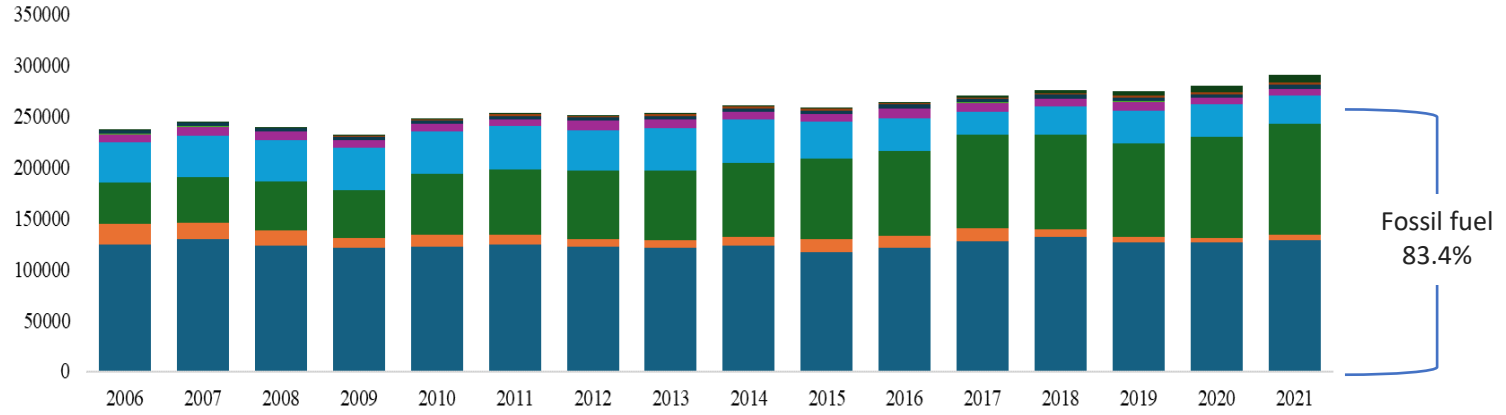
# Glance of climate governance in Taiwan

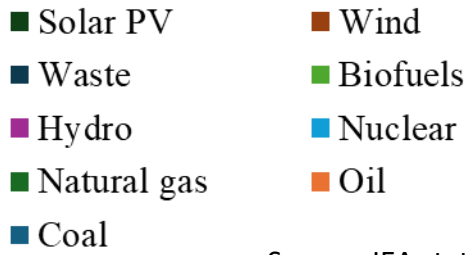



2010
Carbon crediting mechanism

2015
GHGs Reduction and Management Act

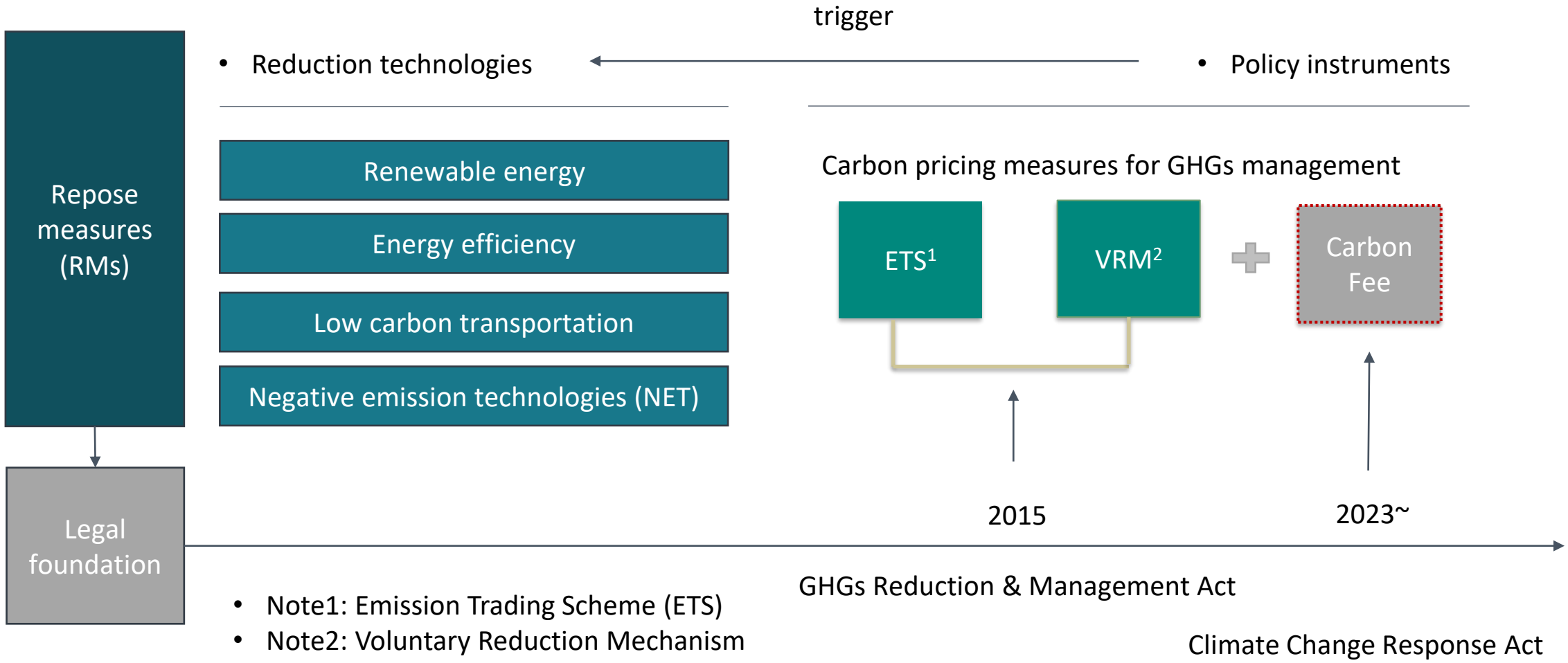
2023
Climate Change Response Act




Source: IEA statistics.

# Legal foundation of GHGs management in Taiwan




- Note1: Emission Trading Scheme (ETS)
- Note2: Voluntary Reduction Mechanism

# Structure of “Climate Change Response Act”

| Chapter 1 | Chapter 2 | Chapter 3 | Chapter 4 | Chapter 5 | Chapter 6, 7 |
|---|---|---|---|---|---|
| General Provisions | Authority and Responsibility | Climate Change Adaption | Emission Reduction Measures | Education and Grants | Penalty Provisions |
| • Amend long-term national mitigation goal to **net-zero GHG emissions in 2050** | • Strengthen guideline plan and evaluation mechanism, and disclose to public | • Capacity building for climate change adaption<br>• Climate change scientific reports and risk evaluation<br>• National climate change adaptation action plan | • Management of inventory and verification<br>• **Carbon Fee and spending**<br>• **Issuance and use of credits**<br>• Performance Standard (PS)<br>• Offsets for new emission sources (EIA)<br>• Carbon footprint calculation & label<br>• Taiwan CBAM | • Strengthen education of specialists in response to climate change | |

Source: Taiwan EOM

# Carbon pricing: Carbon Fee as priority

Taiwan is in different readiness stages:

- **Carbon fee** can be **readily implemented with current capacity**
- **ETS** implementation would require **further capacity building**

## Short-run instrument choice

**Implementation capacity**
**→ Carbon levy preferred**
Industry is more familiar with fees but averse to the administrative burden of ETS trading. It takes time to develop rules for market oversight and trading infrastructure.

**Secondary market challenges**
**→ Carbon levy preferred**
Taiwan must address the lack of liquidity and concentrated market power if an ETS is used. Options include purchasing and holding limits, frequent auctions, consignment auctions, and expanding ETS scope.

## Short-run instrument design

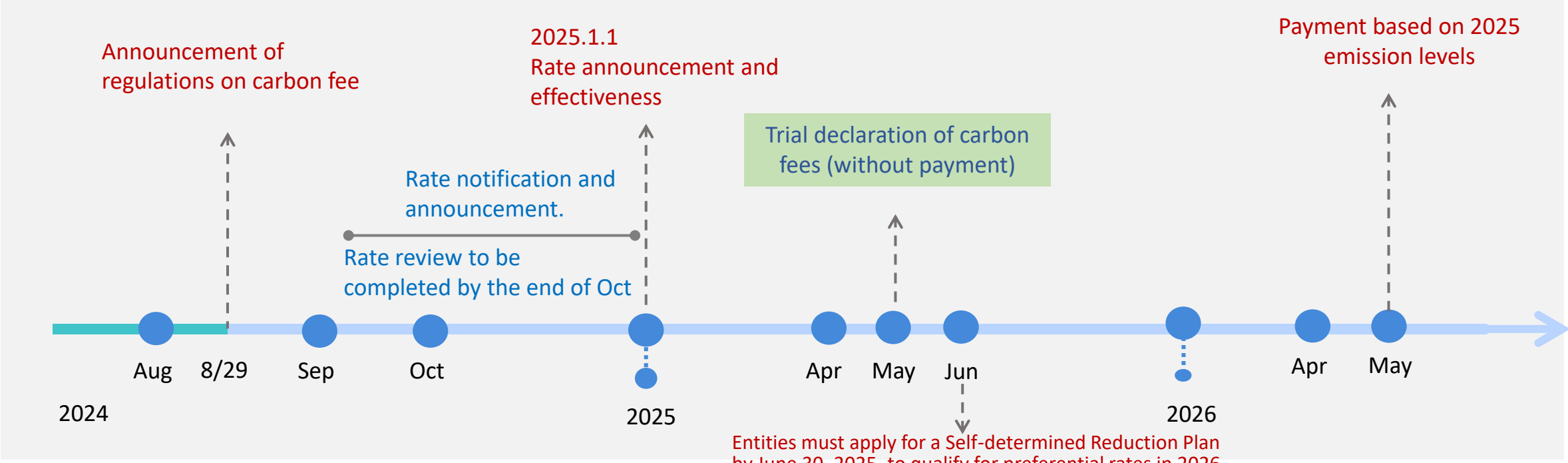
**Regulated electricity sector**
**→ Cover the sector if possible**
Taipower can be regulated by a carbon levy after an amendment to the GHG Act. Pass carbon costs to electricity users via a consumption charge on indirect emissions.

**Impact on competitiveness**
**→ Support to mitigate impact**
Cost impact will focus on emissions-intensive and trade-exposed industries and can be addressed effectively in both a levy and an ETS. Carbon costs in indirect emissions via electricity use will have limited impact on the wider economy.


*Grantham Research Institute on Climate Change and the Environment and Vivid Economics (2020)*

# The timeline for carbon fees collection

- On **August 29**, the Ministry of Environment(MOENV) announced the three major regulations for the carbon fee system, **officially putting the policy into effect**.
- To allow entities subject to the carbon fee sufficient time to assess their ability to meet the 2030 reduction targets and to submit Self-determined Reduction Plans, there will **be a trial declaration without payment in 2025**. **In 2026, payments will be made based on the 2025 emission levels and the applicable fee rates**.
- **The carbon fee rate** will be reviewed and expected to be completed by **the end of October** this year. **The MOE will announce the rates by the end of the year, effective on January 1, 2025.**



# Key points of three regulations on Carbon Fee

## 1 *Regulations Governing the Collection of Carbon Fees*

**Entities subject to carbon fees**: **power and gas supply industries**, as well **as manufacturing industries**, with annual emissions of 25,000 metric tons of $CO_2e$ or more.

Starting from the year following the rate's effective date, entities must pay carbon fees **by the end of May each year**, based on the **previous year's total emissions and the announced rates.** (If the rates take effect on January 1, 2025, the payment for the 2025 emissions must be made by May 2026.)

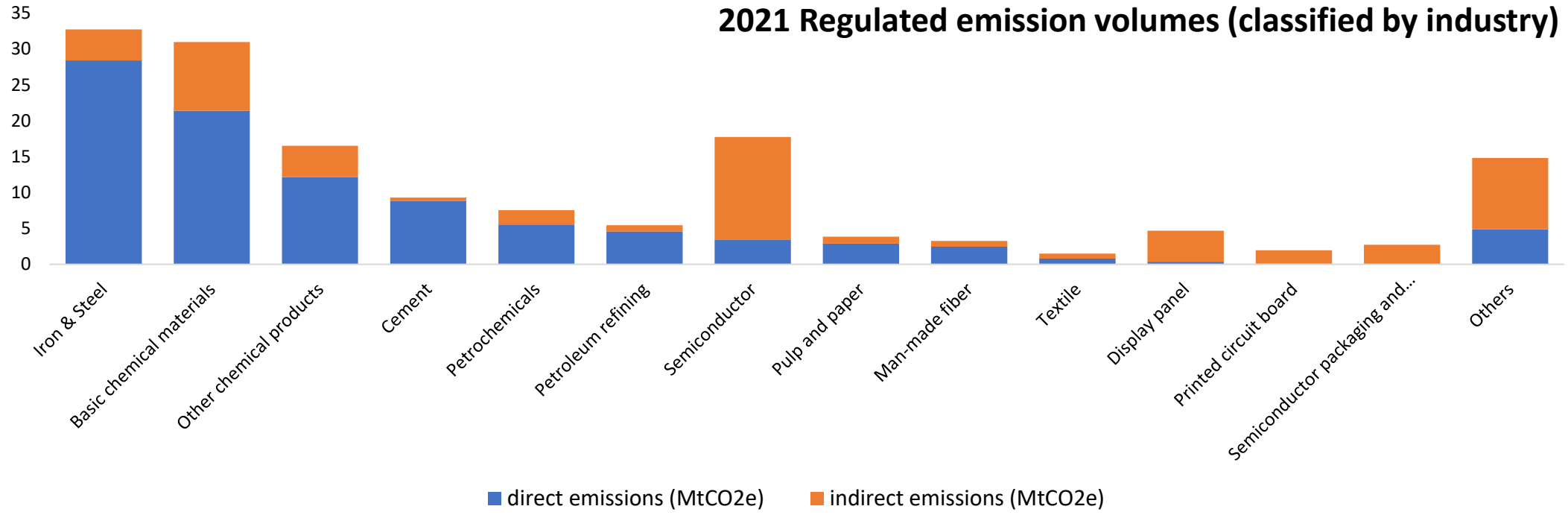
**Carbon fee calculation**: **carbon fee payment = chargeable emissions × fee rates**

**Transitional adjustment mechanism**: chargeable emissions = (annual emissions - **K**) × emission adjustment coefficient

1. **For industries classified as high carbon leakage risk** (based on international assessment approach, considering trade intensity and emission intensity, and **having submitted a Self-determined Reduction Plan that has been reviewed and approved**), the initial emission adjustment coefficient will be 0.2. In the future, the coefficient will increase to 0.4 in the second phase and 0.6 in the third phase.
2. **For industries not classified as high carbon leakage risk**, the annual emissions will be reduced by the carbon fee threshold value K (25,000 metric tons, with future phased adjustments).
3. **Use of emission reduction credits**: Domestic credits can be used to offset up to 10% of the chargeable emissions. International credits must be approved by the MOENV and can only be used by non-high carbon leakage risk industries, with a maximum offset limit of 5%

# Analysis of industries subject to carbon fee collection

- Based on the 2022 survey results of "Sources of GHG Emissions that Entities Must Register and Verify," **it is estimated that around 500 entities (from 281 companies, including 141 publicly listed companies)** will be subject to the carbon fee.
- The emissions from entities subject to the carbon fee amount to approximately **155 million metric tons of $CO_2e$**, accounting for about **54% of the nation's total emissions**.



# Key points of three regulations on Carbon Fee(cont.)

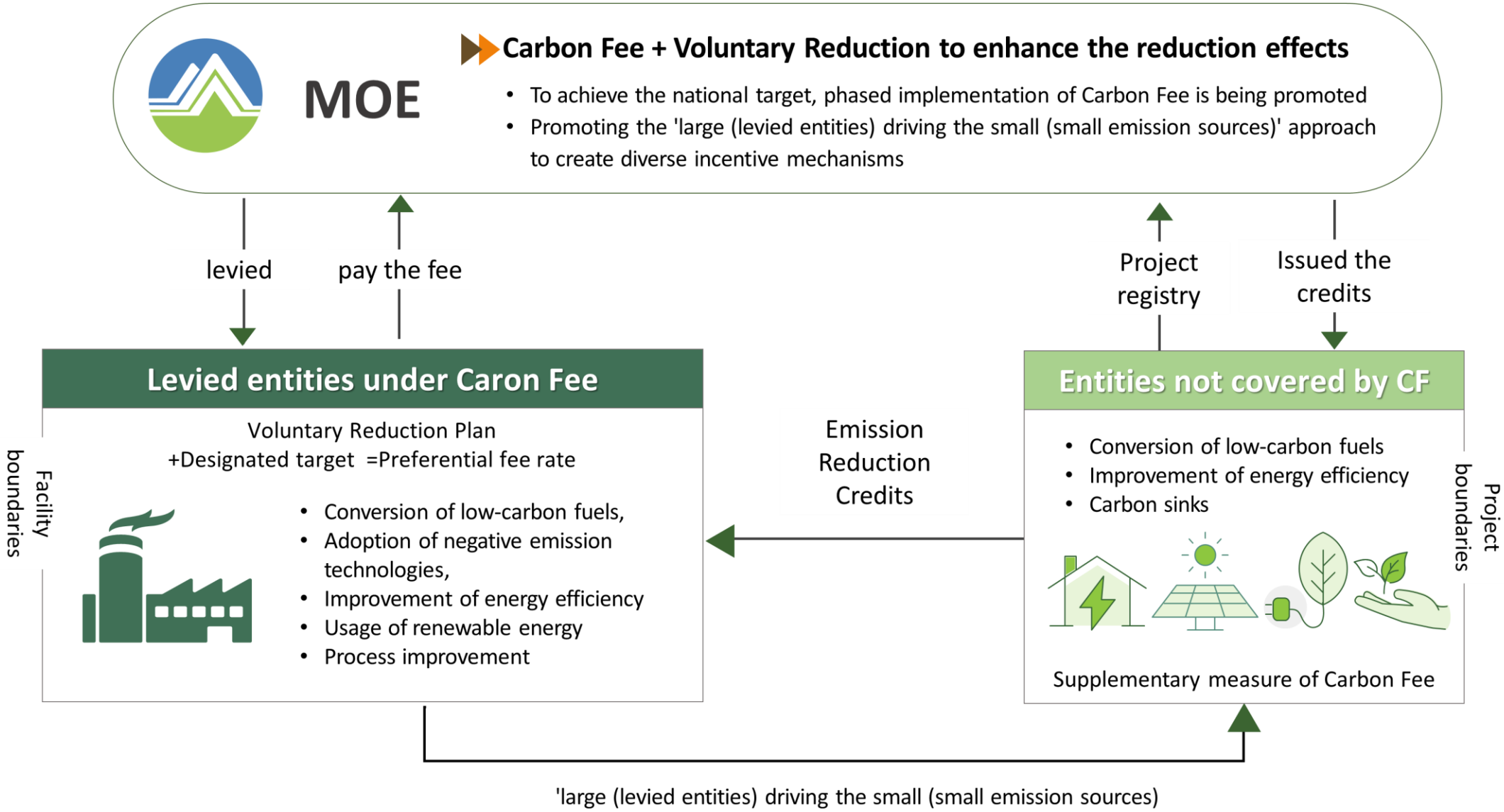
## ② *Regulations for Administration of Self-Determined Reduction Plan*

- Entities subject to the carbon fee that effectively reduce their emissions and achieve designated targets by **switching to low-carbon fuels, adopting negative emission technologies, improving energy efficiency, utilizing renewable energy, or enhancing industrial processes** may submit a Self-determined Reduction Plan to apply for approval of preferential rates.
- **By April 30th of each year, entities must submit an execution progress report for the previous year** to the MOE for review. The report must include details on any required improvements and circumstances that could lead to the cancellation of preferential rates. **If, upon review, the entity fails to meet the designated targets, the rates for that year will revert to the general fee rate**.

## ③ *Designated Greenhouse Gas Reduction Goal for Entities Subject to Carbon Fees*

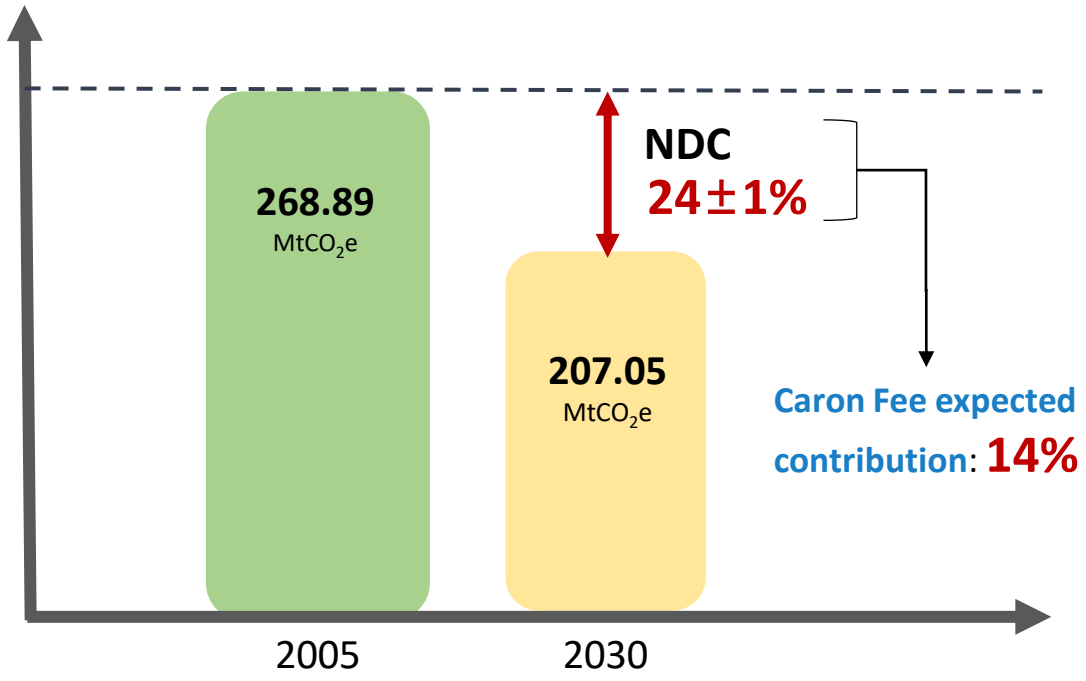
**With 2030 as the target year, two designated reduction rates will apply to different preferential rates:**

1) **Industry-specific designated reduction rate**: Using 2021 as the baseline year, this target is set with reference to international science-based targets (SBT) and qualifies for **Preferential Rate A**.
2) **Technology benchmark designated reduction rate**: Using 2018-2022 as the baseline years, this target considers the emission types of each source, including fuel types, processes, and electricity usage, and qualifies for **Preferential Rate B**.


MOE
Carbon Fee + Voluntary Reduction to enhance the reduction effects
• To achieve the national target, phased implementation of Carbon Fee is being promoted
• Promoting the 'large (levied entities) driving the small (small emission sources)' approach to create diverse incentive mechanisms
levied
pay the fee
Project registry
Issued the credits
Levied entities under Caron Fee
Voluntary Reduction Plan
+Designated target =Preferential fee rate
Facility boundaries
• Conversion of low-carbon fuels,
• Adoption of negative emission technologies,
• Improvement of energy efficiency
• Usage of renewable energy
• Process improvement
Emission Reduction Credits
Entities not covered by CF
• Conversion of low-carbon fuels
• Improvement of energy efficiency
• Carbon sinks
Project boundaries
Supplementary measure of Carbon Fee
'large (levied entities) driving the small (small emission sources)

# The Reduction Effectiveness of the Carbon Fee System

- **If** all carbon fee collection entities submit **Self-determined Reduction Plans** and meets the **Designated Reduction Goal**, it is estimated that by 2030, **$CO_2e$ emissions could be reduced by 37 million metric tons**, equivalent to **about 14% of the 2005 emission levels**.




- The three regulations on carbon fees **provide businesses with a clear understanding that carbon emissions have a price**, and how they can reduce both their carbon emissions and carbon fee burden through Self-determined Reduction Plans.

# Resources to Strengthen Carbon Reduction Efforts

## MOENV Earmarked usage of carbon fee

| | |
|---|---|
| Implementations | Emission source inspection, emission reduction implementation, platform account management, carbon footprint management, international affairs, and just transition |
| Reduction | Subsidies and incentives for emission reduction efforts and research and development activities |
| Adaptation | Coordination, formulation, and promotion of climate change adaptation initiatives |
| Education | Climate change and GHGs reduction education and outreach initiatives. |
| Others | Others related to climate change |

## MOEA supporting measures

**Entities covered by Carbon Fee** 2024-2025

Measure① **connect to Carbon Fee**

**All Companies**

measure ② **Promotion of deep energy saving**

measure ③ **Carbon diagnostics and guidance**

measure ④ **Subsidies**

measure ⑤ **Low-interest loans**

measure ⑥ **Tax incentives for carbon reduction**

**21 Billion NTD**

# Regulatory education and guidance

**2024, Aug**

- 8/29 announcement of 3 regulations of Carbon Fee

**2024, Sep-Oct**

- MOE and the MOEA will conduct over 10 informational sessions related to the three regulations on Carbon Fee

**2024, Nov-Dec**

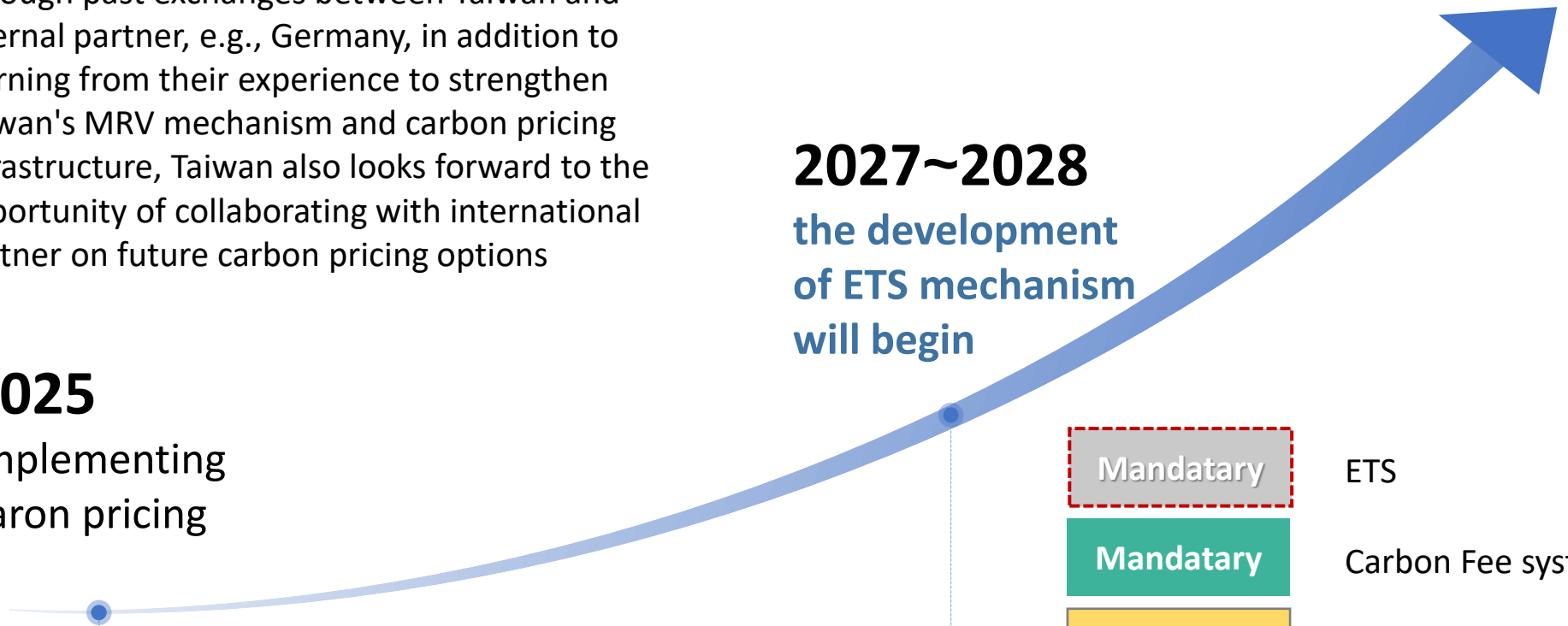
- Commence the review of Self-determined Reduction Plans
- 2024.11~2025
  The MOEA will provide guidance on drafting Self-determined Reduction Plans.

**2025, Jan~**

- Upon the rate announcement and its effectiveness, the MOE will establish a carbon fee calculation platform and consultation service

# The prospects of carbon pricing in Taiwan

Through past exchanges between Taiwan and internal partner, e.g., Germany, in addition to learning from their experience to strengthen Taiwan's MRV mechanism and carbon pricing infrastructure, Taiwan also looks forward to the opportunity of collaborating with international partner on future carbon pricing options



**2025**

Implementing caron pricing

- Mandatary — Carbon Fee system
- Voluntary — Voluntary Reduction Project

**2027~2028**

**the development of ETS mechanism will begin**

- Mandatary — ETS
- Mandatary — Carbon Fee system
- Voluntary — Voluntary Reduction Project

**Planning a mid- to long-term carbon pricing mechanism:** Base on the international experience, the development of ETS mechanism will begin in 2028.

# Conclusion

- Currently, 75 countries or regions worldwide have implemented carbon pricing systems. **Due to the different challenges and experiences each country faces when adopting, implementing, and designing carbon pricing policies, these systems vary widely.**
- To align with international carbon pricing systems, **Taiwan's Carbon Fee has been developed with reference to models from the EU, Japan, South Korea, Singapore**, and others. **This approach ensures a balance between maintaining international industrial competitiveness and helping industries transition to low-carbon operations.**
- **Taiwan's Carbon Fee is designed as an economic incentive tool that encourages reduction while also considering a smooth transition process.** Once implemented, Taiwan's carbon fee system will combine public and private sector funds, **driving new green growth in the country**.

環境部
Ministry of Environment

# THANK YOU