

出國報告（出國類別：會議）

赴日本及歐洲交流綠色成長相關議題及 參加「環境部綠色成長聯盟德國碳定價 研習會」

服務機關：環境部

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派赴國家：日本、德國

出國期間：114 年 6 月 17 日至 114 年 6 月 29 日

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摘 要

本次出國計畫內容包含赴日本及歐洲，前者為環境部彭啓明部長率黃韋堯技士、氣候變遷署蔡玲儀署長，赴日本東京出席 2025 日本能源高峰會(Japan Energy Summit 2025)，並拜會日本參議院淺尾慶一郎議員及日本 GX 推進機構。後者為彭部長率吳靖方秘書、氣候變遷署張根穆副署長、周仁申組長、陳宜佳組長、羅禮淳科長，與經濟部、金融監督管理委員會、臺灣證券交易所、臺灣碳權交易所及綠色成長聯盟企業成員，赴德國柏林辦理「環境部綠色成長聯盟德國碳定價研習會」，彭部長並於此行拜會德國聯邦環保署(UBA)及德國聯邦環境部(BMUKN)，並出席見證臺灣碳權交易所與歐洲能源交易所(EEX)合作備忘錄(MOU)簽署儀式。

彭部長應邀出席 2025 日本能源高峰會，與國際能源總署(IEA)前署長田中伸男對談，說明我國最新氣候政策、碳定價制度進展及綠色轉型策略，並藉此呼籲亞洲各國合作，打造區域性減碳市場與合作網絡。於拜會日本淺尾慶一郎議員時，介紹我國碳定價及循環經濟推動規劃，雙方並就氣候變遷、《巴黎協定》合作機制、循環經濟、全球塑膠公約、化學物質國際公約及環境荷爾蒙管理等議題進行交流，深化臺日在環境保護議題合作基礎。本次行程也拜會日本 GX 推進機構，瞭解日本 GX 經濟轉型債券進展，以及 GX 人才市場創造之相關機制等，將納為我國溫室氣體管理基金支用規劃，以及我國綠領人才制度推動參考。

環境部於 2025 年 6 月 24 日至 26 日於德國柏林舉行「環境部綠色成長聯盟德國碳定價研習會」，與德國聯邦經濟暨能源部(BMWEL)、德國排放交易管理局(DEHSt)、國際碳行動夥伴組織(ICAP)、德國智庫 adelphi、全球永續發展倡議組織(GeSI)及 EEX 等機構交流，議題聚焦歐盟總量管制與排放交易(ETS)制度、碳市場及交易平台等，交流及學習之成員包含我國相關政府機關及潛在碳定價制度列管對象，為我國未來推動 ETS 制度之重要能力建構，並可藉此凝聚政府機關與民間企業對於中長程碳定價制度規劃的共識。本次彭部長也拜會德國聯邦環保署(UBA)署長及剛改組後的聯邦環境部(BMUKN)負責氣候治理的總司長，就碳定價策略、能源轉型、全氟及多氟烷基物質(PFAS)、空氣污染及循環經濟等議題深入交換意見，未來我國與德方將持續擴大在氣候治理與循環經濟領域的合作機會。

臺灣碳權交易所與 EEX 於 2025 年 6 月 27 日在德國萊比錫簽署 MOU，環境部一同參與見證，EEX 未來將分享受託執行歐盟排放交易制度的經驗，並提供相關教育訓練資源，以協助臺灣碳交易市場平臺建立以及能力建構。

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壹、目的

為展現我國邁向 2050 淨零排放的決心與行動力，環境部彭啓明部長於 2025 年 6 月 18 日應邀出席 2025 日本能源高峰會(Japan Energy Summit 2025)，與國際能源總署(IEA)前署長田中伸男對談，並向來自各國的能源與氣候領袖，說明臺灣最新的氣候政策、碳定價制度進展，以及綠色轉型策略，以彰顯在亞洲區域氣候治理中的積極角色。

我國碳費制度已正式上路，今(2025)年起，碳費徵收對象的溫室氣體排放量將納入計價，環境部亦同步規劃未來結合總量管制與排放交易(ETS)制度，以加速企業減碳同時帶動綠色成長。而環境部自 2013 年起即長期與德國在碳排放交易經驗維持緊密合作，並於 2018 年 4 月簽署《臺德碳交易合作意向書》，深化雙邊夥伴關係。因此，環境部於 2025 年 6 月 24 日至 26 日於德國柏林舉行「環境部綠色成長聯盟德國碳定價研習會」，由環境部彭啓明部長率經濟部、金融監督管理委員會、臺灣證券交易所、臺灣碳權交易所、氣候變遷署及綠色成長聯盟企業成員，與德國聯邦經濟暨能源部(BMWE)、德國排放交易管理局(DEHSt)、國際碳行動夥伴組織(ICAP)、德國智庫 adelphi、全球永續發展倡議組織(GeSI)及歐洲能源交易所(EEX)等機構合作，深入交流碳市場制度推動經驗，3 日的研習會聚焦歐盟 ETS 制度設計、運作經驗、改革成果、利害關係人溝通機制，以及全球碳市場發展趨勢、自願性碳市場機制、碳市場交易平台之運作機制與法規架構等。

本次行程率綠色成長聯盟成員實地參訪柏林 EUREF Campus，觀摩智慧電網與再生能源整合示範，學習德國政府如何透過制度建立與政策施行以扶植本土新創能源產業，有助於強化我國能源轉型策略與產業創新布局。

此外，本次行程亦拜訪日本及德國相關機構，包含日本 GX 推進機構、德國聯邦環保署(UBA)、德國聯邦環境部(BMUKN)及 EEX 等，就碳定價及各面向之環境議題進行意見交換與分享，所獲得之交流成果將作為我國推動碳定價制度發展、環境政策，以及國際接軌之重要參考。

貳、過程

一、行程表

日期	地點	工作內容
6/17 (二)	臺北至日本東京	啟程
6/18 (三)	日本東京	出席 2025 年日本能源高峰會(Japan Energy Summit 2025)
6/19 (四)	日本東京至臺北	1. 拜會日本參議院淺尾慶一郎議員 2. 拜會日本 GX 推進機構 3. 返程
6/22 (日) 至 6/23 (一)	臺北至德國柏林	1. 啟程 2. 研習會資料整理及會議場地勘查
6/24 (二)	德國柏林	辦理環境部綠色成長聯盟德國碳定價研習會
6/25 (三)	德國柏林	1. 辦理環境部綠色成長聯盟德國碳定價研習會 2. 拜會德國聯邦環保署(UBA)
6/26 (四)	德國柏林	1. 辦理環境部綠色成長聯盟德國碳定價研習會 2. 拜會德國聯邦環境部(BMUKN) 3. 參訪 EUREF campus
6/27 (五)	德國萊比錫	出席臺灣碳權交易所與歐洲能源交易所(EEX)合作備忘錄(MOU)簽署儀式
6/28 (六) 至 6/29 (日)	德國柏林至臺北	返程

二、行程內容摘要

(一) 出席 2025 年日本能源高峰會(Japan Energy Summit 2025)

日本能源高峰會為每年舉辦一次的年度大型能源峰會，聚焦日本與亞太地區能源轉型與創新能源策略，邀集政府能源部門、能源企業、投資機構與技術供應商等，促進全球能源領袖交流合作，而本次會議我國環境部彭啓明部長受邀出席擔任論壇與談人。

彭部長於論壇上與國際能源總署(IEA)前署長田中伸男對談時，強調我國

新版國家自定減量貢獻(NDC 3.0)設定 2035 年相較 2005 年減碳 36%至 40%的目標，在亞洲僅次於日本，同時，臺灣也在穩健推動能源轉型。

在氣候政策工具方面，彭部長說明臺灣最新的氣候政策、碳定價制度進展，以及綠色轉型策略氣候政策工具方面，將於 2026 年下半年至 2028 年間試行碳交易，與現行碳費制度雙軌並行，推動企業自主減量並促進綠色轉型，碳費設計將依產業特性訂定減量目標與差別費率，同時與國際制度接軌。彭部長也於會中呼籲亞洲各國攜手合作，建立區域性的減碳市場與夥伴網絡。另外，針對能源轉型議題，也說明我國正積極開展能源轉型技術，包括太陽光電、離岸風電、地熱、氫能供應鏈、去碳燃氫、碳捕捉封存與再利用(CCUS)以及儲能科技等。



圖 1 彭啓明部長擔任 2025 年日本能源高峰會論壇與談人

（二）拜會日本參議院淺尾慶一郎議員

本次環境部彭部長前往拜會日本淺尾慶一郎議員，介紹臺灣碳定價及循環經濟推動情形，議員也表達關心能源轉型、半導體及資料中心用電需求、循環經濟等議題，雙方也就未來臺日可合作之環境議題初步達成共識如下：

1. 臺日年輕公務員互訪交流構想：

可循《臺日環境保護交流與合作瞭解備忘錄》，強化每年「臺日環境會議」，並推動年輕公務員互訪交流。以雙邊實習、參訓或考察合作模式，發展制度化交流機制，深化雙方在永續環境領域的對話與合作，並建議可由

臺日雙方各自籌組代表團，進行為期 5 至 7 天的互訪行程，由對方協助安排部門交流、座談與實地參訪。

2. 氣候變遷與巴黎協定第六條機制合作：

日本政府正協助籌辦「第六條施行夥伴關係」(Article 6 Implementation Partnership, A6IP)組織，共同就《巴黎協定》第六條的執行、透明度、能力建構進行跨國合作，因此可以思考臺日如何透過《巴黎協定》第六條機制進行合作，建議可採符合雙方利益且透過非官方組織合作之方式，以共同推進《巴黎協定》氣候目標。

3. 稀貴金屬提煉

臺灣已於 2005 年依據巴塞爾公約與日本完成簽署有害廢棄物越境轉移雙邊協定，臺灣目前廢棄物回收稀貴金屬資源多僅進行前置拆解處理，後續便將稀貴金屬（如銅、金、銀、鉑、鈮等）輸出至國外業者進行精煉，未來可合作推動促成臺日民間企業就電子產品再利用合作。

4. 國際塑膠資源循環

日本長期在東南亞、大洋洲及非洲等地區協助評估及規劃塑膠資源回收政策及循環產業鏈，亦常參考臺灣的政策及技術，因此借由臺日合作，能更有效的輔導東南亞、大洋洲及非洲國家，建立屬於自己的循環模式。合作方式如未來臺灣「8+N 資源循環聯盟」與日本「循環經濟夥伴」(Japan Partnership for Circular Economy, J4CE)建立雙邊產業組織互訪與交流機制，並邀請日方來臺參加「2025 亞太循環經濟圓桌論壇暨熱點活動」，此外日本因應歐盟要求汽車塑膠回收再利用分階段提高到 25%，此議題也可與我方進行交流。

5. 化學物質國際公約及環境荷爾蒙管理交流

我國針對全氟及多氟烷基物質(PFAS)之管理與斯德哥爾摩公約一致，為及早蒐整評估斯德哥爾摩公約公告以外之 PFAS 資訊，已跨部會研擬「全氟及多氟烷基物質(PFAS)管理行動計畫」，持續掌握國際 PFAS 管制情形，並透過跨部會平臺，整合各部會資源，執行 PFAS 相關物質之管制、監控及民眾風險溝通工作。而日本明年四月起飲用水中 PFOS 與 PFOA 合計不能超過 50ng/L，另因應歐盟對於半導體業 PFAS 管制議題，臺日可延伸進行交流及資訊分享。

（三）拜會日本 GX 推進機構

「綠色成長與 2050 淨零轉型」為我國國家發展核心戰略，環境部已啟動「綠色成長聯盟」及「臺灣綠色成長基金」，公私協力參與推動總量管制與排放交易(ETS)試行機制，加速我國碳市場制度與國際接軌，另推動我國綠領人才培育機制。而日本 GX 推進機構高田英樹理事亦赴台參與環境部 2025 年 5 月 23 日舉辦之「臺灣綠色成長啟動暨亞洲綠色成長論壇」與「綠色成長與碳定價工作坊」兩場次活動，進行「日本綠色轉型：去碳化與經濟成長」專題演講，介紹日本「GX 實現機構」以及「綠色轉型」(GX)政策。本次拜會日本 GX 推進機構交流議題摘要說明如下：

1. GX 經濟轉型債券進展及可能借鏡之處

日本氣候轉型債券係就營運、證券公司、銀行、評估機構、投資者等，使其能將其低碳和脫碳投資貼上「過渡債券/貸款」標籤並為其籌集資金。由於轉型融資相對較新，推廣和確保其可信度將有助於其成為脫碳融資工具，尤其是在減排困難領域。透過引入更多轉型融資，有助於日本實現 2050 年碳中和的目標。

高田理事於環境部 2025 年 5 月 23 日舉辦之「臺灣綠色成長啟動暨亞洲綠色成長論壇」提及，日本除提供 150 兆日元的資金，協助民間企業進行轉型，也在海外募集相關資金，例如日本政府邀請退休投資基金 (Government Pension Investment Fund, GPIF) 參與募資計畫，第五次淨零計畫 2025 年到 2029 年考慮投入影響力投資，透過這次募資計畫，強調與民間企業與民間主導的投資基金會合作，共同實現影響力投資，今年 3 月更新版 GPIF 計畫當中著重促進家用資金用於綠色投資及永續投資項目。

2. 淨零新創企業合作機制

日本編列 2 兆日圓設立「綠色創新基金」，針對能源、運輸製造、住商產業等共 14 個優先發展項目，承諾實現淨零目標的企業，資助其研究與開發、示範計畫及社會實施成果等經費；環境部「加強投資綠色成長淨零產業實施方案」亦已獲審議通過，成功爭取國家發展基金總額度 100 億元，未來 10 年加強投資淨零永續新興產業，引進私部門資金共同投入，加速國內淨零新興產業發展，同時創造更多綠色就業機會，啟動臺灣綠色成長的新動能。

3. GX 人才市場創造

日本由民間發起 GX 人才市場創造工作小組廣徵意見，建立 GX 技能基準，從宏觀、微觀、積極、保守等面向建立不同需求導向，兼具產業需求及公正轉型之考量。日本已於 2025 年 5 月 14 日已發布 GX 推廣技能標準 (GXSS-P) Ver2.0，定義了「GX 分析師」、「GX 專案經理」、「GX 策略家」、「GX 溝通家」、「GX 發明家」等人力資源類型，並列舉了除 GX 發明家之外的 4 種類型 11 種角色，得參考其精神，納為我國綠領人才制度推動參考。

（四）辦理環境部綠色成長聯盟德國碳定價研習會

環境部本年度於德國柏林辦理「綠色成長聯盟德國碳定價研習會」，為期 3 日的課程以德國排放交易管理局(DEHSt)為主要交流對象，包含「講座課程」及「工作坊」，深入理解其總量管制政策推動經驗與面臨挑戰，並安排與國際碳行動夥伴關係(ICAP)及歐洲能源交易所(EEX)等單位交流，進一步掌握全球自願性市場與碳市場機制的最新發展趨勢，做為我國推動相關制度設計之重要參考依據，交流內容摘述如下：

1. 歐盟總量管制與排放交易(EU ETS)初期研擬過程(講師：Karin Fritz, DEHSt)

本課程介紹 EU ETS 推動歷程中，德國的具體實踐與制度設計重點。德國自制度初期即重視利害關係人參與，於 2000 年制度規劃階段便由聯邦環境部主導，召集橫跨產業、查驗機構與法律部門的常設工作小組。制度初期定期召開會議，形成涵蓋設計、執行與回饋的長期對話平台。以第四交易期為例，共辦理 12 場利害關係人會議，以蒐集意見並提前溝通制度調整重點。政府並與產業共同出資支持溝通工作，建立年度報告制度。除實體會議外主管機關也提供指引、FAQ 與電子報，並透過 DEHSt 建置的電子溝通平台，確保資訊透明。

在制度架構上，德國選擇由中央主管機關 DEHSt 負責 EU ETS 的設計與執行，納管對象為約 1,700 座設施，涵蓋能源、煉油、鋼鐵、水泥、玻璃、化工等碳密集產業。以 2024 年為例，能源設施雖占數量一半，但排放量達總量三分之二。DEHSt 隸屬聯邦環保署(UBA)但具自主性，與環境部每六週定期會議溝通政策方向。地方機構雖非主管機關，但在環境監測與執法面仍扮演支援角色，與中央形成職責明確、功能互補的治理結構。DEHSt 組織下設 4 大部門與逾 30 個專業單位，涵蓋氣候行動、查驗作業、能源政策、CBAM、碳洩漏補償與 IT 系統等面向。人力從初期的約百人擴編至目前約 250 人，背景涵蓋工程、氣候科學、法律與化學等領域。以平均一座設施需

完成 4 項相關法令規定推估，每年約有 6,800 件處理量，需 30 名全職人力負責。整體行政效率仰賴專業團隊與穩定制度支撐。

2. EU ETS 核心要素與最新發展（講師：Dr Baran Doda, adelphi）

EU ETS 自 2005 年啟動，透過四階段改革持續擴大涵蓋範圍與部門，並優化配額設計與市場機制。早期僅納管 CO₂，第三階段起加入 N₂O 與 PFC，2024 年起涵蓋海運。整體制度涵蓋超過 1 萬 1,000 個設施，管制部門包含電力、能源密集產業、區內民航與海運，各部門門檻依排放量與裝置容量設計。2024 年總量上限為 13.86 億 EUA，其中海運部門增加 7,840 萬 EUA。

配額分配上，電力業採全額拍賣，製造業採標竿法免費核配，並依產業碳洩漏風險調整比率。拍賣由 EEX 以密封投標方式執行，制度預計至 2034 年全面取消免費配額，並透過 CBAM 減緩碳洩漏風險。2023 年起，各會員國拍賣收入須全數用於氣候與能源轉型，創新基金（至 2030 年規模約 400 億歐元）與現代化基金（約 560 億）用於支持低碳技術與能源轉型。

市場穩定儲備(MSR)於 2018 年上路，依總流通配額(TNAC)自動調節拍賣供給。若 TNAC 超過 1,096 億，則轉入 24%至儲備；低於 400 億時釋出 1 億 EUA，超出儲備上限則予以註銷。另依第 29a 條規定，遇價格劇變可啟動額外拍賣。EU ETS 至今已與瑞士、挪威完成連結，並與英國展開協商，惟協調 MSR 設計為目前主要的挑戰。

制度檢討方面，歐盟執委會定期發布檢討報告，涵蓋 MSR 調整、碳洩漏議題、負排放等。講者指出，EU ETS 設計有助於臺灣未來制度發展與國際接軌，並強調市場連結可提升全球碳價一致性與減碳效率。

3. 德國國家碳交易制度概覽（講師：Dr Daniel Detzer, BMW）

德國國家排放交易系統(nEHS)係於 2019 年氣候運動與綠黨崛起背景下推動，作為當年氣候法案的核心政策之一，並自 2021 年實施。nEHS 與歐盟「Fitfor55」套案相互呼應，後者將於 2027 年啟動涵蓋建築與運輸的 EU ETS 2。目前，德國約 85%排放已納入碳定價機制，EU ETS 1 涵蓋能源、工業、航空，且 2024 年起已涵蓋海運，nEHS 則補足建築、運輸及部分能源與工業排放，農業僅部分涵蓋。

nEHS 為上游管制，由燃料分銷商擔任義務方，透過配額拍賣產生碳價，排放上限逐年遞減。焚化部門則為例外，採下游履約。其排放上限依

歐盟 ESR 目標設定，2021 年為 3 億噸，2030 年降至 1.8 億噸，2045 年達氣候中和。2021 至 2025 年採固定碳價（25 至 55 歐元／噸），配額無上限；2026 年轉為價格走廊，2027 年實施市場定價並固定排放上限。碳價對燃料價格影響較為溫和，如 2021 年每公升汽油僅增加 6 歐分，2023 年增至 15 歐分；同年 nEHS 收入達 100 億歐元，用於弱勢支援與技術轉型。

依 Fitfor55 的規劃，nEHS 將於 2027 年併入 EU ETS 2，兩者皆為上游制度，由燃料分銷商負責；但 EU ETS 2 自啟動即採市場定價，並設 6 億噸市場穩定儲備。德國擬將鐵路、農林燃料選擇性納入 EU ETS 2，焚化部門則擬併入 EU ETS 1，但細節尚在討論。EU ETS 2 目標至 2030 年較 2005 年減量 40%，需年度減少將近 6,000 萬噸，壓力極大，價格波動性高。歐盟將透過法規、財政與社會氣候基金等輔助政策，減緩對弱勢族群的衝擊。

4. ETS 範疇擴大：EU ETS 2 概覽（講師：Jakob Graichen, Oeko-Institut）

本課程介紹之 ETS 2 屬於「Fitfor55」政策套案，目標較 1990 年減量 55%。ETS 2 於 2021 年立法，2023 年生效，2024 年啟動申報，預計 2027 年開始交易。採上游設計，監管燃料供應商，配額全拍賣，無免費核配。排放上限自 2024 年起逐年遞減，預計 2044 年達零排放。為維護 ETS 1 穩定，兩系統初期不互通。

ETS2 涵蓋道路運輸、建築排放，以及小型能源與工業設施（鍋爐容量 20MW 以下）。由於燃料用途難以精準掌握，申報與驗證(MRV)具有一定複雜性。約半數排放來自家庭，其餘來自商業用戶，部分排放源如泥炭燃燒、都市廢棄物、農業燃料、小型船舶與非公路運具尚未涵蓋，未來可透過成員國自願納入。ETS2 選擇上游制度，主要考量下游管理 3 億戶家庭不具可行性，且上游管理成本低、效率高，對政府而言，整體行政成本相較收入極低。

為避免碳價劇烈波動，ETS 2 設有市場穩定儲備(MSR)，與 ETS 1 類似。當配額供應過剩時，MSR 可暫停拍賣；若配額過少，則可釋出額外配額。ETS 2 設有 3 種價格控制機制，每年最多啟動 1 次。若碳價高於 2020 年基準價 45 歐元（預估 2030 年約 60 歐元），則釋出 2,000 萬配額；若碳價在半年內倍增，則可能觸發更大釋放量，這些額外配額均透過拍賣進入市場並於 12 個月內釋出。ETS 1 至今從未啟動此機制，顯示其設計主要為應對極端情境。

2027 年 ETS 2 碳價預測為每噸 50 至 90 歐元，接近價格上限。碳價對

成員國影響不一，德、法、義三國占近半排放，其政策行動對碳價具有關鍵影響；相對地，較貧窮國家受支付能力限制，承擔壓力更大。為減緩社會衝擊，歐盟設計社會氣候基金(SCF)，部分資金來自拍賣收入（如碳價為50 歐元時撥入 25%），總額約 650 億歐元，不僅支援弱勢家庭、微型企業與交通用戶，亦具再分配功能，低收入成員國可獲得較高比例資金。各國須提交「社會氣候計畫」，將資金用於交通與供暖的脫碳投資，如電動車、熱泵等，避免僅提供現金補貼，例如德國即制定依建築能效分攤房東與租戶碳成本的法律，以鼓勵供暖系統升級。

5. 正式利害關係人參與程序：以德國為例（講師：Philipp Geres, Future Camp）

本次會議聚焦於 ETS 中利害關係人參與的理論基礎與實務策略，並探討臺灣借鏡歐盟及德國經驗的可行性。會中指出，利害關係人參與對於提升制度透明度、政策品質與社會接受度至關重要，能夠透過雙向溝通強化政策認同，進而促進 ETS 順利推動與執行。

建立參與機制可分為 3 個步驟：首先為辨識利害關係人；其次為瞭解其對 ETS 的知識程度與態度立場；最後提出具體政策選項，引導公共討論與參與。不同推動階段應搭配不同的參與工具，在制度設計初期應強化能力建構，使利害關係人充分理解政策利基；進入實施階段後則應著重於專業諮詢與符合法規遵循的培訓；制度上路後，審查與修正階段則需持續開放意見回饋與溝通。

歐盟建立正式的利害關係人參與機制，透過「Have Your Say」與「Call for Evidence」等平台廣泛蒐集意見。歐盟執委會亦編訂《Better Regulation Toolbox》，其中第七章詳列利害關係人諮詢的程序與方法，作為各項立法之參考依據。德國方面，其立法程序明定須進行兩類利害關係人諮詢，包括與產業協會、公民團體等之「團體諮詢」，以及開放社會參與的「公聽會」，並要求將相關意見公開上網，以確保政策經濟影響充分討論並提高透明度。

整體而言，德國經驗顯示，若要有有效強化利害關係人參與和社會接受度，應及早規劃溝通策略、針對不同對象設計適當工具、確保政策資訊透明，並在制度施行後持續進行溝通與意見回饋機制的建構。

6. 非正式利害關係人參與機制-排放交易工作小組(AGE)（講師：Andreas Wehrl, Future Camp）

本次會議探討德國在 ETS 推動過程中所採行的利害關係人參與機制，

並分析其運作實例，作為臺灣制度設計的潛在參考方向。德國建立了兩項關鍵機制以促進利害關係人參與：一是「碳交易工作小組」(Arbeitsgruppe Emissionshandel zur Bekämpfung des Treibhauseffektes, AGE)，二是負責實際執行與溝通任務的「德國排放交易局」(DEHSt)。AGE 為一常設性的諮詢平台，主要成員來自產業界與政府部門，另納入部分具有政策參與能力的環保非政府組織(NGOs)與工會代表。其核心功能包括政策溝通、能力建構與技術建議，協助利害關係人正確認知碳市場制度，並針對 EU ETS 實施過程中，出現問題時提供解方。

AGE 自 2000 年成立以來，已召開逾 180 次會議（每年約 7 至 8 次），討論議題從排放交易制度設計與執行，延伸至國際碳市場連結等前瞻議題。該平台之所以能長期穩定運作，關鍵在於其「非正式性質」與「保密原則」，讓與會者能自由交換意見，不受政治壓力或對外公報影響，亦不需在會議中做出具拘束力的決策。另一方面，DEHSt 則設有一支約 20 人的專責團隊，負責與碳交易參與者進行日常溝通，並對間接利害關係人如查驗機構、研究機構、媒體等進行政策說明與答詢。該單位運用網站、出版品、專案活動及客戶服務等多元管道，確保資訊傳遞透明且即時。

此外，建立碳交易制度時也須特別關注中小企業的參與門檻。中小企業往往缺乏處理法律與交易事務的資源，德國經驗顯示，可透過專業輔導團隊或與中介機構（如銀行）合作，協助其進入市場並簡化操作流程，降低制度運作衝突。如臺灣有意推動類似的工作小組機制，德方建議需審慎考量其任務目標與設計原則，包括成員組成、主持機關、運作形式、議程規劃及資訊透明度等，方能有效發揮平台功能並兼顧溝通與實務推動需求。

7. EU ETS 與政策交互作用（講師：Dr Baran Doda, adelphi）

本課程說明為何在設計與實施 ETS 時，必須審慎考量其與其他氣候政策工具之間的重疊與交互作用，並釐清 ETS 在整體氣候政策組合中的功能與角色。ETS 的核心目的在於提升減量效率，透過市場機制賦予排放者彈性，使其可在成本最低的部門或區域進行減量，直到其邊際減量成本與碳價相當。主管機關亦能透過碳市場所釋出的價格訊號掌握減量成本變化，無須干預具體技術或做法，從而避免高干預成本與資訊不對稱的問題。

然而，ETS 並非萬能。由於其本質上屬於廣泛的價格型工具，在面對資金障礙、行為動機不足、資訊落差或市場失靈等情況時，效果可能有限。因此，補充政策便有其必要性，能針對特定部門或問題進行修正與支援，

不僅可以消除制度性障礙，也能為轉型投資與創新技術提供長期誘因。

進一步來看，氣候政策的組合必須平衡效率、公平與政治可行性。若僅依賴 ETS，可能導致碳價過高，產生民眾與產業的反彈壓力；若搭配合理的補充政策，則可達成減量、成本控制與社會接受度的多重目標。此外，ETS 設計與其他政策的互動也可能產生「水床效應」(Water bed Effect)。當補充政策針對與 ETS 重疊的排放來源實施時，若總量上限不變，則其實現的減量效果可能被碳市場中其他排放者吸收，使得整體排放未減少。歐盟在 2018 年 ETS 改革中，便正面回應了這項挑戰，賦予會員國針對額外減量措施註銷配額的選擇，同時設置市場穩定儲備機制(MSR)，在如經濟危機等時期進行額度調節，避免市場失衡。

由此可見，ETS 的設計不應與其他政策脫節，而應納入現有能源、產業與社會結構的脈絡中。不同政策的設計目標與工具效應需整合與協調，避免彼此抵銷或產生扭曲誘因，例如若存在化石燃料補貼，將削弱碳價效果，反而提高整體減量成本。良好的政策組合應具備一致性與連貫性，不僅有助於碳價發揮最大效能，也有助於確保社會公平與轉型穩定性。

從策略角度而言，規劃 ETS 時應事先模擬與評估既有與預期政策在各部門的減量貢獻，再據此設定合適的總量上限。對於難以監管或碳價難以觸及的部門，則應以補充政策支援之。此外，ETS 可內建自動穩定機制，如透過數量型或價格型調整機制，確保制度在面對供需變化或外部衝擊時仍具韌性與調節能力。在合理的政策設計下，補充政策不應僅視為技術推動工具，更應強調其協助合理分擔轉型成本，使企業與投資者在面對碳價壓力時，仍有足夠誘因與能力進行轉型投資。

綜上，ETS 雖是實現淨零轉型的重要架構，提供明確的量化減量框架與市場導向機制，但僅靠價格訊號仍不足以解決所有問題。氣候政策需要具備韌性與回應性，ETS 與其他政策工具應以互補方式共同作用，並需持續滾動調整與評估其互動效果。透過有效整合各類政策工具，方能建立一套成本可控、社會可行、政治穩定的減碳治理體系，穩健推動長期淨零目標的低碳轉型。

8. EEX 市場營運及平台簡介（講師：André Tzschoppe, EEX, Andrew Rimmer, KB Technology）

EEX 團隊說明其市場運作機制與在全球碳市場的角色。EEX 是歐洲領先的能源交易所，擁有全歐洲最大規模的電力合約交易量，天然氣交易量

則排名第二。其市場覆蓋範圍廣泛，包括電力、天然氣、航運、原產地保證及再生能源憑證(REC)等。EEX 集團成員包括 EEX、Epex Spot 與位於新加坡的 EEX Asia。清算機構由歐洲能源清算所(ECC)負責，Grexxel 提供註冊服務；在美國，EEX 透過 Nodal 與其清算機構 NodalClear 進行環境衍生品交易。

EEX 的碳市場服務涵蓋歐盟、美國、德國與紐西蘭等地，在歐盟，EEX 擔任 EU ETS 的官方拍賣平臺與次級市場營運商；在德國，負責國內排放交易系統(nETS)的拍賣；於紐西蘭與 NZX 合作營運其 ETS；在美國，則經由 Nodal 涵蓋包括 REC 在內的碳衍生商品。依據德國交易所法，EEX 除了設有監事會與管理委員會外，另設交易所委員會、管理層、市場監督辦公室(MSO)及制裁委員會等執行單位，接受薩克森州主管機關與 BaFin 的監督。

EU ETS 的交易量於啟動初期成長緩慢，自 2018 年起快速上升，尤以衍生性商品市場為主。第一階段曾因禁止配額跨期保留，導致配額價格在期末歸零。此問題自第二階段起已解決，且自 2017 至 2018 年起，因市場穩定儲備機制(MSR)實施，價格顯著上升。自 2005 年以來，EU ETS 覆蓋產業的排放已減少約 47 至 50%，至今累計拍賣收入超過 2,360 億歐元，僅 2025 年上半年即超過 200 億歐元。

EUA 拍賣為 EU ETS 配額分配核心，單位為每噸 CO₂e，每筆競標最小量為 500 EUA，交割採 DvP 機制。拍賣參與者類型包括法遵對象、投資機構、代理法遵對象之買方與其他中介機構。拍賣流程由歐盟執行委員會、EEX、ECC 與會員國指定的拍賣人協同運作，採單輪密封統一價格制，結算與交付於拍賣後次日完成。截至目前，EEX 與 ECC 已完成超過 3,000 場拍賣，僅 12 場因價格或競標量不足被取消。EEX 具備同時營運大型與小型市場的專業能力，能配合不同國家制度運作。例如 2024 年的排放上限分別為：EU ETS 1,500 百萬噸、德國 nETS 280 百萬噸、紐西蘭 ETS 22 百萬噸。

此外，簡報也展示紐西蘭 ETS 拍賣系統之功能，該系統與 EEX 同樣採用相同底層技術，整合政府認證登入、API 自動化、單輪密封與統一價格拍賣流程，並設有價格觸發機制如價格下限、技術儲備價格與成本控制儲備(CCR)。拍賣過程中導入審查機制，確保系統公平與安全運作。

9. 我國碳費制度與碳定價規劃（講師：環境部氣候變遷署 羅禮淳科長）

我國積極設定 2030 減碳新目標，從 2015 年所訂 20%、2022 年提升至 24±1%，再於 2024 年提升至 28±2%，除此之外，賴總統也於 2025 年 1 月公

布臺灣 2032 年與 2035 年分別達 $32\pm 2\%$ 及 $38\pm 2\%$ 的減碳目標，最終於 2050 年達成淨零排放，而為達成此目標，碳定價制度即為重要的政策工具之一。

我國碳費制度於 2025 年正式生效，自 2025 年起，碳費徵收對象的溫室氣體排放量將納入碳費計算，並於隔年 5 月繳費。碳費徵收對象為年排放量達 2.5 萬公噸 CO₂e 以上之電力、燃氣供應及製造業，碳費計算公式為「收費排放量×徵收費率」，其中「收費排放量」將依排放量調整係數值進行調整。依據 112 年盤查登錄資料，碳費預計徵收對象約 260 家公司（474 廠），其總排放量約 147 百萬公噸 CO₂e，占全國總排放量約 54.8%。這些排放涵蓋直接與間接溫室氣體排放。

過渡配套機制方面，若屬高碳洩漏風險行業，且提出自主減量計畫經審查核定者，其排放量調整係數初期為 0.2，第二期與第三期分別調高至 0.4 與 0.6。非屬高碳洩漏風險行業則可扣除碳費起徵門檻 K 值（2.5 萬公噸），未來亦將分階段調整。除此之外，企業可使用國內外減量額度抵減收費排放量，國內額度抵減上限為排放量 10%、國外額度（需經主管機關認可，且為非高碳洩漏風險事業）抵減上限為 5%。

我國碳費制度訂有徵收對象提出自主減量計畫達減量指定目標者，得適用優惠費率之機制，自主減量措施可包括轉換低碳燃料、採行負排放技術、提升能源效率、使用再生能源及製程改善等，並需於每年 4 月底前提交前一年度執行進度報告，若查核未達指定目標，當年度將改用一般費率。減量指定目標分為兩種：一是參照國際 SBT 標準所訂行業別指定削減率，適用優惠費率 A；二是考量燃料種類、製程、電力使用等因素所訂技術標竿指定削減率，適用優惠費率 B，企業可依實際情形選擇一種目標提出自主減量計畫。

就高碳洩漏風險事業認定，環境部規劃訂定 2 個層次的認定原則，除了參考國際上考量各行業別排放密集度及貿易密集度所訂的通案標準外，也將評估事業如有營業毛利不佳、碳費占毛利比達一定程度以上、受關稅衝擊影響導致出口成本增加一定比例、或是面對國際商品傾銷風險等情形，可以透過逐年申請取得適用資格，避免碳費課徵弱化產業國際競爭力。但須強調的是，認定屬高碳洩漏風險事業之前提為提出自主減量計畫並經環境部核定，以確保徵收對象確實進行溫室氣體減量。

至於碳費制度所帶來的減量成效預估，行業別削減率以 2021 年為基準年，至 2030 年一般行業須削減 42%，鋼鐵業為 25.2%，水泥業為 22.3%。

技術標準削減率則以 2018 年至 2022 年平均排放量為基準，經估算所有碳費徵收對象平均至 2030 年須削減 23%。假設所有碳費徵收對象皆提出符合技術標準削減率之自主減量計畫並確實執行，預估 2030 年可減少 37 百萬噸 CO₂e，約為 2005 年國家整體排放量的 14%，有助於達成 2030 年國家減量目標。

此外，碳費制度將與自願減量交易機制搭配，企業可在非碳費徵收場域執行自願減量專案（如效能提升、能源替代、碳匯等），所產生的減量額度可折抵收費排放量（×1.2 倍計算）。目前臺灣需繳交碳費的企業約 260 家，以上市櫃公司為主，中小企業僅 7 家。而全國約有 163 萬家中小企業，可藉由此機制，由碳費徵收對象以大帶小，鼓勵所有場域積極參與自願減量。

針對碳定價制度的中長期發展，我國於 2025 年實施碳費制度後，刻正研擬 ETS 制度的試行規劃，初步規劃於 2027 至 2028 年導入 ETS 試行機制。自 2018 年起，臺灣即與德國等國進行深度交流與制度對接，並於本次率企業聯盟赴德國學習 ETS 運作模式，強化我國 MRV 機制與碳市場基礎設施。

10. 全球碳排放交易概況、碳交易制度案例分享（講師：Lewis Stevens, ICAP）

ICAP 是一個由 43 個國家與次國家政府組成的國際論壇，秘書處設於柏林，主要目標是為各司法管轄區提供互相學習平台，支持全球交易機制的發展與政策，並探討這些機制在實現溫室氣體減量過程中的作用。ICAP 的三大主要支柱包括知識共享、能力建設與技術研究。知識共享方面，ICAP 透過報告、出版物與年報等形式，協助成員掌握全球碳市場發展情況。能力建設則涵蓋區域與進階訓練，協助政策人員與實行人員提升制度設計與執行能力。技術研究部分，則深入探討如 ETS 等機制設計與效能，以促進經驗交流。

在全球趨勢方面，ETS 的制度在新興國家如巴西、土耳其等國家持續擴展。巴西已進入立法與實施階段，土耳其議會亦在審議相關草案。制度設計亦愈趨多元，從傳統的「總量管制與交易」(cap-and-trade)轉向排放強度型設計(intensity-based schemes)，並整合碳額度(offsets)與碳稅(taxes)等工具。成熟的系統如歐盟與英國的 ETS，正與其淨零排放目標接軌，針對碳排放配置機制與減量軌跡進行調整。不過，也面臨地緣政治與經濟不確定性挑戰，需提升制度韌性與社會接受度。

目前全球共有 38 個 ETS 制度，涵蓋範圍廣泛，涵蓋全球近三分之一人口與 58% 的 GDP。ETS 實施密集區域包括歐洲、北美、中美洲與亞洲部分

地區。歐盟、英國與韓國等地制度較為成熟，而如印度與越南則處於開發或評估階段。臺灣也被納入 ICAP 觀測範圍。自 2005 年歐盟 ETS 實施以來，新機制的數量與涵蓋排放量持續增長，2019 年後尤為明顯。產業涵蓋方面，大多數 ETS 制度以工業與電力部門為主，也有部分涵蓋建築、交通與廢棄物等領域，但目前尚無涵蓋農業生物源排放的制度。

ETS 帶來的收入亦逐年成長，自 2008 年以來尤其在 2020 年代快速上升，主要來自歐盟、德國與英國，約占總收入的四分之三。不過，由於配額價格下降，2023 至 2024 年間部分制度收入有所下滑。

關於碳額度進行抵換的使用，各地規定不同。例如歐盟與英國等地完全不允許抵換機制，部分國家如加拿大、美國與韓國允許部分使用，並設有比例與類型限制，通常偏好國內抵換(domestic only)。部分制度允許最多 5% 的配額來自抵換來源，前提是必須符合嚴格標準。

11. 碳交易制度案例分享：電力部門的管制設計(講師：Katja Biedenkopf, ICAP)

ETS 的基本概念源自 EU ETS，最初在歐洲電力市場自由化後成功推動脫碳。然而，隨著越來越多國家推動 ETS，其電力市場結構卻不盡相同，例如部分國家仍為非自由化市場，或存在單一企業壟斷、容量市場等情形，導致 ETS 無法發揮預期的成本轉嫁作用。設計 ETS 時，需深入理解市場結構與目標需求，並評估其對價格鏈中不同階段的適用性，包括發電端、系統營運商與下游售電行為者等，以確保制度有效傳遞碳價訊號。

韓國的 ETS 被視為具代表性的制度調整案例，顯示 ETS 如何因應特定國情調整而運作。K-ETS 涵蓋部門包括電力、工業、建築、交通、航空、海運與農業等，覆蓋約 80% 的韓國溫室氣體排放量（若僅計直接排放則為 72%），是韓國氣候政策的重要支柱。

然而，韓國 ETS 面臨多項核心挑戰。首先是電力市場的非自由化，難以使碳價直接反映至消費者電價，削弱其傳導機制。其次，韓國在再生能源推動方面面臨生產容量受限與離岸風電等高成本投資障礙，影響投資誘因。在制度設計方面，K-ETS 目前仍以大量免費配額為主，拍賣比重低，導致碳價偏低。與歐洲相比，韓國價格相對較低，市場活躍度也有限。儘管允許使用國際碳額度，但相關規則尚未完備。此外，K-ETS 雖於 2015 年啟動，但目前尚未顯著觀察到排放下降的趨勢，朝向 2050 年淨零排放目標的挑戰仍大。

針對挑戰，韓國提出多項應對措施，如將熱電與熱力供應的間接排放納入、推動更多拍賣以提升碳價、引入氣候調度與氣候附加費，鼓勵再生能源優先合併並調整用電價格。此外，也正研議導入價差合約(CfDs)機制，以保障一定碳價，穩定投資回報，特別是針對成本較高的離岸風電等項目。

韓國的經驗顯示，ETS 設計應依據各國國情進行彈性調整，無法採一體適用的標準模式。K-ETS 的推動過程展現從因應特定背景出發，逐步導入變革與政策工具。這也強調了 ICAP 等國際合作平台的重要性，有助於促進各司法管轄區之間的學習與互動。

12. 自願性碳市場：數位解方（講師：Luis Neves, CEO, GeSI）

本報告由全球永續倡議組織 GeSI(Global Enabling Sustainability Initiative)代表 Mr. Louise Neves 主講，介紹數位解決方案在自願性碳市場(Voluntary Carbon Market, VCM)中的應用潛力。GeSI 為全球性聯盟組織，專注於永續發展與數位科技交匯議題，與超過百個政府與私部門夥伴合作，推動「數位賦能」以促進各部門減碳效率。GeSI 指出，數位科技可驅動能源、農業、水資源管理、運輸等領域轉型，達成減量成效，並與 UNFCCC、歐盟執委會、歐洲綠色數位聯盟等合作推動數位減碳策略。GeSI 亦與臺灣如電子電機工業同業公會等產業組織建立連結，其成員涵蓋多家科技與通訊大廠，並延伸至能源、水務與食品企業，聚焦數位科技於永續領域的貢獻。

根據 GeSI 的研究（如 Smart2020、2012、2015 年報告），數位解決方案到 2030 年可望協助全球減少約 20%的碳排放（約 12 億噸 CO_{2e}），這相當於每年創造一個中國 GDP 等值的商業機會，其中有 6 成可轉化為企業直接收入，5 成則為供應鏈效益。這顯示數位科技具有超過 10 兆美元的減量潛力。然而，目前仍有許多潛力尚未被激發，例如臺灣與其他企業尚未將數位減碳導入核心商業操作，需進一步促進數位減碳標準與驅動機制發展。

目前 VCM 面臨價格下滑、市場波動與可信度不足等問題，部分以自然解決方案為主的碳額度存在監管風險，影響企業參與意願。此外，多數現行 VCM 標準聚焦於林業、廢棄物與農業等領域，尚未涵蓋數位減碳貢獻的量測方法與核證機制。為解決上述問題，GeSI 推出數位 VCM(Digital-VCM)方案，核心目標在於建立一個以量正向影響(Net Positive Impact)為前提的機制，將碳交易與數位解決方案的實際貢獻連結起來。此方案需具備可信度一致性原則，並結合聯合國及歐盟倡議的標準方法。數位 VCM 強調即時驗

證、透明度與創新性，涵蓋從專案開發、測量驗證、碳額度發行到交易註冊全流程。

實務上，數位 VCM 的買方可能為 Shell、Microsoft、ENGIE 等企業或政府，賣方則為提供數位解決方案與專案開發的科技公司。其運作模式聚焦於數位技術如何精準測量與追蹤排放減量，建立高可信度之減量貢獻證據，並鼓勵更多開發者投入此領域。整體而言，GeSI 的倡議將數位科技視為尚未被充分認識但具有巨大潛力的氣候行動工具，並主張建立一套專屬於數位減碳的自願性碳市場，以釋放其對全球減碳的關鍵作用與經濟效益。



圖 2 環境部綠色成長聯盟德國碳定價研習會



圖 3 環境部綠色成長聯盟德國碳定價研習會



圖 4 環境部綠色成長聯盟德國碳定價研習會合影

（五）拜會德國聯邦環境部(BMUKN)及德國聯邦環保署(UBA)

本次環境部彭部長於「綠色成長聯盟德國碳定價研習會」辦理前間，順道分別拜會德國聯邦環境部(BMUKN)負責氣候治理的總司長 Mr. Berthold Goeke，以及德國聯邦環保署(UBA)署長 Prof. Dr. Dirk Messner，就碳定價策略、能源轉型、PFAS、空氣污染及循環經濟等議題深入交換意見。

本次討論相關議題摘要如下：

1. 我國碳定價推動現況與未來規劃

環境部彭啓明部長簡介臺灣目前碳費制度，以及預計推出臺灣 ETS 的時程規劃，並說明此次行程目的係為邀請了綠色成長聯盟企業一同向德國 ETS 團隊取經。此外，也提及我國環境部與全球永續賦能倡議組織(GeSI)已簽署 MOU，在數位綠色轉型進行交流。

德方主要關注我國碳定價政策路徑規劃細節，包含 ETS 啟動的期程、現況碳費制度涵蓋的企業家數以及排放量，以及臺灣的各期階段管制目標比較基準等。並說明 UBA 相關團隊樂意與環境部團隊就長期國家整體排放量模擬數據進行交流及協助。

2. PFAS 管制與空氣污染議題

環境部彭啓明部長與 UBA 署長 Dr. Dirk Messner 分享臺灣已經正式立法禁用 PFAS，Messner 對此非常感興趣，並表示德國目前仍在推動禁用 PFAS，臺灣能先行禁用令人驚豔。彭部長亦表示臺灣可以分享相關經驗給德國。

另就空氣污染議題，彭部長表示環境部刻正與衛生福利部合作有關 PM2.5 與肺癌的關聯問題。Messner 則表示德國現階段較關注 PM10 議題，將其視為重大空污與健康風險源。至於 BMUKN 總司長 Mr. Berthold Goeke，彭部長分享逐步淘汰燃煤機組之規劃，並說明燃煤與空氣污染關聯性之議題在臺灣受到廣泛討論，對此 Goeke 亦說明，德國在這個議題上也面臨類似的難題。

3. 推動循環經濟

環境部彭啓明部長與 UBA 署長 Dr. Dirk Messner 分享率領臺灣進行循環經濟相關的企業一同前往參訪法國的循環經濟施行情形，並表示後續可規劃再與臺灣相關企業赴柏林參訪 Messner 之公司，進行經驗交換。



圖 5 彭啓明部長與德國聯邦環境部總司長 Mr. Berthold Goeke 合影

（六）參訪 EUREF campus

本次於德國柏林進行的 EUREF Campus 實地參訪，聚焦於能源轉型議題，涵蓋園區整體發展策略、綠能新創企業現場觀摩以及關鍵能源技術應用之深入瞭解。透過此參訪行程，進一步觀察德國如何結合制度設計、產業支持與區域創新機制，具體實踐能源轉型與技術創新，對我國相關政策擘劃提供多元視角

與實務借鏡。

EUREF Campus 為德國政府於推動能源轉型政策下所建構之代表性示範園區，基地原為 19 世紀末之工業氣罐區，現已成功轉型為結合歷史建築保存與綠色技術研發應用的創新空間。園區營運核心聚焦於碳中和目標、智慧電網建置與高效整合再生能源系統，吸引眾多綠能科技公司與新創企業進駐，形成多元且具前瞻性的創新聚落。在能源應用方面，園區導入多項技術，包括以生質甲烷為燃料之熱電共生系統(CHP)、小型風力發電設備，以及電轉熱/電轉冷的能源轉換系統。儲能部分則創新採用退役電動車之鋰電池模組建構儲能設施，實踐「電池第二生命」與循環經濟理念。這些模組雖已不適用於電動車驅動，但仍具備穩定的充放電能力，可有效因應再生能源供電波動。另方面，園區也設置大量的電動車充電樁，提供所有人進行電動車充電，充電樁類型涵蓋多種形式，一般充電或是快充等，並開放不同品牌技術共存與實地部署。

整體而言，EUREF-Campus 展現出德國在能源轉型政策落實過程中，如何透過跨領域協作將制度設計、創新技術與產業支持有機整合，並以區域型創新實驗為依託，實踐永續發展與創新創業雙軌推進的政策目標，其具體作法與實踐經驗，對於我國均具參考價值。



圖 6 參訪 EUREF campus 能源轉型示範技術

（七）出席臺灣碳權交易所與歐洲能源交易所(EEX) MOU 簽署儀式

臺灣碳權交易所與 EEX 於 2025 年 6 月 27 日在德國萊比錫簽署 MOU，環境部彭啓明部長、施文真政務次長及氣候變遷署張根穆副署長也一同參與見證，並參訪 EEX 的線上模擬交易平台運作機制，未來 EEX 將分享受託執行歐盟排放交易制度的豐富經驗，與我國資源共享並提供相關教育訓練資源，協助臺灣碳交易市場平台以及能力建構。

彭部長在受邀參與簽署儀式時表示，建立國內 ETS 制度是政府現階段的重要任務，此次碳交所與 EEX 簽署 MOU，可借助其協助他國建置 ETS 制度的成功經驗，包含人才培訓、平臺設計與未來營運等面向，尤其是在《巴黎協定》第六條通過後，全球單一碳市場將成為趨勢，碳交所與 EEX 的合作是非常重要的且迫切的。環境部將持續關注碳交所與 EEX 的密切合作，並積極展開跨部會合作，推動 ETS 制度建置與法規完善等工作。

EEX 執行長 Peter Reitz 亦指出，碳交易對全球去碳化與能源轉型至關重要，EEX 願分享制度設計與營運經驗，協助新興市場推動碳定價，共同促進全球碳市場發展。

本次碳交所簽署 MOU，除了象徵臺德在碳定價制度建構上的深度合作，也期許我國碳交所能藉由 EEX 的協助，建置穩健透明的碳排放交易平台，為未來 ETS 的試行與推動奠定良好的基礎。



圖 7 環境部出席臺灣碳權交易所與歐洲能源交易所(EEX) MOU 簽署儀式

參、心得及建議

一、心得

本次行程主要目的為出席「2025 日本能源高峰會(Japan Energy Summit 2025)」，並與日方交流碳定價及綠色成長相關議題；另藉由與德方共同辦理「環境部綠色成長聯盟德國碳定價研習會」，深入瞭解歐盟及德國總量管制與排放交易(ETS)之政策與推動經驗，強化雙方合作及交流，成果及心得摘要如下：

- (一) 本次應邀出席「2025 日本能源高峰會(Japan Energy Summit 2025)」，與國際能源總署(IEA)前執行總裁田中伸男對談，並於會上說明我國最新氣候政策、碳定價制度進展及綠色轉型策略，藉此呼籲亞洲各國合作，打造區域性減碳市場與合作網絡，並於論壇期間，積極與多國能源部門高層及氣候科技重要業者互動交流，拓展臺灣國際合作。
- (二) 拜會日本淺尾慶一郎議員，我方介紹我國碳定價及循環經濟推動規劃，雙方就氣候變遷、《巴黎協定》合作機制、循環經濟、全球塑膠公約、化學物質國際公約及環境荷爾蒙管理等議題進行交流，確實加深臺日在環境保護議題合作之基礎。
- (三) 日本 GX 推進機構今(2025)年曾來臺介紹日本「GX 實現機構」及其轉型政策，本次前往拜會該機構，深入瞭解日本 GX 經濟轉型債券進展，以及 GX 人才市場創造之相關機制等，我國明(2026)年度將獲碳費第一筆收入，亟需規劃碳費支用方向，GX 轉型債券機制可作為我國後續擴大溫室氣體管理基金效益之參考，而 GX 人才市場創造也契合我國推動綠領人才之精神與方向。
- (四) 德國排放交易管理局(DEHSt)隸屬於德國聯邦環境署(UBA)，是德國政府負責歐盟 ETS 的主管機關，臺德雙方自西元 2018 年簽署臺德碳交易合作意向書後，持續就碳定價制度建構及碳交易市場等主題進行交流。本次舉辦研習會，德方高度肯定我國的氣候政策規劃及努力，允諾全力支持未來臺德合作機會，並鼓勵臺灣持續推動碳費與 ETS 試行，期盼有機會共同推動區域碳市場發展。
- (五) 本次研習會考量綠色成長聯盟成員將是未來驅動臺灣綠色轉型的領導者，對減碳企圖心及敏感度更高，也是未來試行我國 ETS 制度的潛在對象，所以本次邀集綠色成長聯盟成員一同前往學習並相互交流，直接效益更為顯著，並可凝聚政府機關與民間企業的共識。DEHSt 出席代表 Dr. Daniel Klingefeld 在致詞時也表示，在氣候政策推動中，企業不只是被規範的對象，而是在制度設計與去碳化過程中不可或缺的合作夥伴。

- (六) 本次拜會德國 UBA 署長及剛改組後的聯邦環境部(BMUKN)負責氣候治理的總司長，雙方就碳定價策略、能源轉型挑戰深入交換意見。德國在能源政策溝通與社會共識建構上的長期努力，對臺灣極具參考價值，而我國在數位治理、AI 應用、資源循環技術上的創新發展等，也獲得德方高度關注，未來雙方將持續擴大在氣候治理與循環經濟領域的合作機會。
- (七) EUREF campus 是以能源轉型、智慧城市、永續發展等概念為核心的科技示範園區，參訪園區時展示的相關技術包含：園區建築屋頂太陽能板、小型風力發電機組、電動車用電池再利用儲能裝置、冷熱循環水空調系統、綠氫儲能及加氫站等，可供環境部及經濟部、臺灣電力股份有限公司、綠色成長聯盟企業等參與參訪之成員納入政策推動參考或產業能源轉型規劃，尤其向車廠回收已退役之電動車用電池做為該園區內之儲能裝置，為環境部資源循環業務可規劃之政策方向。
- (八) 臺灣碳權交易所與歐洲能源交易所(EEX)於 2025 年 6 月 27 日在德國萊比錫簽署合作備忘錄(MOU)，環境部一同參與見證，並參訪 EEX 的線上模擬交易平臺運作機制，未來 EEX 將分享受託執行歐盟排放交易制度的豐富經驗，與我國資源共享並提供相關教育訓練資源，協助臺灣碳交易市場平臺以及能力建構，對我國未來推動 ETS 制度助益甚大。

二、建議事項

- (一) 就「2025 日本能源高峰會(Japan Energy Summit 2025)」，提及建置亞洲區域碳市場發展之構想，建議可持續關注鄰近亞洲競爭國家，如日本、南韓、新加坡等國之碳定價政策發展，適時尋求建立《巴黎協定》第六條雙邊合作或共同 ETS 額度交易市場等可能性。
- (二) 我國與日本經濟、環境及文化背景較為相近，建議持續深化及追蹤臺日環保合作事項，包括年輕公務員互訪、《巴黎協定》第六條國際合作機制、循環經濟、全氟及多氟烷基物質(PFAS)等議題。
- (三) 環境部初步規劃未來可將部分碳費收入用於淨零轉型貸款利息補貼、信用保證等資金，故可持續追蹤日本 GX 經濟轉型債券進展、操作方式、相關限制條件及成效等，納入後續政策規劃參考。
- (四) 為擴大「環境部綠色成長聯盟德國碳定價研習會」效益，建議後續規劃邀集綠

色成長聯盟成員辦理分享會，由參與本研習會之相關成員進行課程心得分享與建議，並和聯盟成員共同交流與討論。

- (五) 本(114)年度下半年規劃之「亞洲碳定價論壇」，可邀請 DEHSt 及國際碳行動夥伴關係(ICAP)、全球永續賦能倡議組織(GeSI)等本次研習會之碳定價領域專業機構及團體，持續深化雙邊合作關係，並可就我國研擬推動之 ETS 試行規劃進行意見交流。
- (六) 持續關注臺灣碳權交易所與 EEX 之合作進展，並與金融監督管理委員會及經濟部等機關進行跨部會研議，推動 ETS 制度建置與法規完善等工作，奠定良好交易環境基礎。

肆、附錄

環境部綠色成長聯盟德國碳定價研習會 簡報資料

Taiwan Study Visit to Berlin

24th and 25th June 2025



Early preparations for establishing the EU ETS

Karin Fritz

Section V 2.4 – Legal Department

Berlin, 24th June 2025



Overview

- EU ETS – legislation/ Stakeholders involvement
- Installations covered/Where to settle the task/Roles of Ministry
- Structural questions/ What kind of professionals/ Calculation of expenses (example)
- E-governance/ Outsourcing tasks/Examples

EU ETS Legislation and Stakeholder Involvement



EU ETS Legislation/Stakeholder Involvement

- ETS Legislation EU-Germany: process of several years of intense discussion (in force in 2003)
- Stakeholder Consultation > ongoing, started 4 years before start of EU ETS (2000) and
- Stakeholder Information > ongoing

Stakeholder consultation in Germany („soft law“)

Stakeholders: operators, verifiers, authorities, legal offices

- since 2000: Working group under chair of ministry
 - with all relevant participants (sub-working groups)
 - financed by German government and German industry
 - Meetings: Once per month, annual reports
- permanent consultation process
to all aspect of EU ETS
- ➡ goes into legislation process



Stakeholder information in Germany (through DEHSt)

- Implementation workshops for stakeholders:
12 Workshops for 4th Trading period in 2019 and 2020, ongoing for all new tasks
- Updated webpage with necessary information in German and English
- Operators can contact the customer service (Mon-Fr)
- Publication of guidelines and FAQs
- Information via Newsletter
- Electronic Communication, procedures, templates
(e-government from 2003 on)
- Client-orientation of DEHSt



Installations covered/Where to settle the task



Installations covered/Where to settle the task

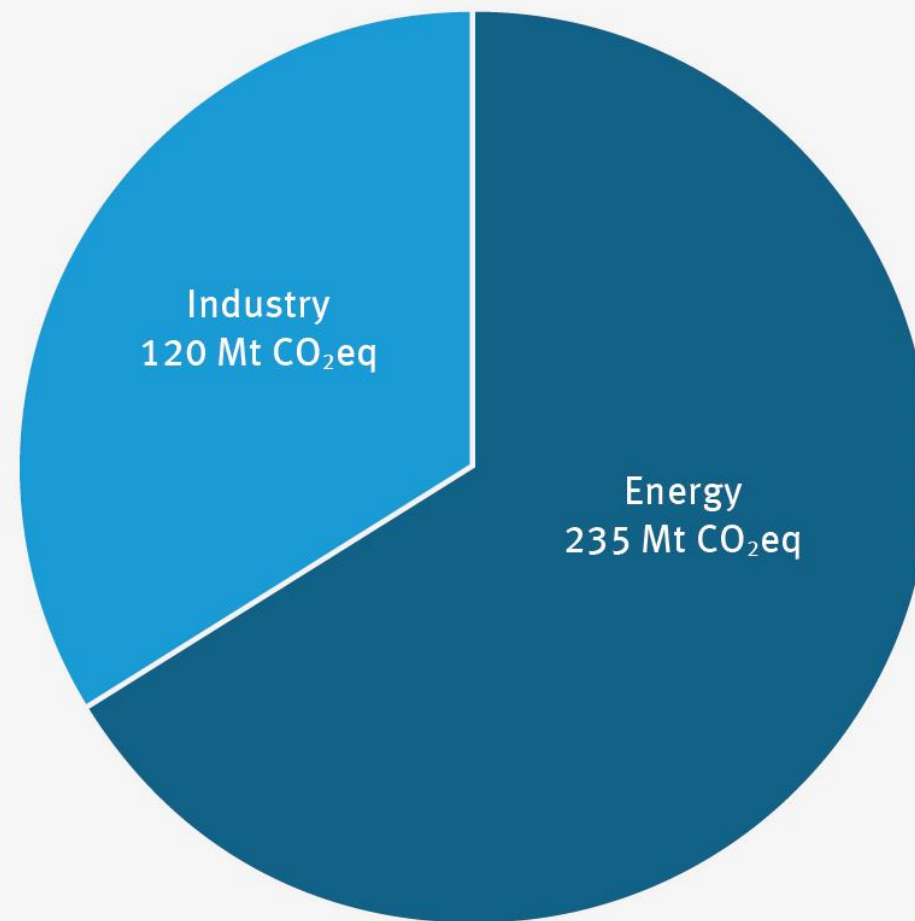
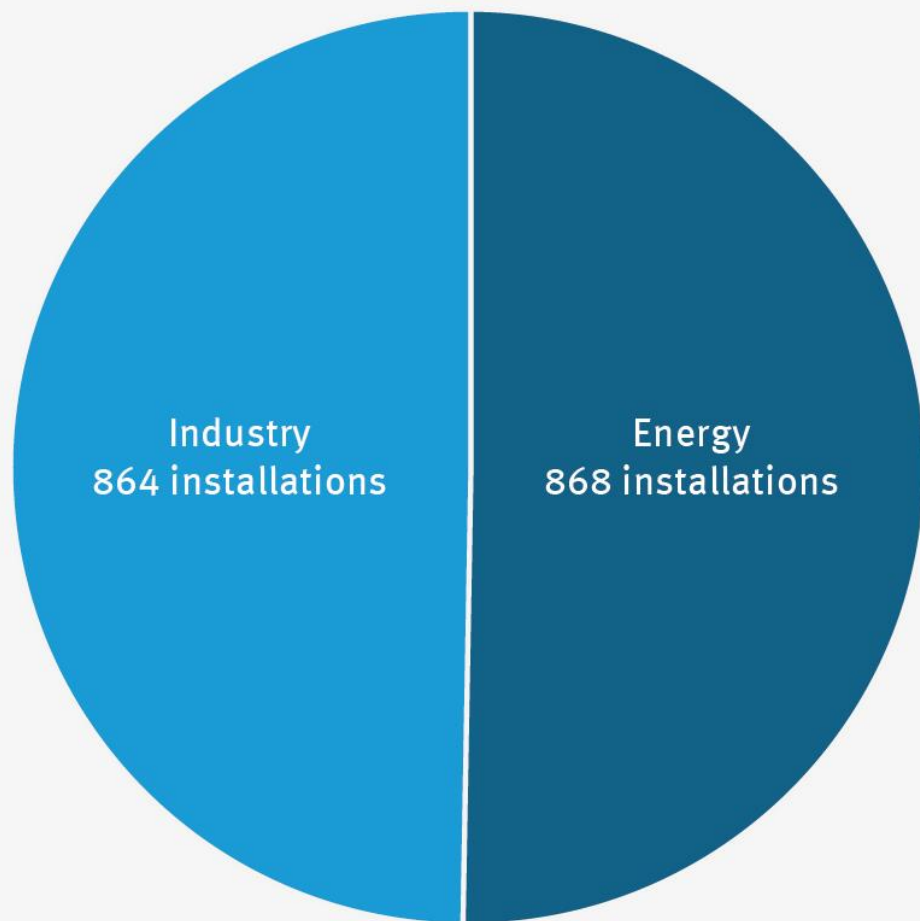
- How many and what kind of installations are included
- Energy/Industry
- Where to settle the task/Roles of Ministry

How many installations are included?

Sectors, size, emissions

- 1700 installations in Germany , >20 MW (in some cases production capacity), CO2 Emissions
- Nitrous oxides from 2013 on included
- Sectors: Power and heat generation, oil refineries, steel works, production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard
- Acids and bulk organic chemicals were added in 2018.

Installations and Emissions under German regime in 2023



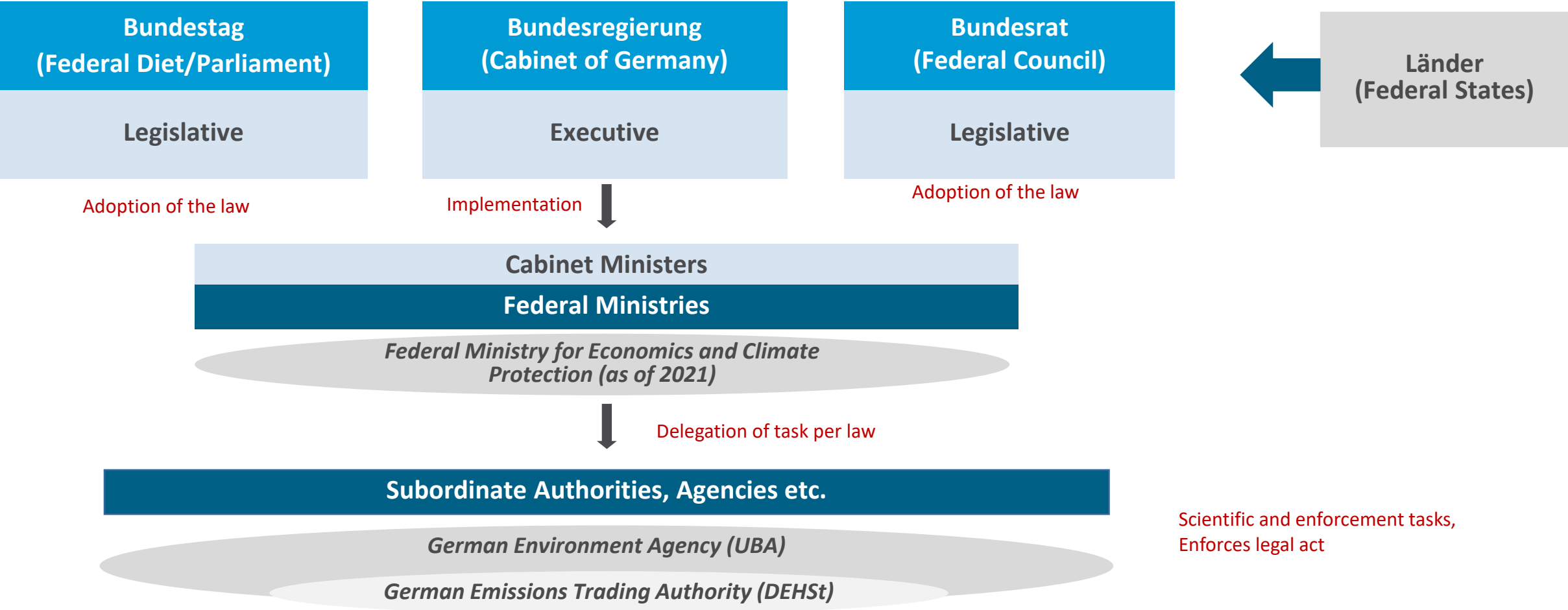
Where to settle the new task I

- Generally, the Federal States (Länder) are responsible for enforcing environmental law. **However, the German Emissions Trading Authority (DEHSt) was founded on the federal level in 2003 to enforce the EU ETS.**
- This **division of tasks was controversial in the beginning of the EU ETS**, but Germany wanted to centralise the enforcement. This turned out to be reasonable because of the **equal treatment of facilities**.
- A private –public entity was not considered because we have the **principal structures for enforcement of laws in various federal agencies** already (altogether 120 FAs, e.g. the UBA). Also the task is „sovereign“ and was considered so important (and extensive) that the government wanted to have the enforcement „close-by“.
- The Ministries in Germany are per law only in exceptional cases responsible for enforcement tasks (e.g. high political meaning). However this is different in other countries and might be manageable as well.

Where to settle the new task II

- After that decision, UBA was asked by the Ministry of Environment to **set up a new division (DEHSt) for the EU ETS**.
- The UBA/DEHSt is independent with the actual enforcement from the Ministry. However, there is a **legal and functional supervision by the Ministry** (= „appropriate action“ has to be supervised, comprises e.g. instructions for information or the set up of new units) Common practice shows a good cooperation without actual control.
- **Jour fixe every 6 weeks** with the involved colleagues: All current questions/problems/tasks are discussed. A direct order is possible, but was very rarely placed in the past.

Roles of Ministry and subordinate Agencies



Structural questions



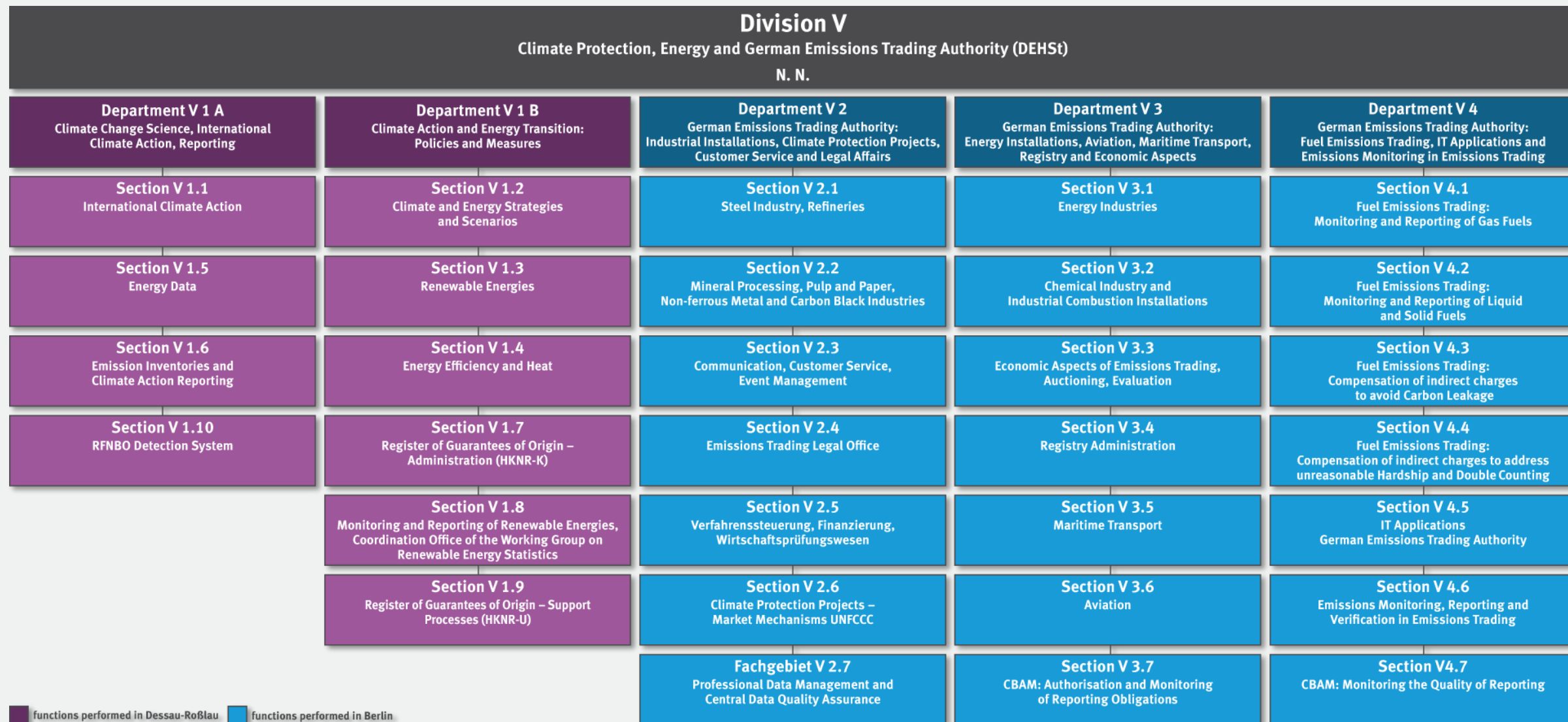
Structural questions

- How many units/divisions
- What kind of professionals
- Calculation of expenses (example)

Structural Questions

- Energy sector : 2 units
- Industry sector: 2 units
- Communication unit
- Legal unit
- IT unit (e –governance decision)
- Finance and administration procedures unit
- Registry unit
- Auctioning and economic aspects unit
- Later: aviation, maritime units, CDM, currently 2 CBAM units
- > altogether now 3 departments, financed by revenues of EU ETS

Division V



What kind of professionals and how many do we need?

- Every sector mirrors at least one professional employee
- Compliance cycle and number of installations account for estimation of employees
- We started with 100 employees (now around 250)
- Professions in DEHSt (e.g.): chemist, biologist, environmental engineer, resource manager, mathematician, mechanical engineer, industrial engineer, energy engineer, environmental process engineer, bio pharmacist, lawyer
- Thinking through the process of one installation (compliance cycle):
 - Approval of Monitoring plan (one year before each trading period)
 - Examination of application for certificates (via Templates)
 - Issuance of administrative acts for each applicant/coordination of auctioning
 - Objections and lawsuits against acts – legal department (up to now 8000 legal proceedings over all trading periods)
 - Examination of certified emissions – annually
 - Enforcement (sanctions)
 - Management of German accounts -Registry

Calculation of expenses

Example of annual tasks for installation engineers

- Calculation of tasks (compliance cycle – 4 annual tasks) x number of installations (1.700) = case count (6.800 processes)
- Expense per process (e.g. examination of certified emissions): 4 -8 hours (average 6 hours)
- 24 hours (all tasks) x 1700 installations = 40.800 personnel hours annually
- 1 personell year = 1.340 personell hours
- = 30 employees (account for expenses depending on annual income levels)

E-governance/ outsourcing tasks



E-governance/ outsourcing tasks

Outsourcing of IT (examples):

1. Process and communication via Templates > development of a tool > **FMS (Formular Management System)**
bidding process was short because of framework treaty with Federal government (IT contractors).
One template takes 3-12 months to develop, depending on complexity of application
Ongoing task > for every new mechanism we need new templates
2. **Electronic file management** > licence > **Domea** (existed already)
now mostly just updates/internal adjustments
3. For both tools external hosts, however our employees also have support (of users) and training tasks

FMS (Formular Management System)

Zuteilungsdatenbericht nach Art. 3 AnpVO

Betrieb der Anlage

Erfolgte die Aufnahme des Betriebs im Berichtsjahr?

☐ ja ☒ nein

Datum der Aufnahme des Betriebs

Erläuterung zur Aufnahme des Betriebs

 Die Angaben zur Aufnahme des Betriebs sind ...

☒ zutreffend ☐ nicht zutreffend

War die Anlage im Berichtsjahr im Betrieb?

☒ ja ☐ nein

 Die Angaben zum Betrieb der Anlage im Bezugszeitraum sind ...

☒ zutreffend ☐ nicht zutreffend

 Anmerkungen zum Betrieb der Anlage

Der Betrieb der Anlage hat sich innerhalb des Bezugszeitraums nicht wesentlich geändert. Die Schwankungen zwischen den Jahren sind nachvollziehbar und liegen im zu erwartenden Bereich.

Teilung oder Zusammenlegung von Anlagen

Der Zuteilungsdatenbericht wird aufgrund einer Zusammenlegung bzw. Teilung dieser Anlage neu eingereicht.

☐ ja ☒ nein

Datum der Teilung bzw. Zusammenlegung

Beschreibung der Teilung bzw. Zusammenlegung

 Die Angaben zur Teilung bzw. Zusammenlegung sind ...

☐ zutreffend ☐ nicht zutreffend ☒ entfällt

Arbeitsgruppen

Aktenbestandsverzeichnis

Default PC (Default PC/Default Process Class)

Deutsche Emissionshandelsstelle (DEHS) (1/Deutsche Emissionshandelsstelle (DEHS))

10000 (10000/Allgemeine Aufgaben der DEHS)

11000 (11000/Recht)

11100 (11100/Allgemeines)

11110 (11110/Rechtsfragen beim Aufbau der DEHS)

11200 (11200/Europarecht, Völkerrecht)

11300 (11300/Treibhausgas-Emissionshandelsgesetz und Verordnungen)

11400 (11400/Gesetze zum nationalen Allokationsplan)

11500 (11500/Sonstiges Bundesrecht)

11600 (11600/Vfidspruchverfahren)

11700 (11700/Klageverfahren)

11800 (11800/F-E Vorhaben)

11900 (11900/Sonstige Rechtsfragen)

12000 (12000/BEHG)

13000 (13000/Registrierung)

13100 (13100/Rechtliche Grundlagen)

13200 (13200/IT - Angelegenheiten des Registers)

13300 (13300/Zusammenarbeit mit dem ITL (UNFCCC))

13400 (13400/Zusammenarbeit mit dem CITL (EU))

13500 (13500/Zusammenarbeit mit anderen Registern)

13600 (13600/Kontoverwaltung)

13700 (13700/Verwaltung der Emissionshandelszertifikate)

13800 (13800/Daten Backup - Emissionshandelsregister)

13900 (13900/BEHG - Register)

14000 (14000/Vollzug Anlagen)

14001 (14001/Technische Normen)

14010 (14010/Antragsverfahren)

14020 (14020/Überwachung)

14100 (14100/Allgemeines)

14200 (14200/Industrieanlagen)

14210 (14210/Raffinerie)

14220 (14220/Eisen & Stahl)

14230 (14230/Zement)

14240 (14240/Kalk)

14250 (14250/Glas)

14260 (14260/Keramik)

14270 (14270/Zellstoff)

14280 (14280/Papier)

14290 (14290/Black Carbon)

14300 (14300/Energiewirtschaft)

14310 (14310/Anlagen gem. Anhang 1 Ziff. I - III TEHG)

14320 (14320/Anlagen gem. Anhang 1 Ziff. IV TEHG)

14330 (14330/Anlagen gem. Anhang 1 Ziff. V TEHG)

14340 (14340/CCS-Tätigkeiten)

14400 (14400/Anlagenfonds)

14500 (14500/Anträge auf Feststellung hinsichtlich der Emissionshandelspflicht)

14600 (14600/weitere stationäre Anlagen)

14700 (14700/Industrie)

15000 (15000/Vollzug Personen)

16000 (16000/IT - Anwendungen)

17000 (17000/Statistik, Berichte, Wissenschaftliche Fragen)

18000 (18000/Joint Implementation / Clean Development Mechanism / Upstream)

19000 (19000/Sonderaufgaben)

Druck und Export (Druck und Export/Druck und Export)

FE (Früherung/Früherung)

Akten/Geschäftszeichen	Akten/Vorgangsbetreff	Prozess	Erstellt am	Ersteller	Aktenplaneintrag	Ist Ko.	Dok.	Akten...	Konto...	Id A.	Recht.	z dA
14200/0	Allgemeines	DEH...	07.11.2005	Aktenübernahme	Industrieanlagen		0					
14200/1	Raffinerie - Allgemeines	DEH...	07.02.2008	Registrieren	Industrieanlagen		1					
14200/2	Eisen/Stahl - Allgemeines	DEH...	07.02.2008	Registrieren	Industrieanlagen		1					
14200/3	Zement - Allgemeines	DEH...	07.02.2008	Registrieren	Industrieanlagen		1					
14200/4	Kalk - Allgemeines	DEH...	07.02.2008	Registrieren	Industrieanlagen		1					
14200/5	Glas Allgemeines	DEH...	07.02.2008	Registrieren	Industrieanlagen		1					
14200/6	Keramik - Allgemeines	DEH...	07.02.2008	Registrieren	Industrieanlagen		1					
14200/7	Zellstoff - Allgemeines	DEH...	07.02.2008	Registrieren	Industrieanlagen		1					
14200/8	Papier - Allgemeines	DEH...	07.02.2008	Registrieren	Industrieanlagen		1					
14200/9	Black-Carbon - Allgemeines	DEH...	07.02.2008	Registrieren	Industrieanlagen		1					
14200/10	Cracker - Allgemeines	DEH...	07.02.2008	Registrieren	Industrieanlagen		1					
14200/11	Wärmewärme - Allgemeines	DEH...	07.02.2008	Registrieren	Industrieanlagen		1					
14200/12	Steinwolle - Allgemeines	DEH...	07.02.2008	Registrieren	Industrieanlagen		1					

DOMEA

opentext

Aktenbestandsverzeichnis für Aktenklasse Industrieanlagen

fritz

domeaserver.uba.intra:3466

09:44
09.11.2023

Thank you for your attention!

Karin Fritz

E-Mail: emissionshandel@dehst.de

Internet: www.dehst.de

This presentation is based on a speech held by the German Emissions Trading Authority (DEHSt) and is not clear for publication. Check against delivery.
References and quotations from the presentation must at all times be approved in written form by the DEHSt.



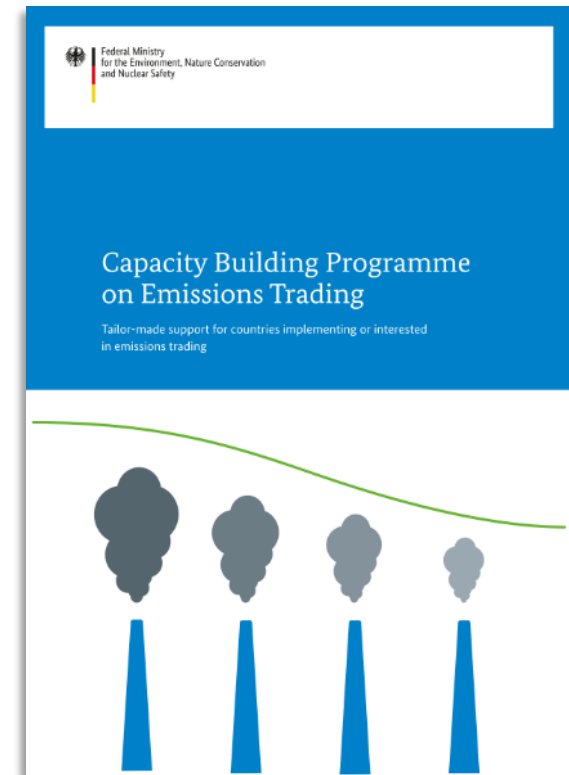
The EU ETS: Main elements and latest developments

ETS Training Taiwan, 24 June 2025

Dr. Baran Doda, adelphi

About the Programme (I)

- International dissemination of basic ETS knowledge and best practices supporting selected countries in designing national ETS or installation based MRV.
- Practical experiences from the EU ETS and Germany as a starting point for developing and implementing own ETS.
- Expert consultations on specific issues to support countries during implementation of ETS.
- Phase I (2011-2013); Phase II (2013-2017), Phase III (2018-2022), Phase IV (from 2023)



About the Programme (II)

Programme by:



Division KB II: „Climate Legislation,
Emissions Trading“

In cooperation
with:



Consortium:



Partner Programmes:



Other partners:

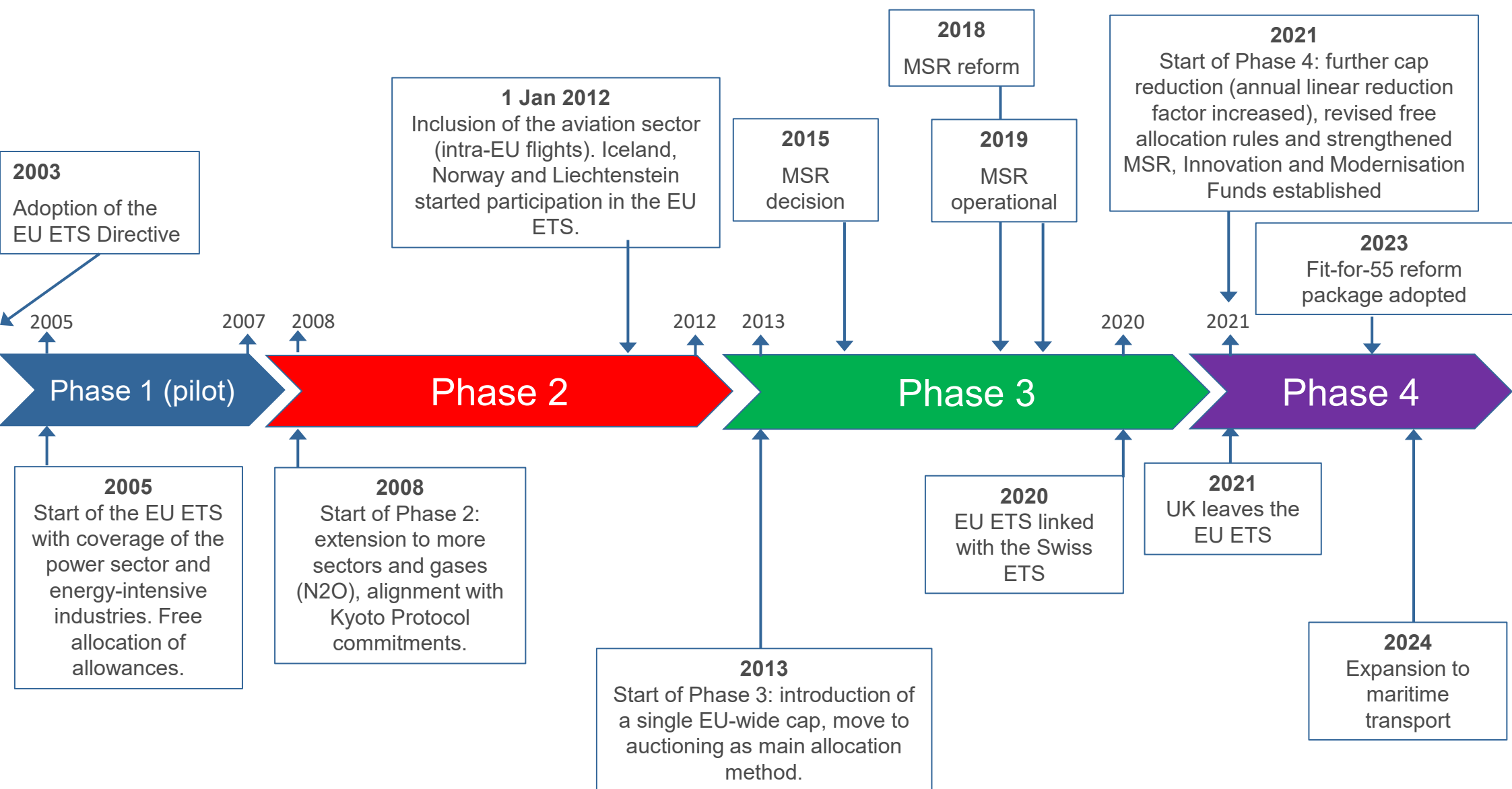


International Carbon
Action Partnership



1. Key milestones in the implementation of EU ETS
2. Scope and coverage of EU ETS
3. Cap setting in EU ETS
4. Allocation of EUAs
5. Revenue use in EU ETS
6. Market stability in EU ETS: MSR
7. Linking with other ETSs
8. Reviews and revisions

Key milestones in the implementation of EU ETS



Scope and coverage in EU ETS (I)

Gases

- Initially, the EU ETS focused on CO₂
- N₂O and PFCs from some industrial activities were added in phase III.

Point of regulation

- Downstream

Sectors

- Energy:** Power and heat generation
- Industry:** Energy-intensive sectors including oil refineries, coke ovens, iron and steel, aluminium, metals, gypsum, nitric cement, lime, glass, bricks, ceramics, pulp, paper, cardboard, acids, and bulk organic chemicals, petrochemicals, ammonia
- Civil aviation:** intra-EEA flights
- Maritime (from 2024):** large vessels entering EU ports



The EU ETS currently covers 11,000+ installations.

Scope and coverage in EU ETS (II)

Thresholds

- **Energy:** 20 MW annual thermal capacity per installation
- **Industry:** Varying thresholds for different sectors; small installations with fewer than 25,000t CO₂/year may be excluded
- **Civil aviation:** 10,000t CO₂/year for commercial aircraft operators and 1,000t CO₂/year for non-commercial aircraft operators
- **Maritime (from 2024):** vessels of at least 5,000 gross tonnage (general cargo vessels and off-shore vessels between 400-5,000 gross tonnage will be reviewed for EU ETS inclusion in 2026)

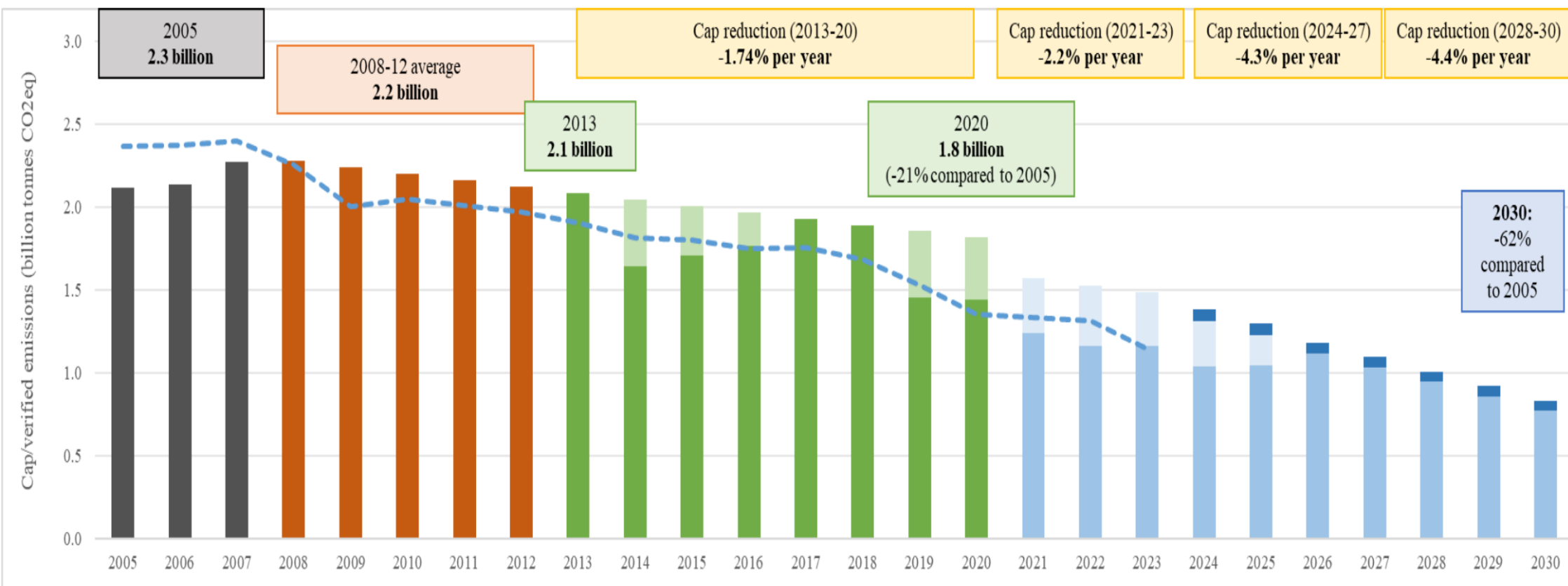


The EU ETS currently covers 11,000+ installations.

Cap-setting in EU ETS

EU ETS cap for 2024: **1.386 billion allowances**; inter-EEA aviation emissions capped at **27.6 million allowances**

Maritime transport is covered under the EU ETS cap since 2024. The 2024 cap was increased by 78.4 million allowances based on the sector's average emissions reported for 2018 and 2019 (marked in dark blue).

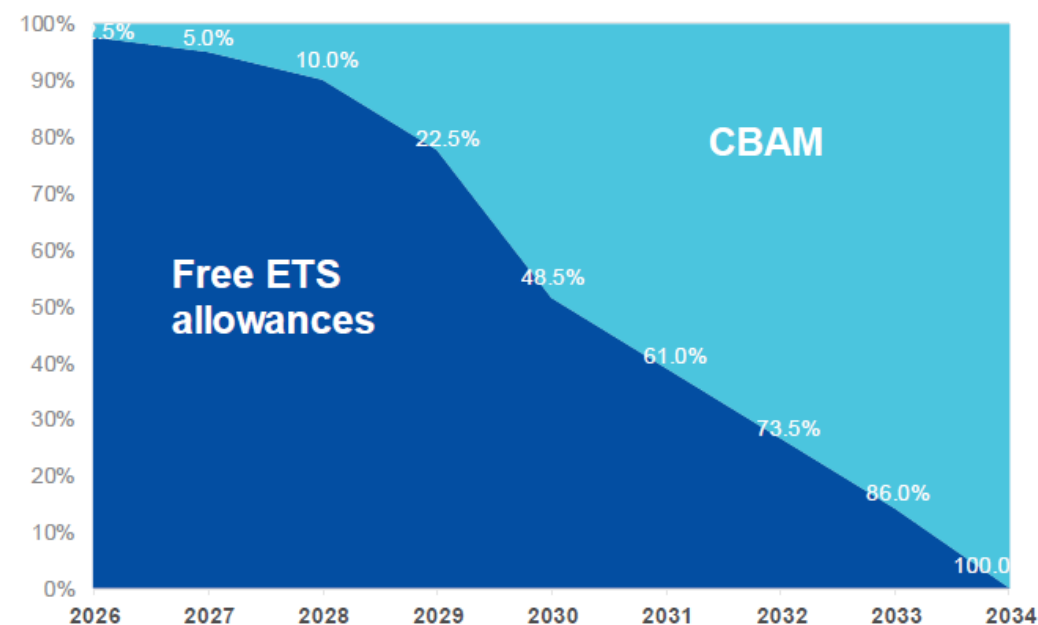


Allocation of EUAs: auctioning

- Auctioning is the default method of distributing allowances, accounting for up to 57% of the cap.
- Of the share of allowances to be sold, 90% are distributed to Member States based on their share of verified emissions, with 10% distributed among the lower-income Member States under the solidarity provision.
- Uniform price auctions with single rounds and sealed bids, conducted daily by EEX.

Allocation of EUAs: free allocation & CBAM

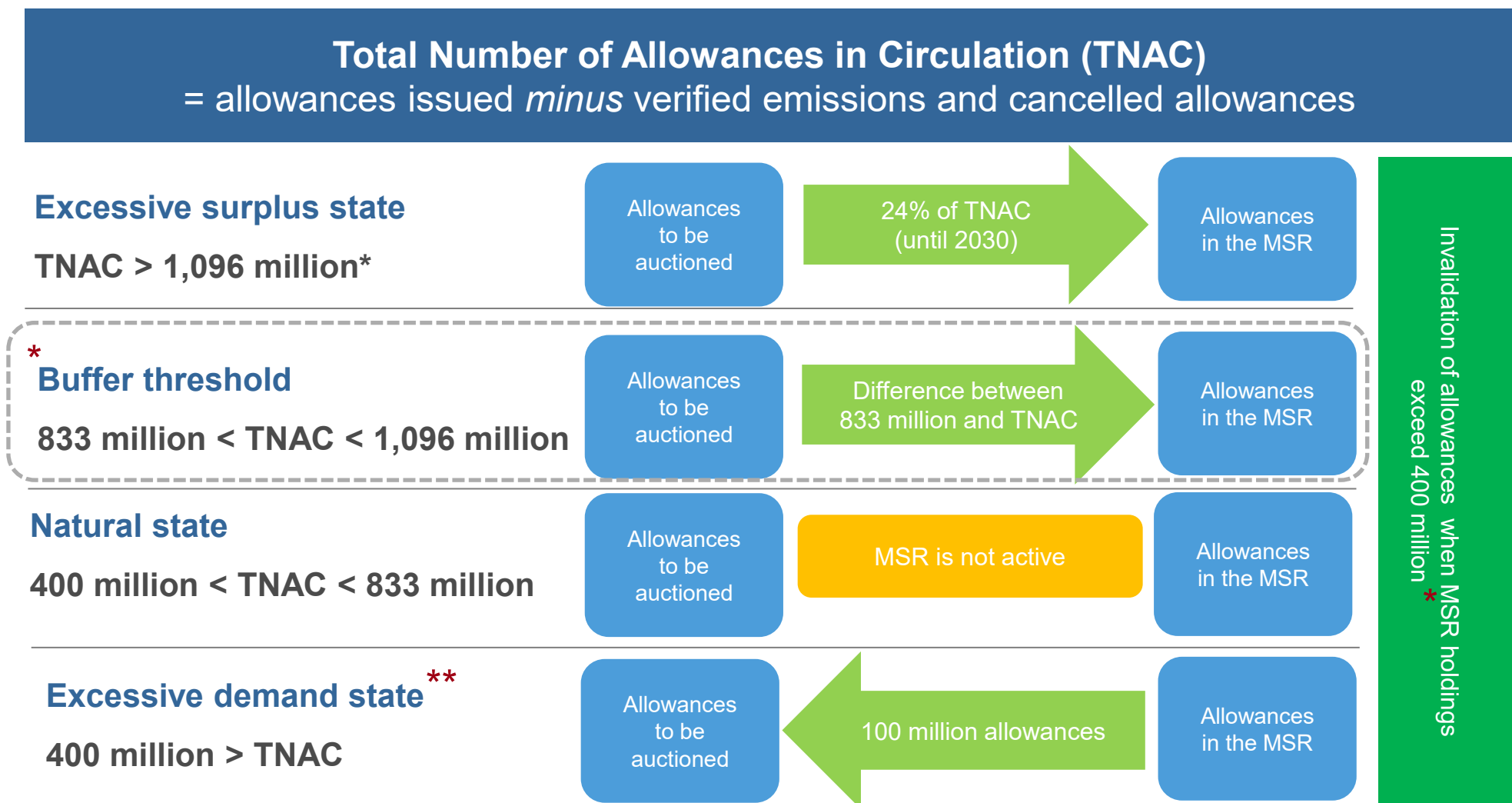
- A significant volume of allowances is allocated for free to address the risk of carbon leakage, based on sectors-specific performance benchmarks.
- Benchmark values are updated twice in Phase 4 to reflect technological progress in different sectors.
- An annual reduction rate is determined for each benchmark. For the steel sector, which faces high abatement costs and leakage risks, a fixed reduction rate applies.
- Free allocation to specific sectors will be gradually phased out from 2026 to 2034, in parallel to the phase-in of the EU's CBAM for third-country imports.
 - Covered sectors: iron and steel, cement, aluminium, fertilizers and hydrogen.



Revenue use in the EU ETS

- Revenue from the auctioning of allowances under the EU ETS accrues primarily to national budgets
- As of June 2023, countries are required to use all ETS revenue (or an equivalent financial value) to support climate action and energy transformation
- EU Member States can use their ETS revenue to finance state aid to certain electricity-intensive industries to compensate for the additional electricity costs they face as a result of the carbon price pass through
- A share of EU ETS allowances is auctioned to supply two funds established to support decarbonization and modernisation investments in ETS sectors.
 - **Innovation Fund:** provides grants to support the commercialization of innovative low-carbon technologies and industrial solutions, helping to drive Europe's transition to climate neutrality.
 - Its estimated budget is up to EUR 40 billion (USD 43.3 billion) until 2030, depending on the EUA price.
 - **Modernization Fund:** a solidarity programme financed by the EU ETS that supports lower-income Member States in modernizing energy systems and improving energy efficiency for a just transition to climate neutrality.
 - It has an estimated budget of EUR 56 billion (USD 60.6 billion) from 2021 to 2030, distributed among beneficiary countries based on a fixed allocation key.

EU ETS Market Stability Reserve (MSR)



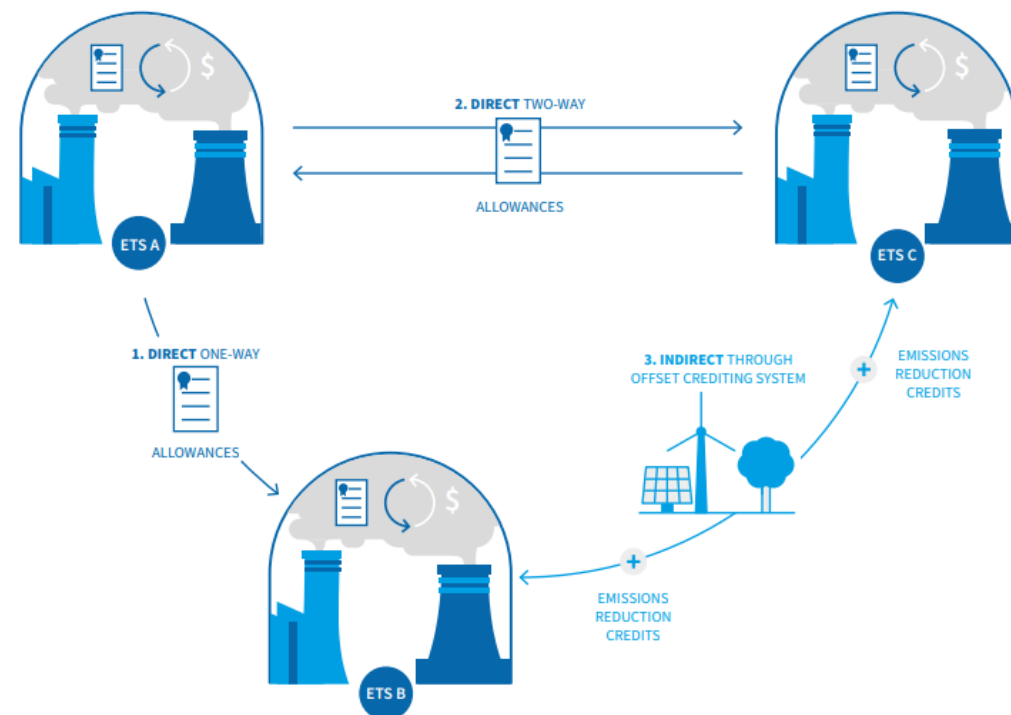
* Changes introduced with the Fit-for-55 legislative package that was adopted in 2023.

Source: Based on PMR & ICAP 2021

** Article 29a also releases allowances from the MSR when certain conditions are met.

Linking EU ETS with other carbon markets

- Linking ETSs enables allowances (and offset credits, where permitted) issued in one jurisdiction to be used for compliance in another one.
- EU ETS - Norway ETS link in Phases 1 and 2
 - Norway ETS Merged into EU ETS from Phase 4
- EU ETS and Swiss ETS have been linked since 2020.
 - Negotiations
- EU-UK Announcement in May 2025
 - Process to link with UK ETS to start soon

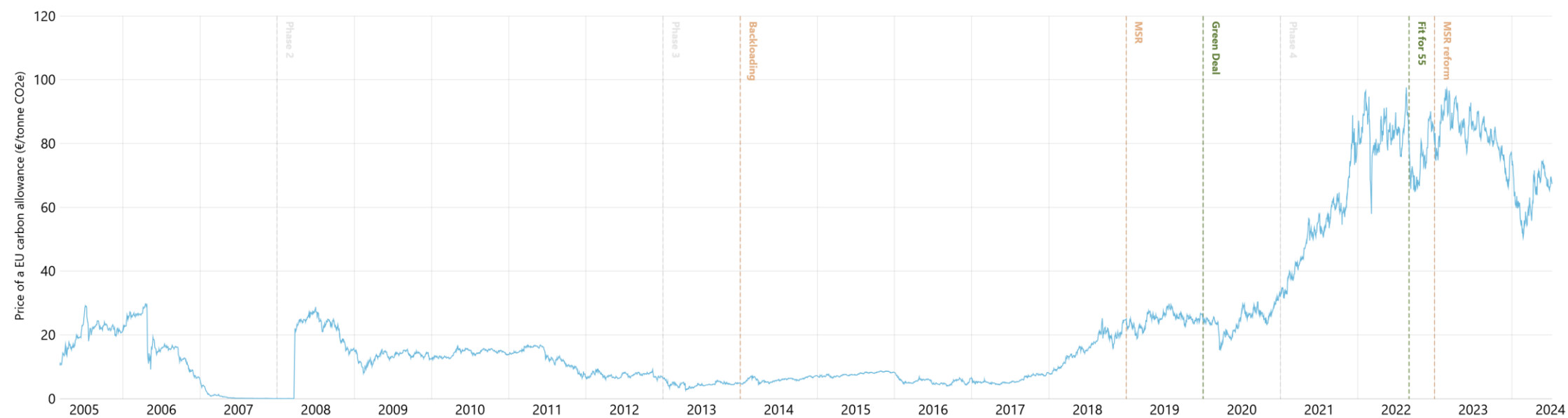


Reviews and revisions of the EU ETS

- EU Commission publishes annual reports on the functioning of the European carbon market
- ETS Directive stipulates that the system is kept under review in light of the implementation of the Paris Agreement and the development of carbon markets in other major economies.
- Three major EU ETS reviews — before Phase 3, before Phase 4, and in the context of increasing the EU 2030 climate target — have been conducted to date.
- Next review is due until July 2026, focusing on MSR, carbon leakage, the integration of negative emissions (removals) and other elements

A final thought: EUA price evolution 2005-2024

Figure 1: EU Carbon allowance price evolution





For more information please contact:

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Energy (BMWE):

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Marius Kaiser
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Marius.Kaiser.EXTERN@bmwe.bund.de

Iryna Holovko / Leon Heckmann
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10559 Berlin

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heckmann@adelphi.de

Further reading and information

European Commission:

https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en

German Federal Ministry for Economic Affairs and Energy (BMWE):

<https://www.bmwk.de/Redaktion/EN/Artikel/Energy/emissions-trading.html>

German Emissions Trading Authority (DEHSt):

http://www.dehst.de/EN/Home/home_node.html

International Carbon Action Partnership (ICAP):

<https://icapcarbonaction.com/>

GHGs included in the EU ETS:

- Carbon dioxide (CO₂),
- Nitrous Oxide (N₂O)
- Perfluorocarbons (PFC)

Sectors affected by the ETS

Affected sectors:

- Thermal power plants (if capacity of over 20 MW)
- Iron and steel smelting,
- Coking plants, refineries and crackers,
- Cement and lime production,
- Glass, ceramics and brick industries,
- Paper and cellulose production,
- Chemical industry,
- Non-ferrous metals,
- Other incineration,
- Mineral processing industry

BACK UP SLIDES

Cap and allocation of allowances

Since 2013 :

- EU-wide cap and centralized allocation
- From 2021 to 2030, linear reduction factor of total emissions cap of 2.2% per year.
- Auctioning as default allocation method

Allocation rules:

- Auctioning
- Free allocation
- Support of sectors with risk of „carbon leakage“
- Use of CER & ERU.
 - Not possible anymore after 30.4.2021 !

Allocation of Allowances

Allocation of EUA by auction

- increasing amount

Free allocation

- **Free allocation according to the principle of best available technology (“benchmark”)**
 - Defined by average performance of the 10% most efficient plants
 - Only energy-intensive plants
- **Carbon leakage prone industry:**
 - From 2021 to 2030: 100% free allocation according to benchmarks
- **Non-carbon leakage prone industry:**
 - 1st allocation period (2021-2025): 30% free allocation according to benchmarks
 - 2nd allocation period (2026-2030): Free allocation decreasing from 30% to 0% by 2030

About to come: CBAM

- ➔ Phase out of free allocation to covered sectors
- ➔ From 2026 to 2034: gradually reduced amount of free allocation

Monitoring, Reporting and verification

Monitoring and reporting of GHG Emissions

- Annual submission of reports, recording emissions during the preceding year
- Description of the installation monitored and its performed activities

Object of verification:

- Emissions report based on the approved monitoring plan
- Verification of the monitoring report by an accredited independent authority
- Unless a report has been accepted as satisfactory: no possibility for transfers of allowances



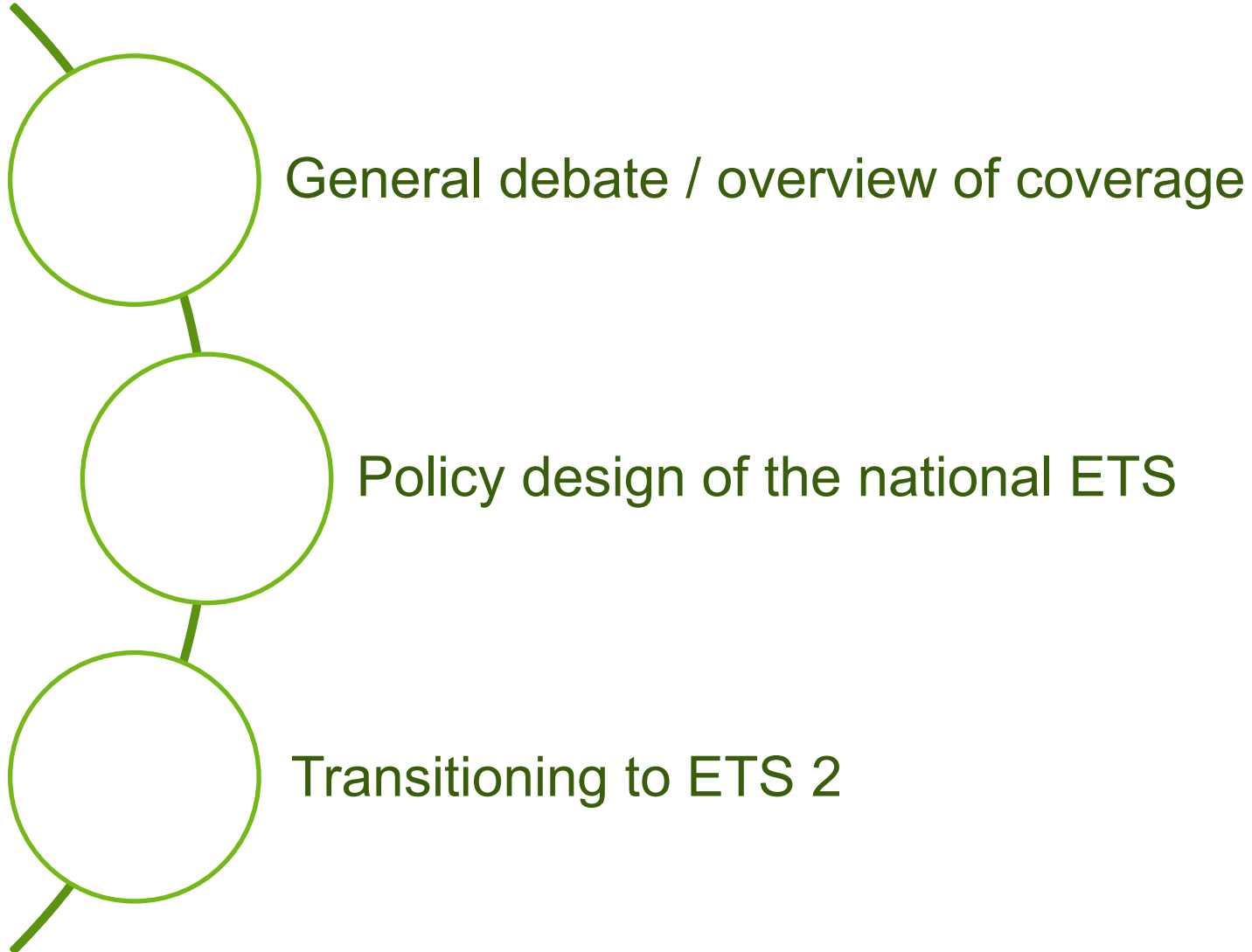
Overview of the German National ETS

German and EU ETS latest developments and outlook
25.06.2025

Dr. Daniel Detzer



Outline





Overview of the German National ETS

GENERAL DEBATE / OVERVIEW OF COVERAGE



General debate and framing

Climate protests of 2019

EP elections 2019, Green agenda gaining momentum

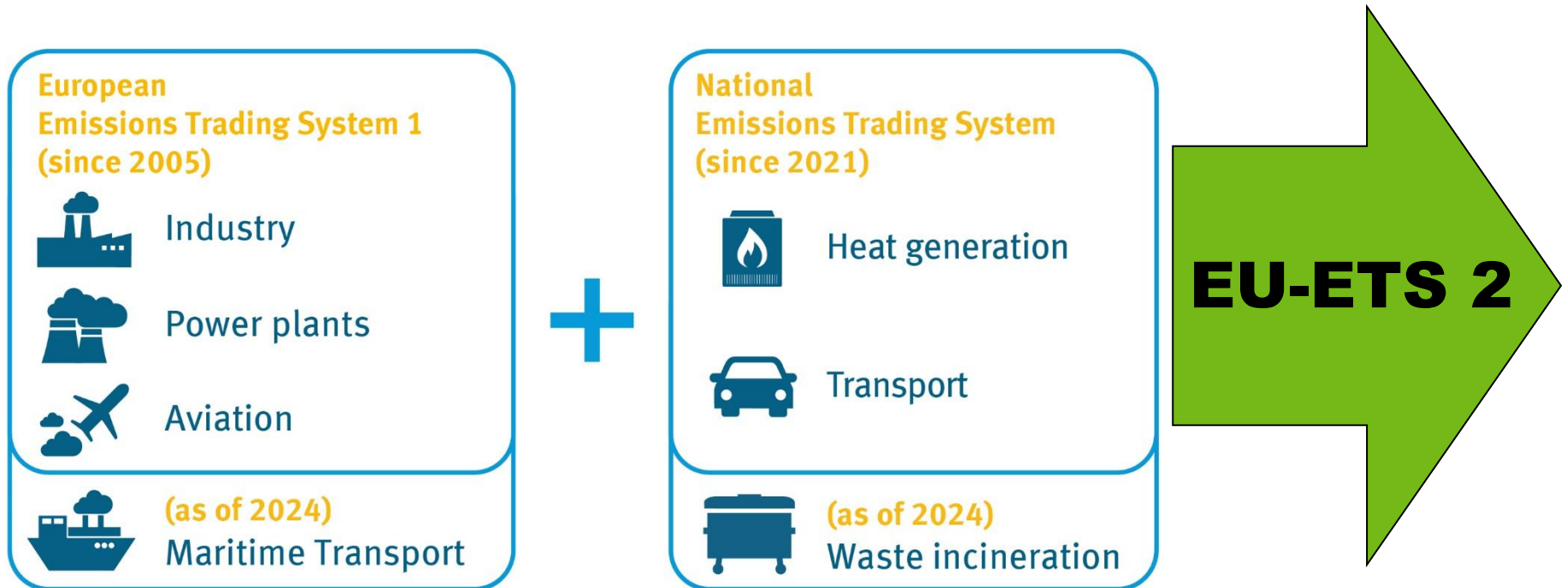
Debate on a **comprehensive climate package in DE** end of 2019

Introduction of Fuel Emissions Trading System (**Fuel ETS**) **by 2021** in DE

Emissions Trading System for Heat and Transport (**EU ETS-2**) **by 2027** as part of **Fit-for-55-Package**



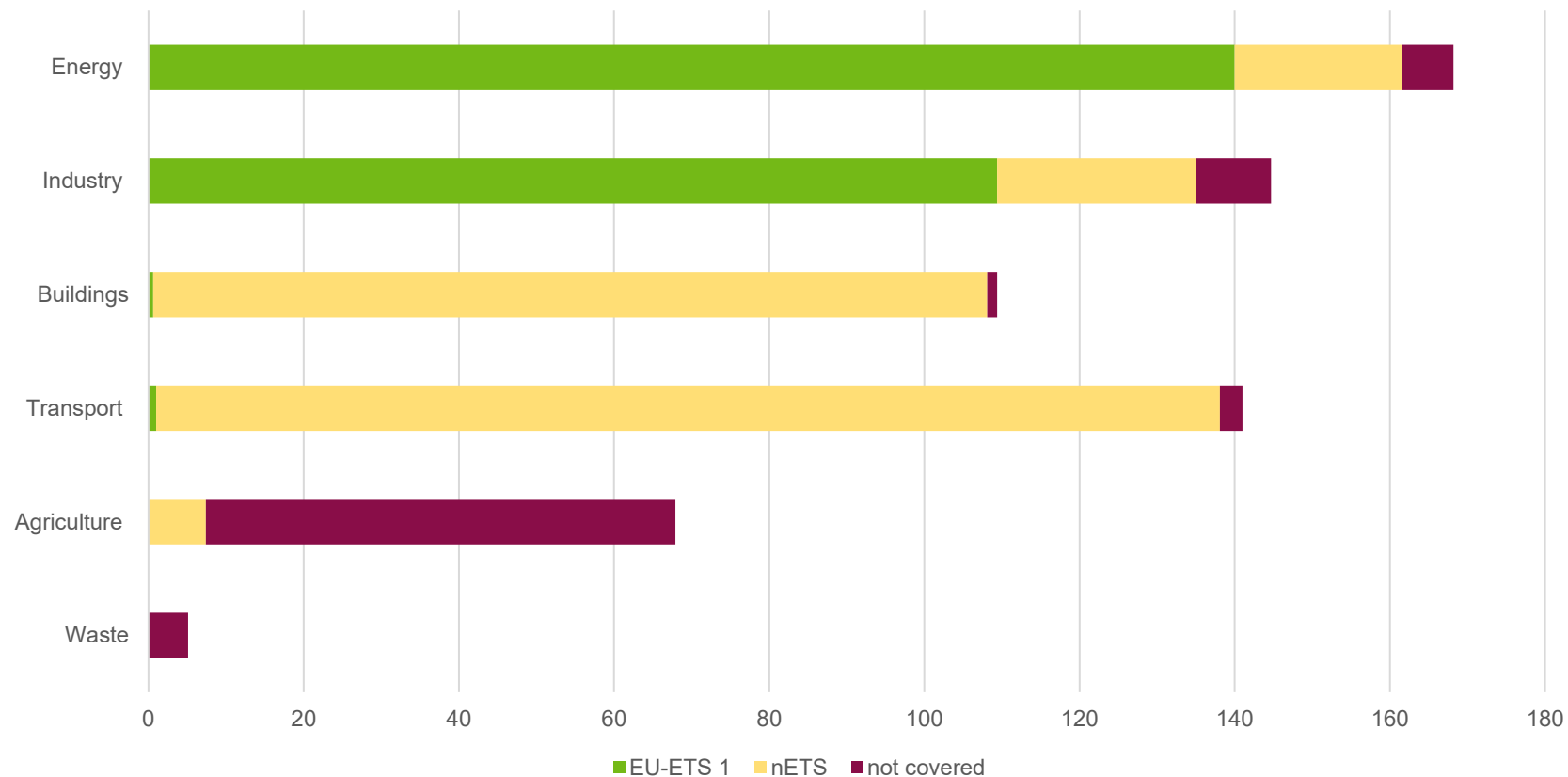
~85% of emissions covered by emission trading schemes





~85% of emissions covered by emission trading schemes

Emissions 2025 in Mt. CO₂-Äq. (2025)





Overview of the German National ETS

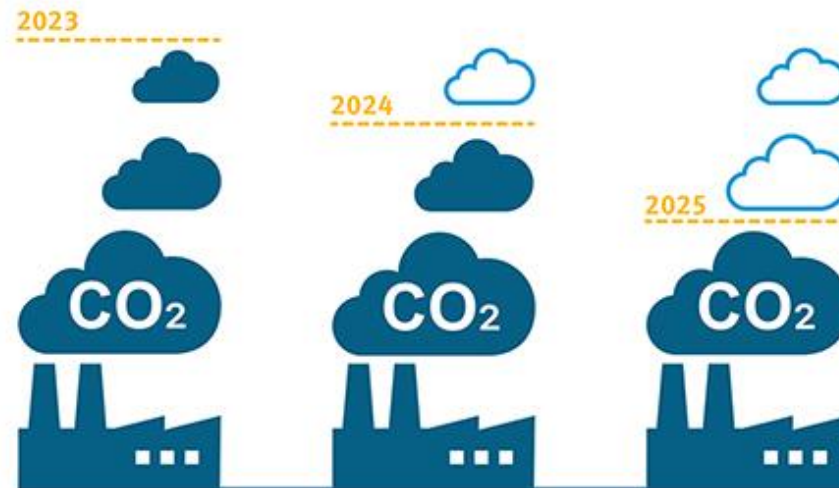
POLICY DESIGN OF THE NATIONAL ETS



Policy design: Building a Fuel ETS

General idea: Set a **cap on emissions** based on climate goals, **auction** these allowances, **decrease** the cap annually, establish an increasing **CO₂-price**

Decreasing cap*, decreasing CO₂ emissions



* Cap = greenhouse gases that may be emitted by all participants



Policy design: Building a Fuel ETS

Upstream system:
Distributors must purchase emission allowances for each ton of CO₂ released. The CO₂ price can be passed on along the supply chain to the end consumer.

European
Emissions Trading System
Downstream



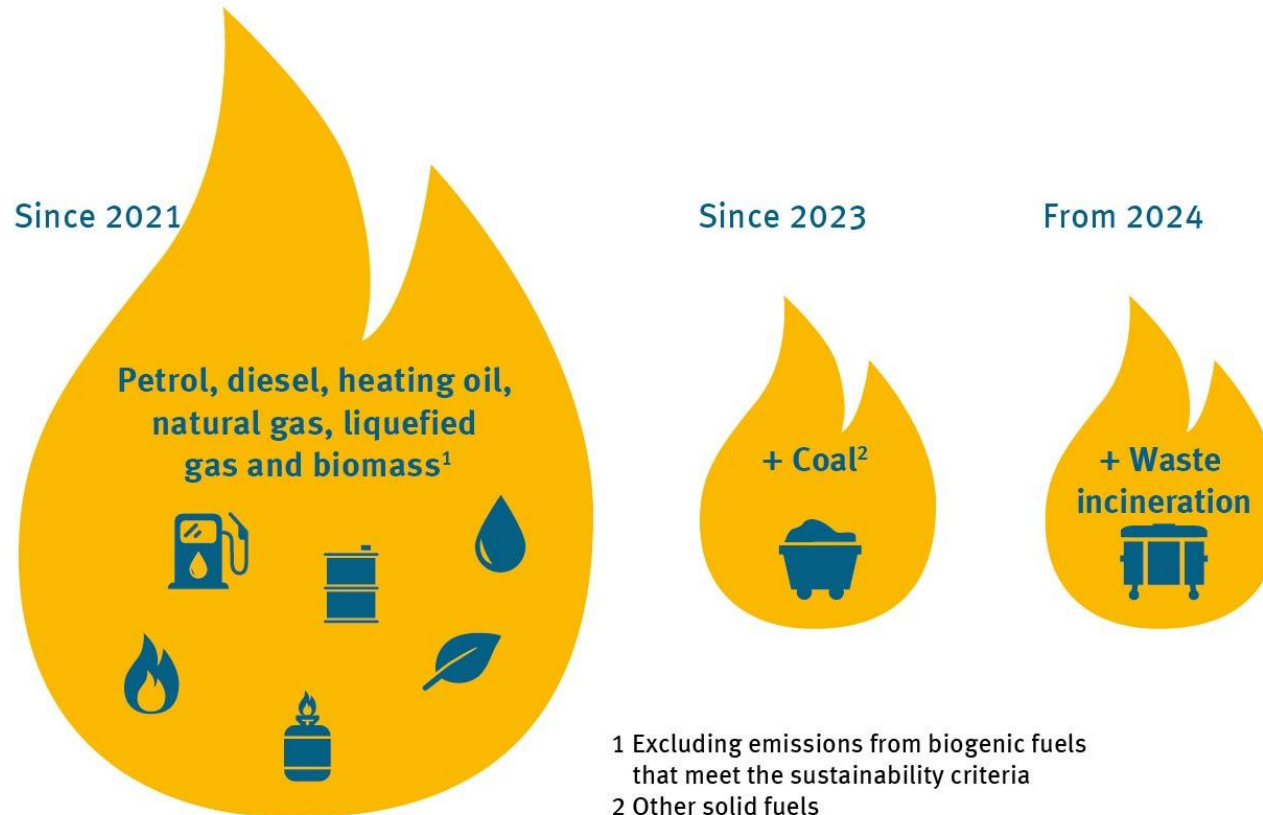
Upstream
National
Emissions Trading System





Policy design: Scope

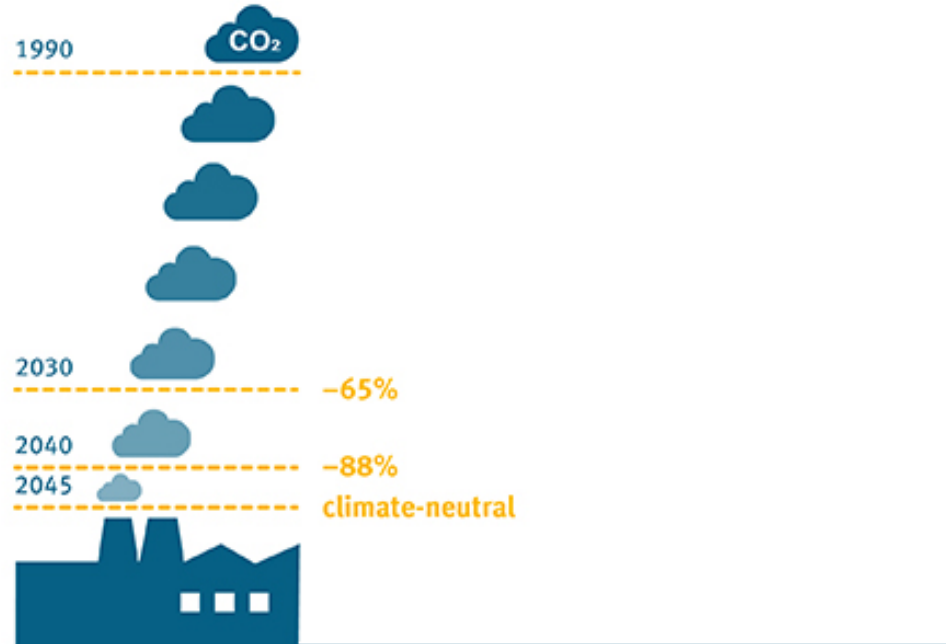
Fuels in the National Emissions Trading System





Policy design: Cap-Setting

The Cap is derived from the German reduction target under the EU-Effort Sharing Regulation



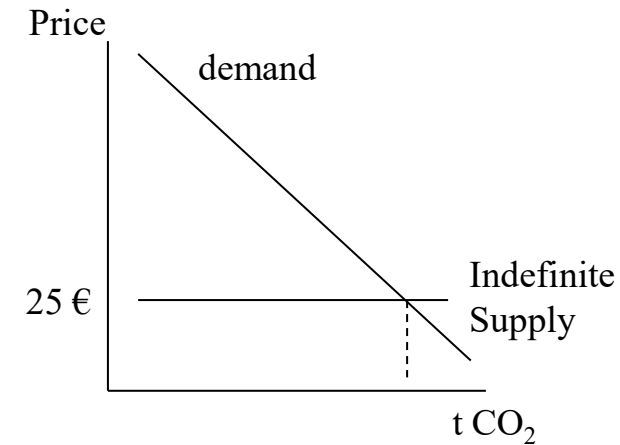
<u>Year</u>	<u>nETS-Cap in t</u>
2021	301 037 178
2022	291 116 621
2023	280 149 525
2024	275 998 949
2025	260 092 203
2026	254 774 703
2027	236 220 646
2028	217 666 514
2029	199 112 382
2030	180 558 250



Policy design: Rising price path

Introduction phase

- fixed prices until 2025
- price corridor in 2026



Adjustment in accordance with the Budget Financing Act (Haushaltsfinanzierungsgesetz) 2024





Emissions exceed cap in introductory phase

<u>Year</u>	<u>nETS-Cap in t</u>	<u>Emissions / prognosis</u>
2021	301 037 178	306 500 000
2022	291 116 621	288 500 000
2023	280 149 525	282 800 000
2024	275 998 949	290 500 000
2025	260 092 203	282 400 000
2026	254 774 703	274 900 000
2027	236 220 646	
2028	217 666 514	
2029	199 112 382	
2030	180 558 250	



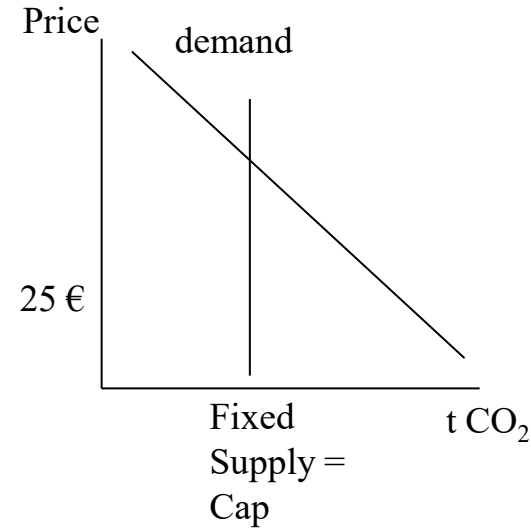
Policy design: Rising price path

Introduction phase

- fixed prices until 2025
- price corridor in 2026

Full fledged emission trading

- free market prices from 2027



Adjustment in accordance with the Budget Financing Act (Haushaltsfinanzierungsgesetz) 2024





Revenues and effects on consumer prices

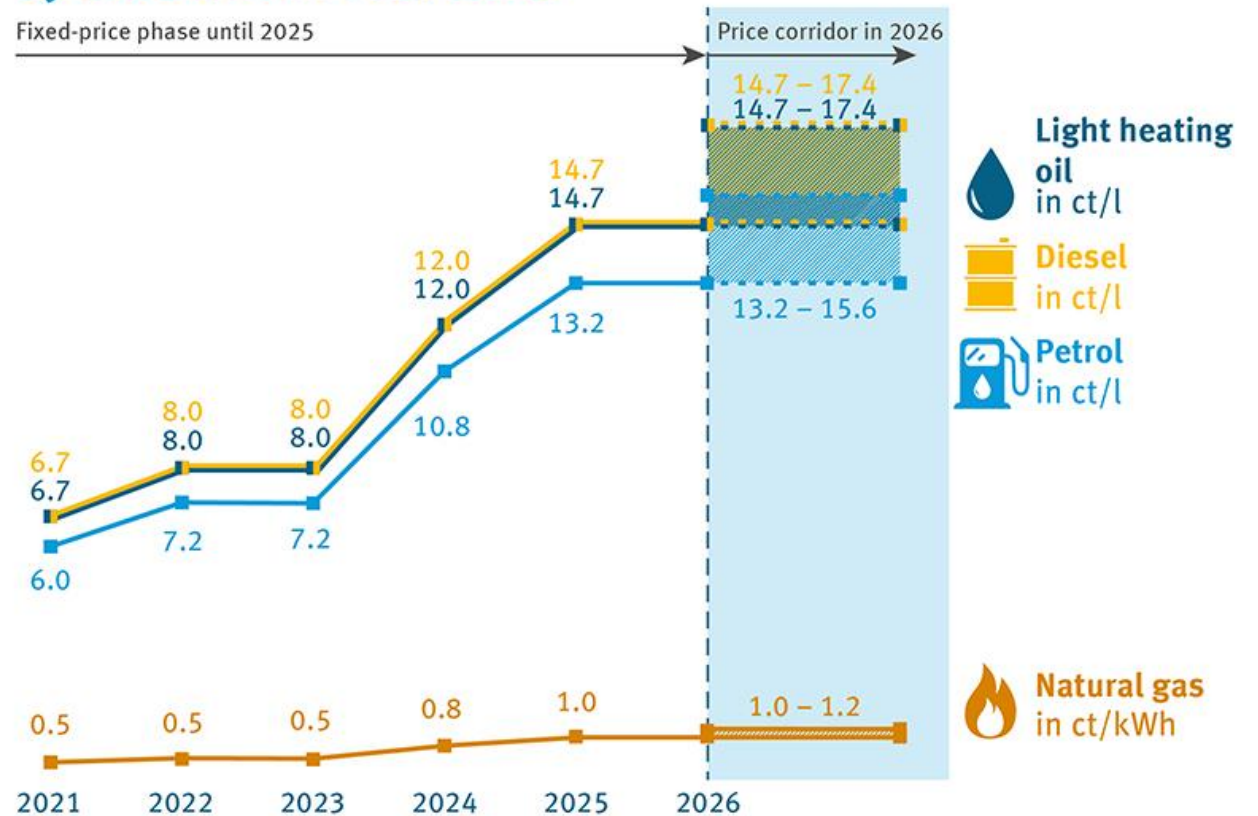
Revenues 2023: €10.7 bil.

Revenues feed into Climate and transformation funds

Price effect: 10 €/tCO₂:

- +2.8 cents per liter of gasoline
- +3.2 cents per liter of diesel
- +0.2 cents per kilowatt-hour of gas

Gradual increase in prices for selected fuels by the BEHG in euro cents





Overview of the German National ETS

TRANSITIONING TO ETS 2



Transitioning to ETS 2

- Fit-for-55 package introduces an emissions trading system (EU ETS-2) for buildings, transport, and small industry starting in 2027
- From 2027, over 75% of EU emissions will be covered by a trading system: energy, industry, buildings, and transport
- German law stipulates that national emissions trading system (BEHG) will be fully integrated into the European system
- National emissions trading is very similar to ETS-2:
 - Upstream system
 - Market pricing from 2027, with a Market Stability Reserve (MSR, 600 million certificates)
 - Scope: BEHG is broader than ETS-2, but opt-in is possible



Systematic differences in the scope of application: BEHG vs. ETS-2

BEHG

- CO2 pricing of all fuels placed on the market
- Final use of the fuels is irrelevant



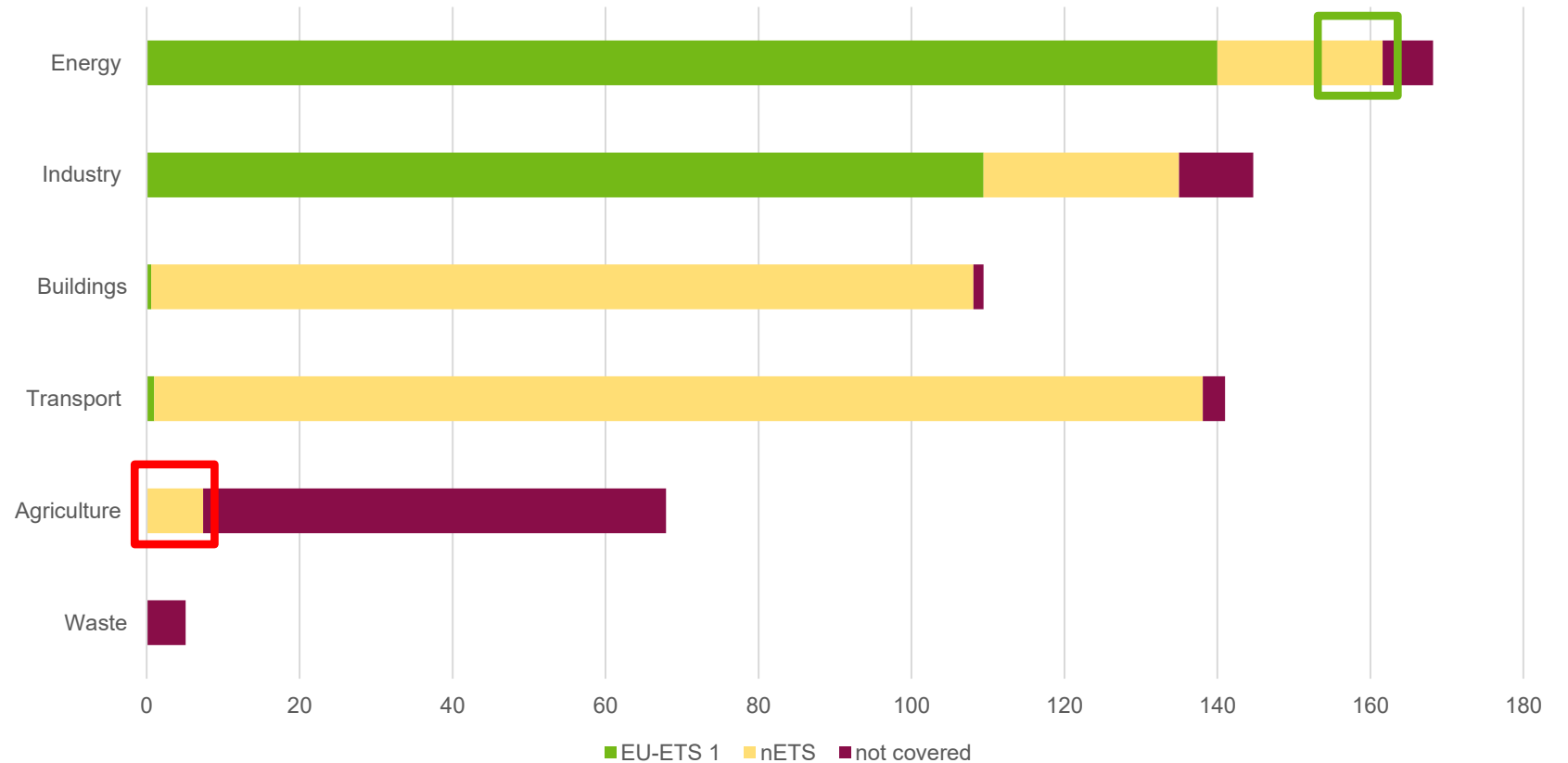
ETS-2

- CO2 pricing of all fuels placed on the market...
- ...used in specific sectors:
 - Road transport
 - Building heating
 - Non-ETS-1 industry



~85% of emissions covered by emission trading schemes

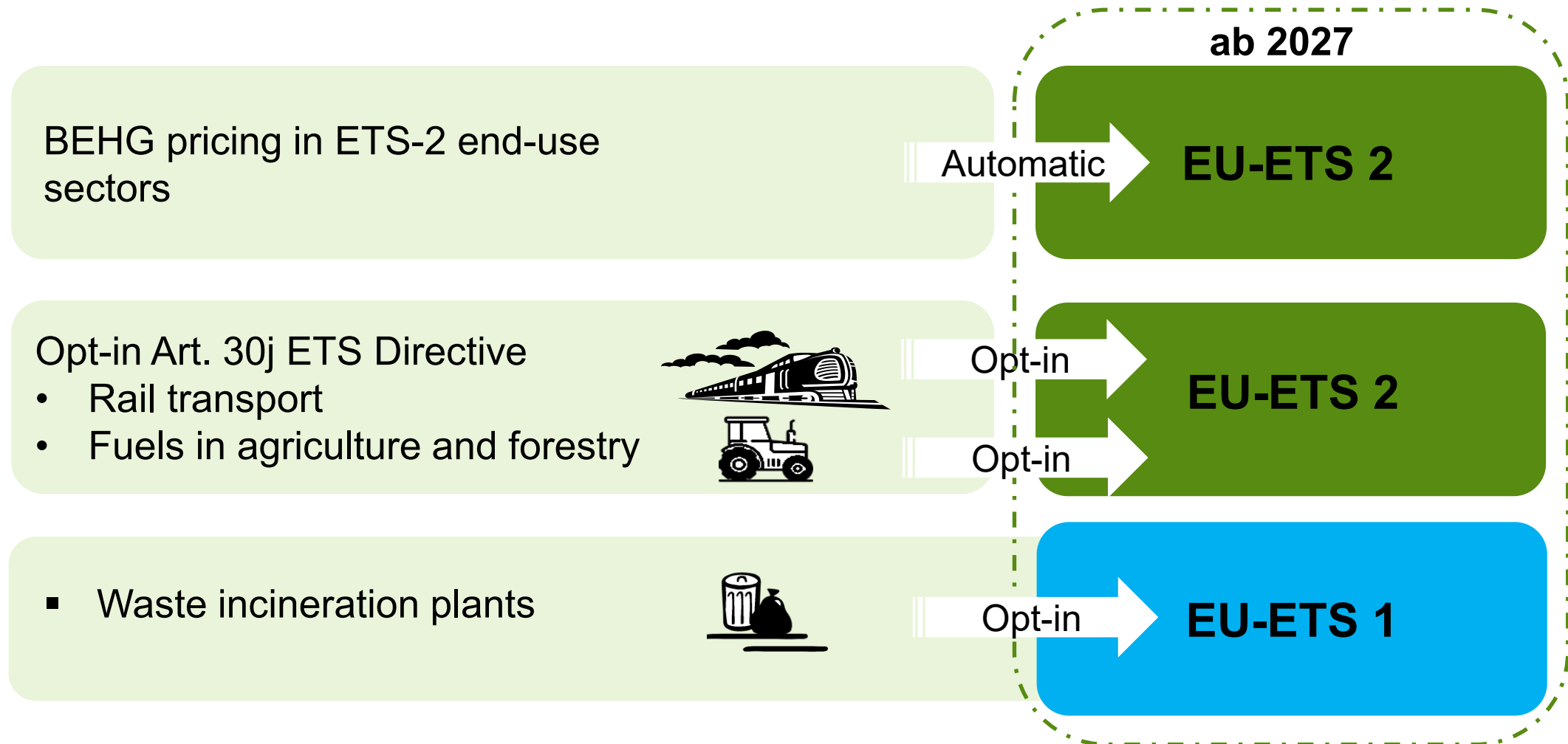
Emissions 2025 in Mt. CO₂-Äq. (2025)



- fuel emissions
agriculture
(red)
- Waste
incineration
(green)

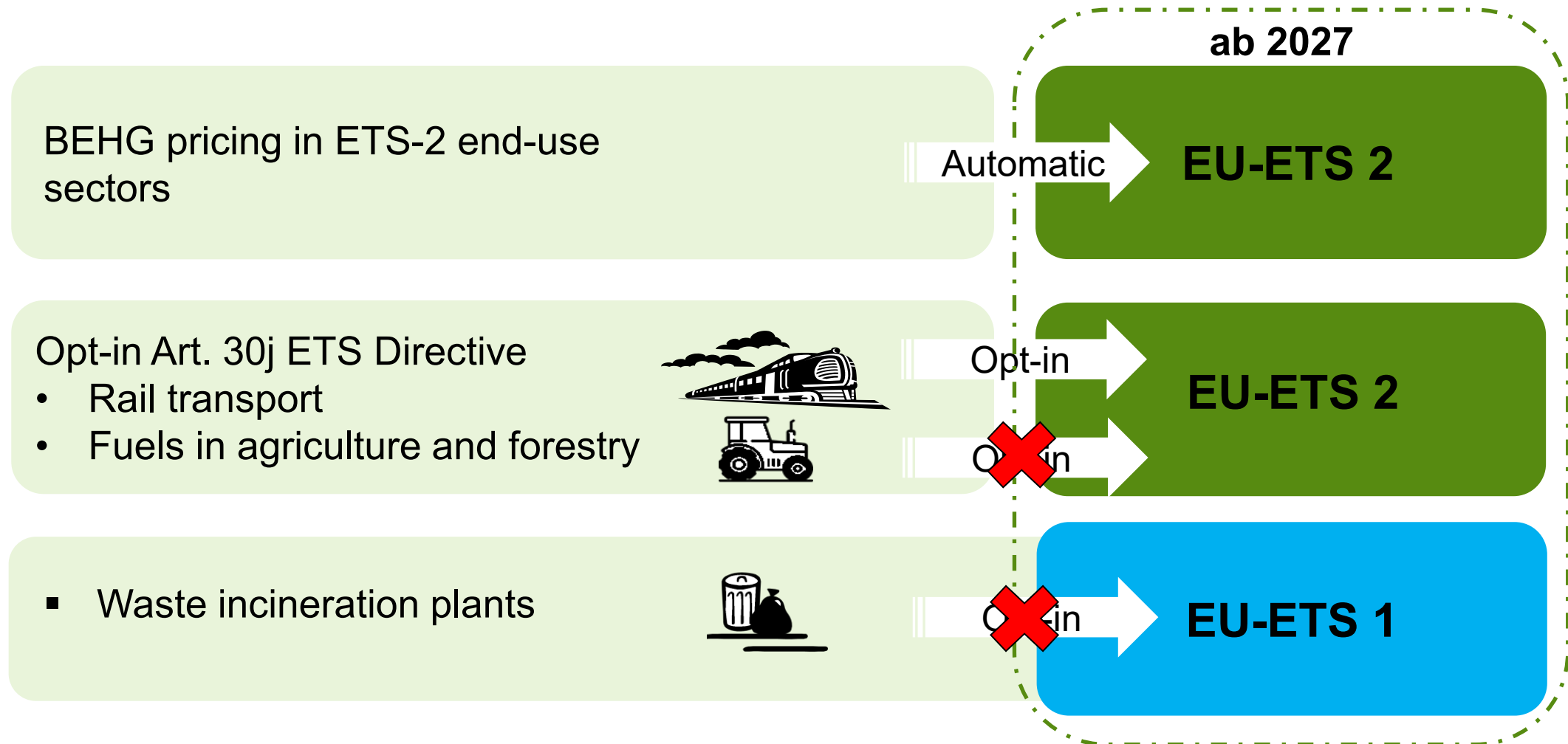


Continuity of CO₂ pricing – BEHG / ETS-2





Continuity of CO₂ pricing – BEHG / ETS-2



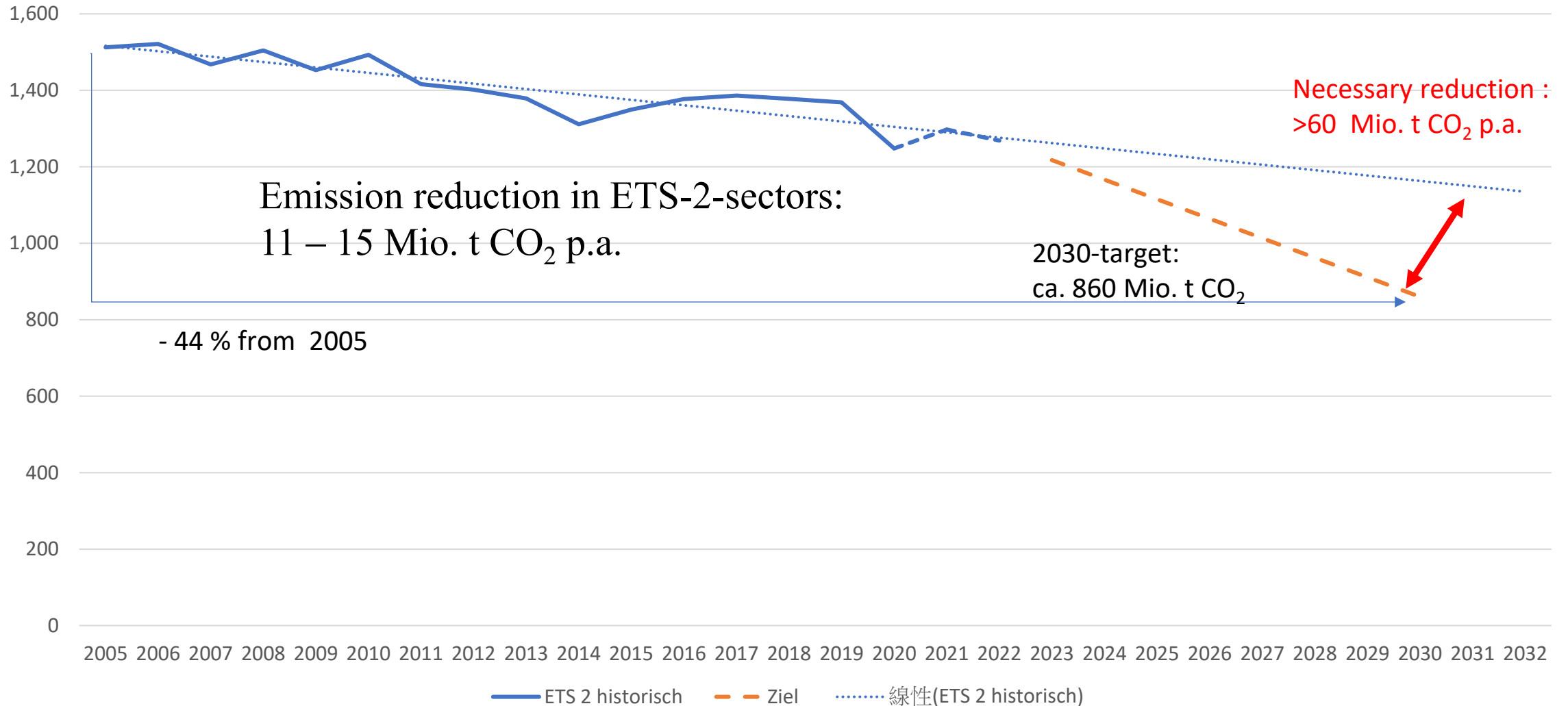


ETS2 – Challenges

- **ETS 2 – Central Instrument for Achieving Climate Targets**
 - With the introduction of ETS 2, up to 75% of EU-wide emissions will be covered under an ETS.
 - Emission reduction target of -42% by 2030 compared to 2005 is very ambitious; emissions need to be reduced much faster.
- **Uncertainties about the price level remain.**
 - The ETS directive embeds instruments for price stabilization: frontloading, MSR (Market Stability Reserve), and price stabilization mechanisms.
 - Complementary emission reduction measures in individual member states are crucial to dampen the price level.
- **Strengthening social acceptance through transformative measures.**
 - With ETS 2, a Climate Social Fund has also been established. The goal is to support particularly vulnerable households during the transformation. A national climate social plan is currently being developed.
 - It is important, however, to use all revenues for the transformation. The coalition agreement (KoaV) also commits to this.



Emissions and reduction target





ETS2 – Challenges

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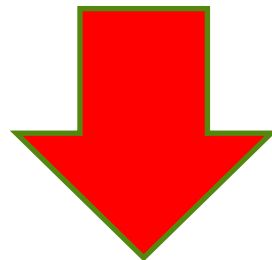


Achieving targets with a policy mix of Fit for 55 and CO₂ pricing

Regulatory instruments, funding schemes, and other measures to reduce emissions

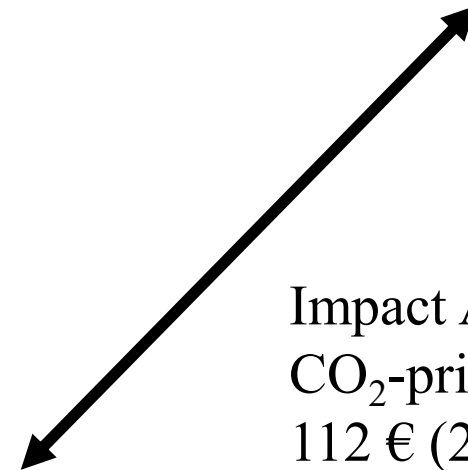
Impact Assessment:

The European Commission assumes an **ambitious implementation** of the Fit for 55 package.



Required emission
reduction

CO₂-Price



Impact Assessment:
CO₂-price of 67 –
112 € (2030)





ETS2 – Challenges

- **ETS 2 – Central Instrument for Achieving Climate Targets**
 - With the introduction of ETS 2, up to 75% of EU-wide emissions will be covered under an ETS.
 - Emission reduction target of -42% by 2030 compared to 2005 is very ambitious; emissions need to be reduced much faster.
- **Uncertainties about the price level remain.**
 - The ETS directive embeds instruments for price stabilization: frontloading, MSR (Market Stability Reserve), and price stabilization mechanisms.
 - Complementary emission reduction measures in individual member states are crucial to dampen the price level.
- **Strengthening social acceptance through transformative measures.**
 - With ETS 2, a Climate Social Fund has also been established. The goal is to support particularly vulnerable households during the transformation. A national climate social plan is currently being developed.
 - It is important, however, to use all revenues for the transformation. The coalition agreement (KoaV) also commits to this.



Questions?



Öko-Institut e.V.
Institut für angewandte Ökologie
Institute for Applied Ecology

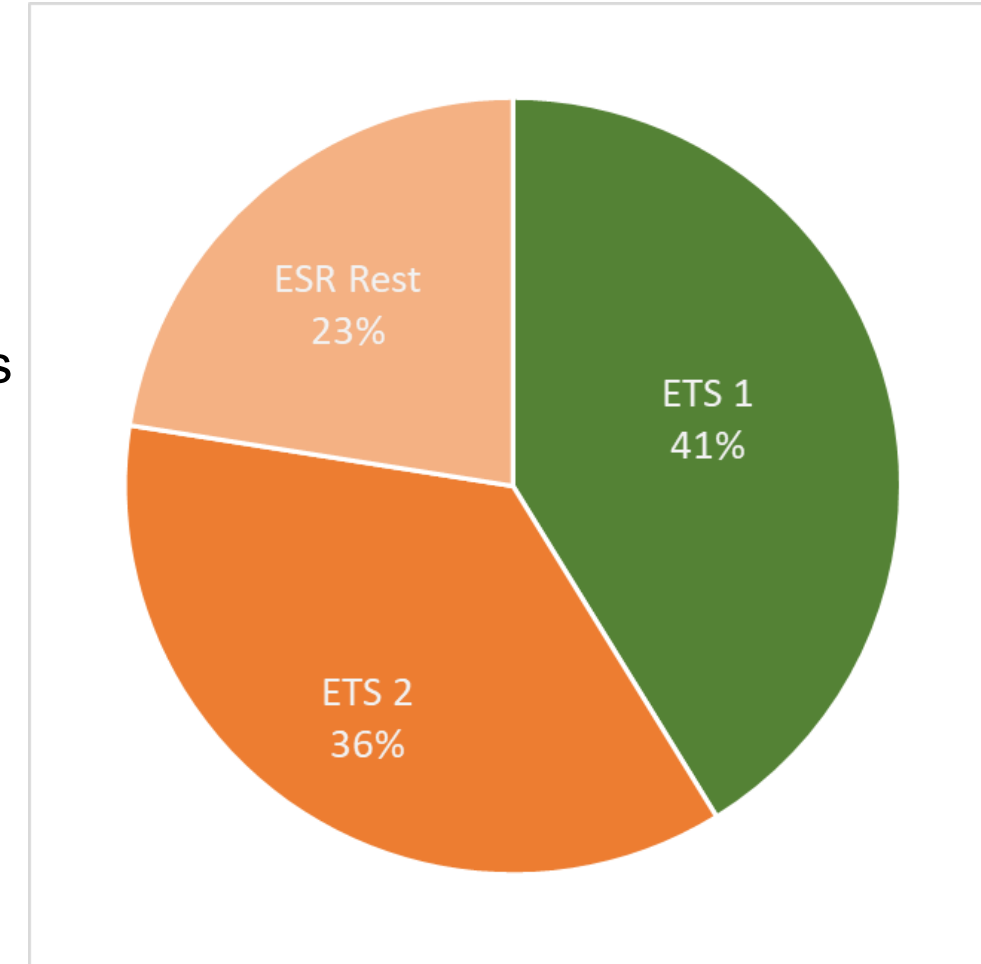
Overview of the new EU ETS 2

Jakob Graichen | Berlin, 24 June 2025 | Workshop for Taiwanese delegation

ETS 2 at a glance

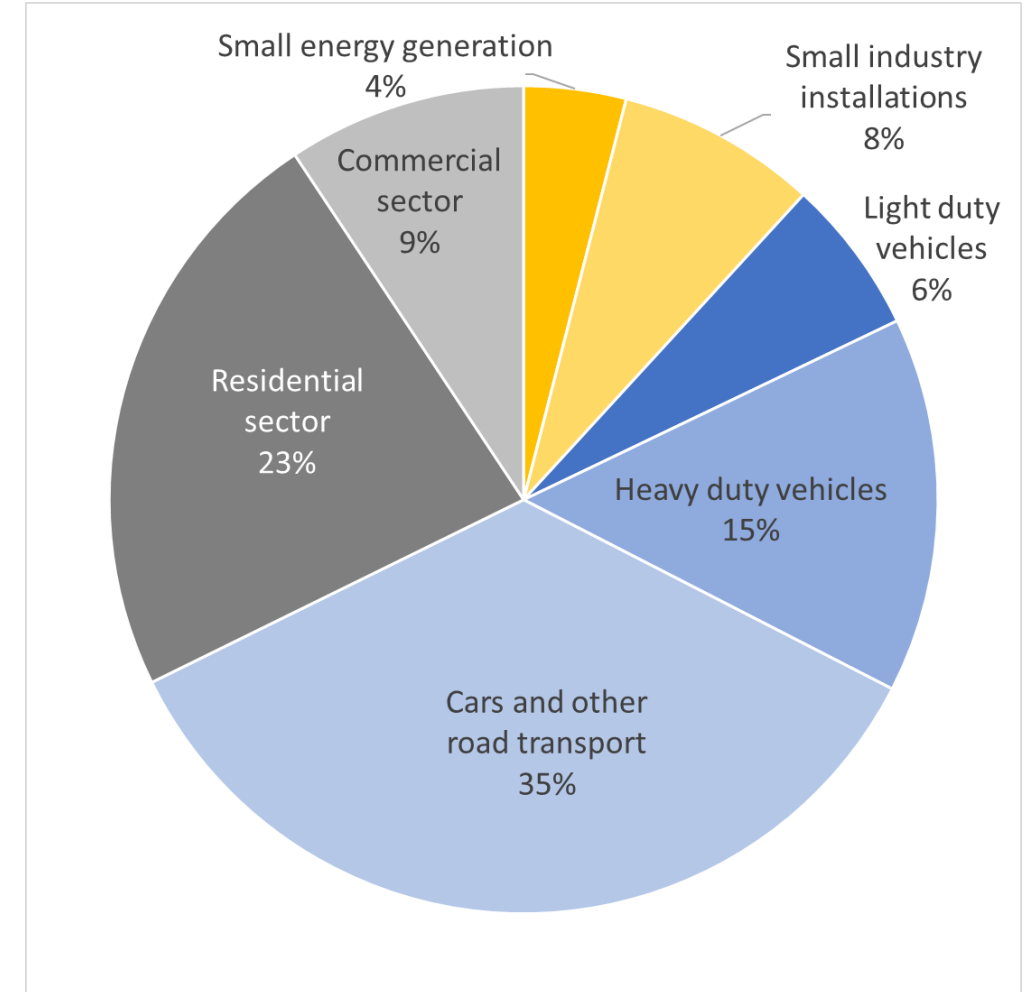
- Timeline
 - Proposed in 2021, adopted in 2023
 - First emission reporting in 2025 (for the year 2024)
 - Start in 2027 (2028 in case of very high energy prices)
- Upstream approach, covered entities are fuel suppliers
- 100% auctioning, no free allocation
- Cap:
 - LRF of 5.1% based on 2024 emissions in ETS2 scope
 - 43% below 2005 until the year 2030
- Opt-in for additional sectors possible
- No interaction with ETS 1

Coverage of emissions by instrument

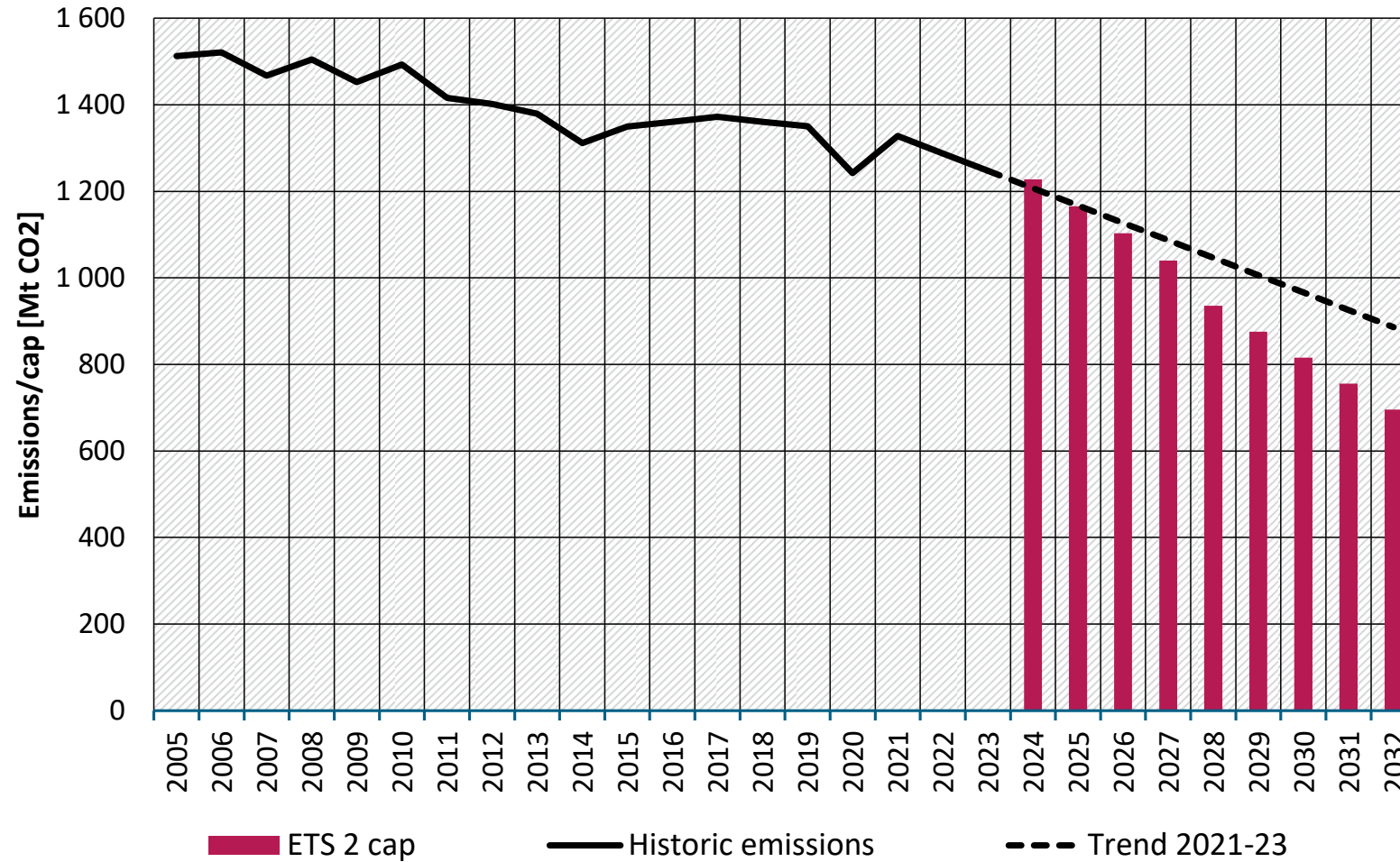


Sectoral coverage

- CO₂ from fuel combustion from
 - Road transport
 - Buildings
 - Small energy and industry installations below 20 MW
- ETS 1 emissions are excluded
- Fossil CO₂ not included in any ETS
 - Peat and Municipal Solid Waste outside of ETS 1
 - Energy use in agriculture
 - Off-road transport (rail, small shipping, small aviation, construction machinery, ...)



Historic emissions and the cap



Annual reductions:

- Historic rates:
 - 2005-2021: 11 Mt/yr
 - 2021-2023: 40 Mt/yr
- Cap: 63.5 Mt/yr

Market stability mechanisms



- Quantity control

- MSR II

- 600 Mio. allowances on top of cap, expire after 2030
 - Same mechanism as MSR I, thresholds 440/210 Mio allowances
 - Frontloading (+30% in first year, deducted over 2029-31)

Cap 2027 – 2030:
≈ 4 000 Mio allowances

- Price containment mechanism Art. 30(h)

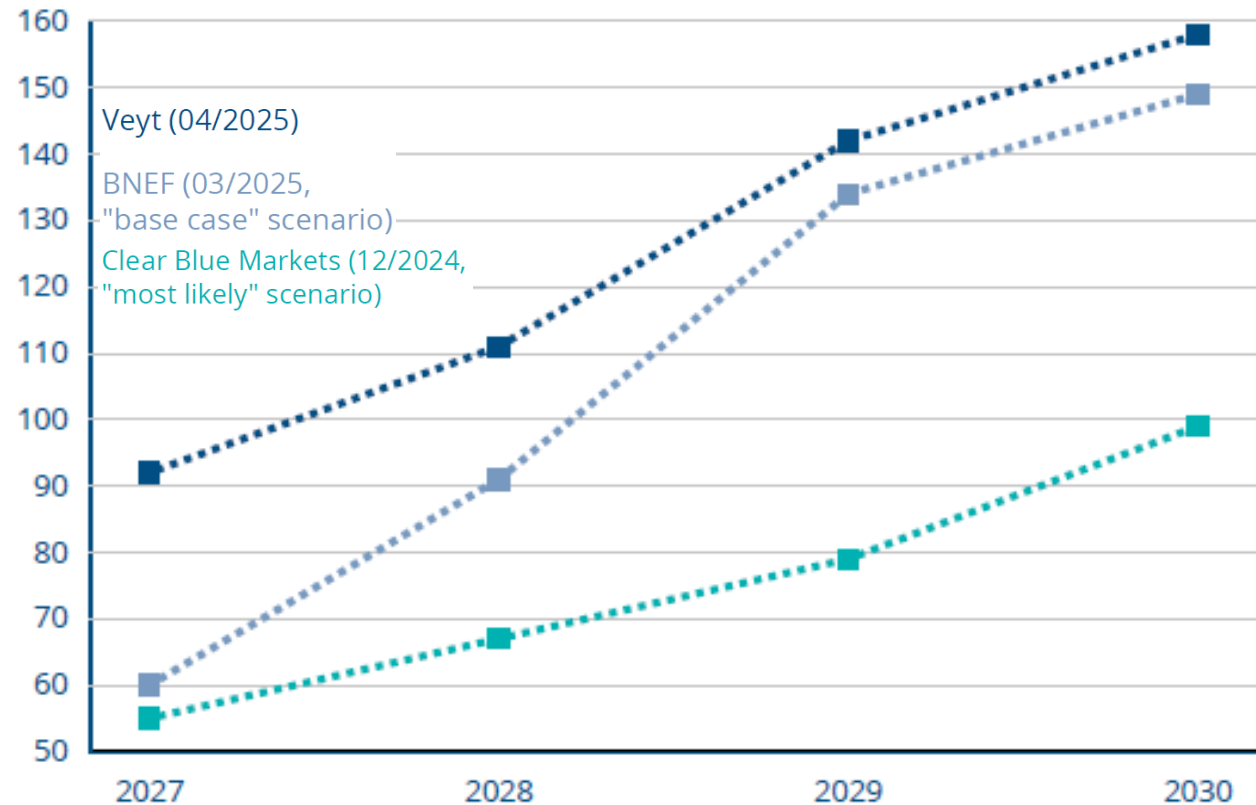
- Max one per year, three different triggers
 - Price > 45 EUR₂₀₂₀): +20 Mio from MSR II
 - Very fast doubling of price: +50 Mio from MSR II
 - Very fast tripling of price: +150 Mio from MSR II

- Limited political intervention

- COM and MS can trigger Art. 30(h) a second time per year if price >45 EUR₂₀₂₀

Expected CO₂ price in the short term

ETS2 Preisprognosen Marktanalysten
EUR/t (nominal)



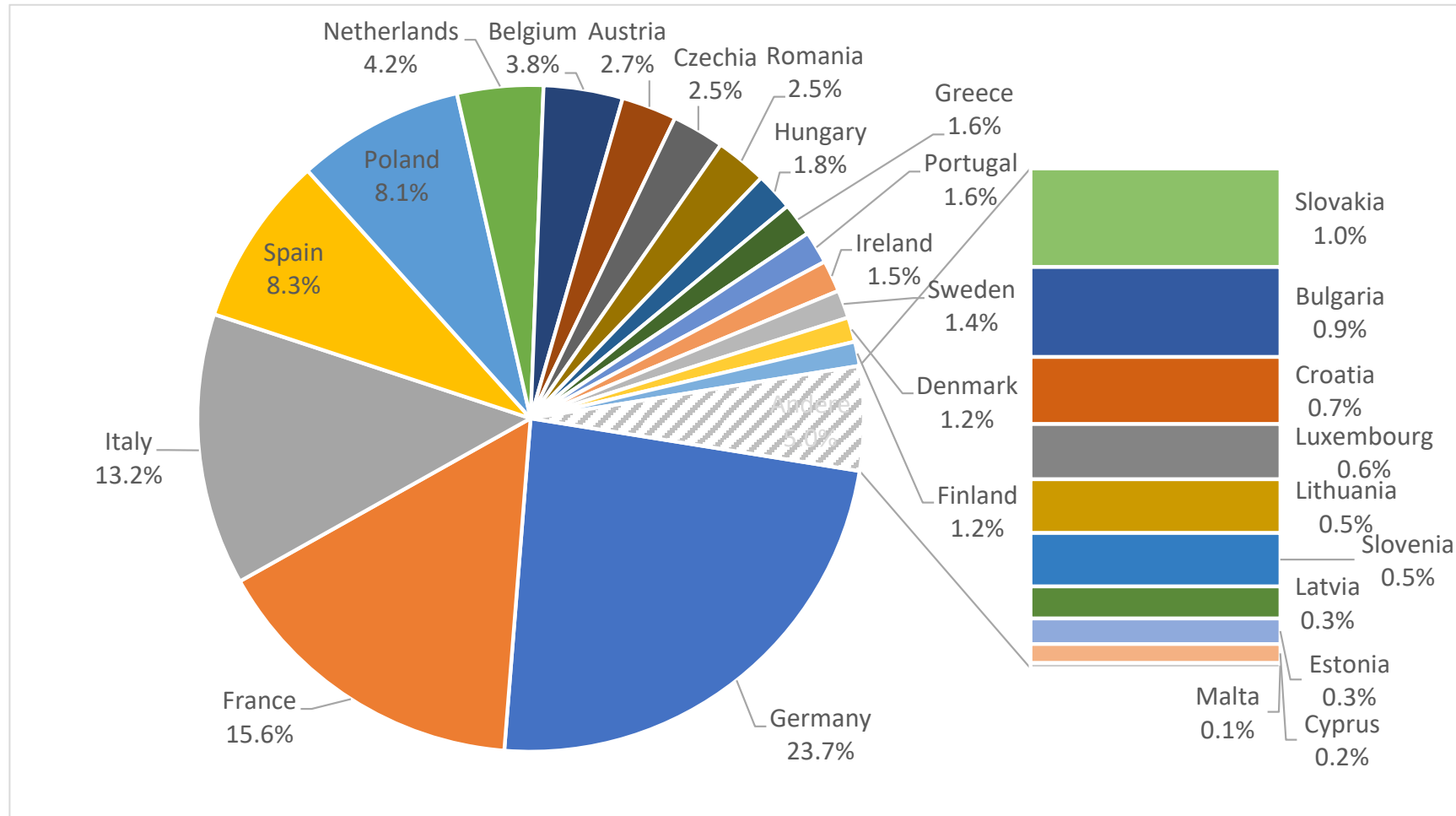
Latest price projections

- 55 – 90 EUR/t in 2027
(≈ 40 – 60 EUR₂₀₂₀)
- 90 – 160 EUR/t in 2030
(≈ 60 – 110 EUR₂₀₂₀)

Impact of 100 EUR/t CO₂ on prices

- ≈ 2.2 ct/kWh gas
- ≈ 30 ct/l liquid fuels

A few MS will determine the CO₂ price



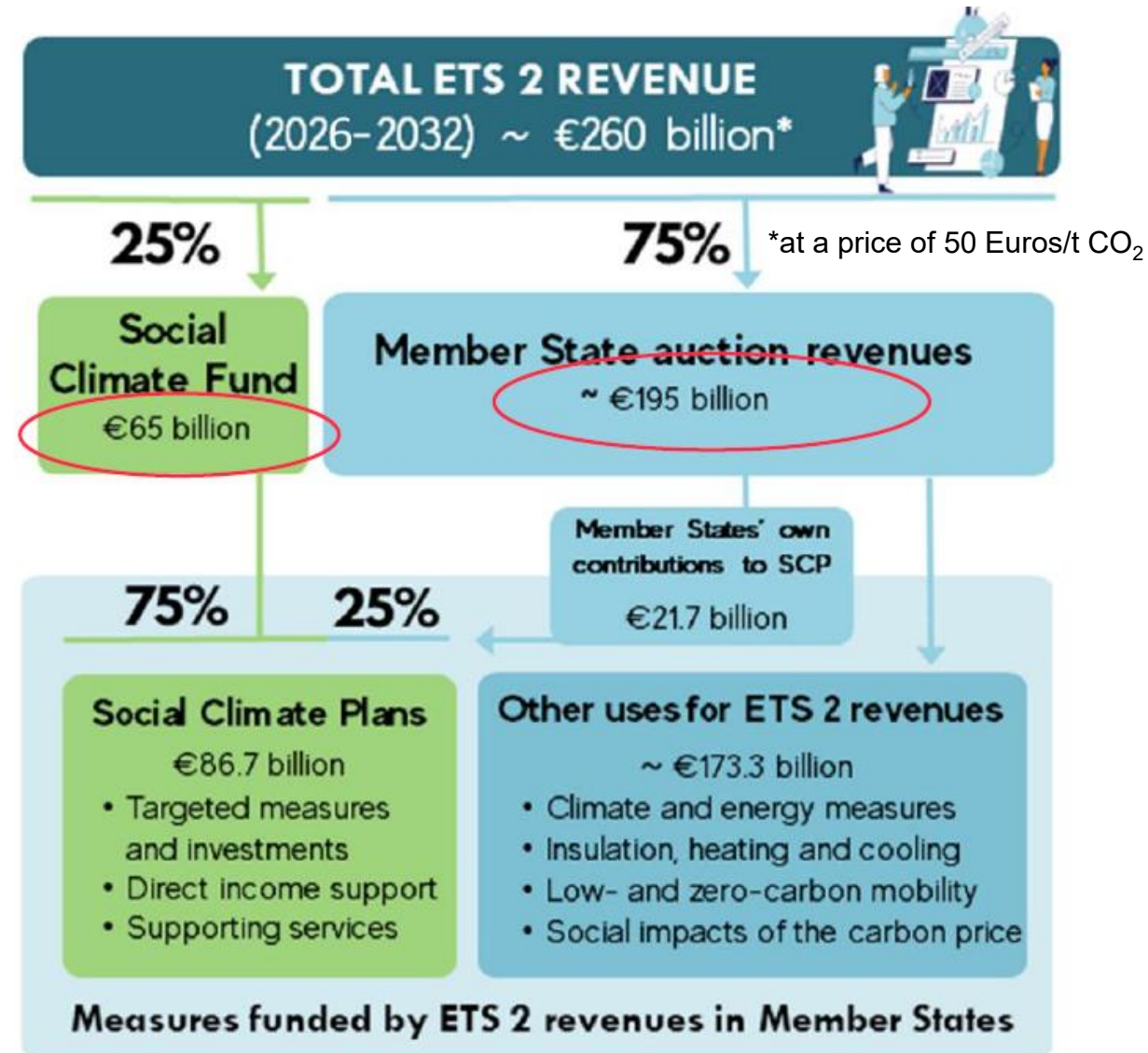
- Six MS responsible for 75% of emissions
- Complementary policies and ability to pay in these MS will set price
- DE especially problematic: high income, low ambition, largest MS

ETS 2 revenues

Social Climate Fund: Size is **fixed**. Must be used for **targeted** measures for those vulnerable to the carbon price introduction

Other revenues: Size **depends on carbon price**. Should be used by Member States for **non-targeted** climate and energy measures

- Funds at 50 EUR/t CO₂ (2026 to 2032)
 - MS revenues: ≈ 195 billion EUR
 - SCF share: ≈ 25% of revenues
- Funds at 100 EUR/t CO₂ (2026 to 2032)
 - MS revenues: ≈ 470 billion EUR
 - SCF share: ≈ 12% of revenues

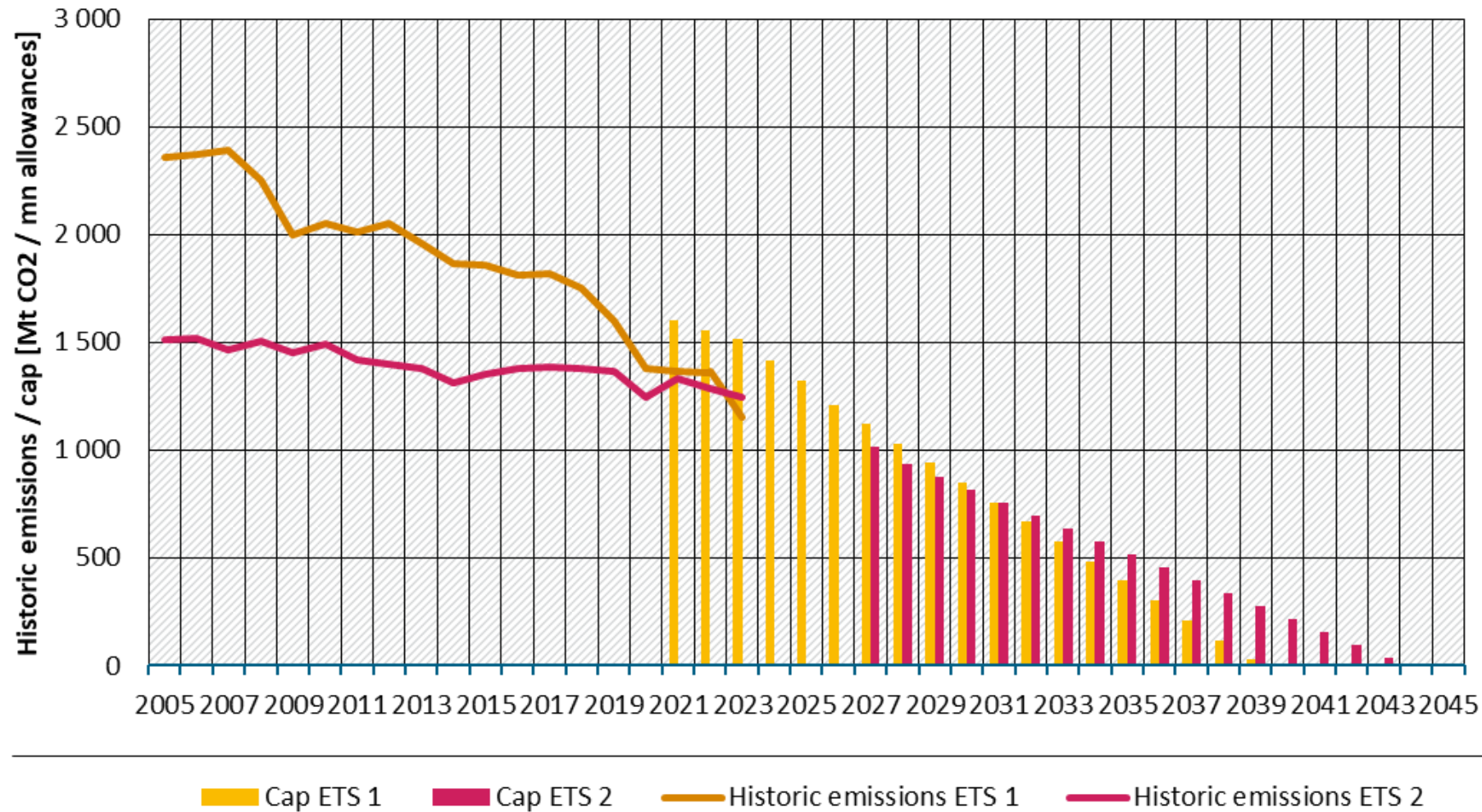


The current EU context:

Regulation establishing a Social Climate Fund (SCF)

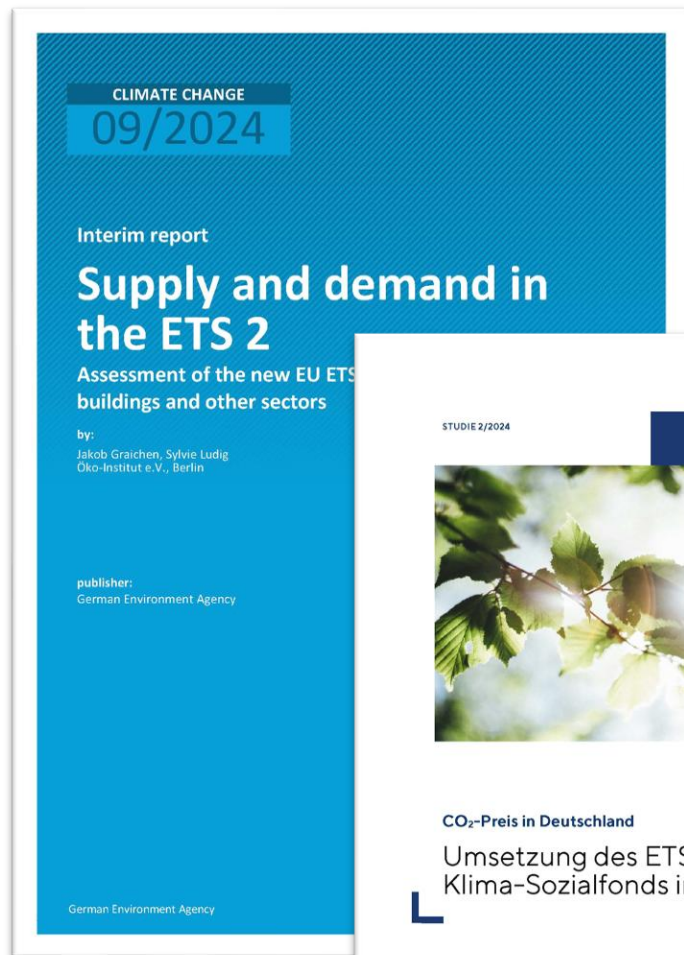
- SCF aims to mitigate the **social impacts** of the proposed emissions trading system for buildings and road transport (ETS BRT) on vulnerable households, micro-enterprises and transport users, through **measures and investments as well as temporary direct income support**.
- **Temporary direct income support** shall not represent more than 37.5% in each country => the larger share of the Fund is to be used for financing measures and investment.
- Emphasis is on measures and investments targeted for vulnerable groups to **reduce reliance on fossil fuels and reduce social impact of CO₂ costs**.
- Support under the Fund shall be additional to other Funds, programs and instruments.
- Eligible measures and instruments are described in the Regulation, need to be laid out in Social Climate Plans and will be subject to Commission assessment.
- Social Climate Plans are due at the end of June 2025
- Payment will be made upon completing and reporting milestones and targets indicated in the Social Climate Plans

ETS 1 and 2 cap development until 2045



Questions, comments, discussion points?

- Supply and demand in the ETS 2:
<https://www.umweltbundesamt.de/publikationen/supply-demand-in-the-ets-2>
- Umsetzung des ETS II und des Klimasozialfonds in Deutschland:
<https://www.oeko.de/projekte/detail/umsetzung-des-ets-2-und-des-klima-sozialfonds-in-deutschland/>
- Identifying and supporting vulnerable households in light of rising fossil energy costs
<https://www.umweltbundesamt.de/publikationen/identifying-supporting-vulnerable-households-in>



Your contact persons

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Thank you for your attention!

Formal Stakeholder Engagement Process

ETS Training Taiwan, 25 June 2025

Andreas Wehrl, The Climate Desk / FutureCamp Climate

Part I

- Foundations and principles on stakeholder engagement for ETS
 - Rationale
 - Stakeholder identification
 - Engagement process
 - Instruments for stakeholder engagement
- Formal stakeholder engagement in the European Union
- Formal stakeholder engagement in Germany

Part II

- Informal stakeholder engagement in Germany
-

Stakeholder engagement: Rationale & building a strategy

Stakeholder engagement...

...provides information by fostering **acceptance** and developing **credibility**.

...helps make informed choices: correct misconceptions, alleviate doubts, address concerns.

...enhances quality of future policy decisions.

...ensures smooth and efficient functioning of an ETS.

...enhances legitimacy by creating **ownership**.

Establishing a strategy

Identify stakeholders

- Who is most affected?
- Who else should be engaged?
- How involved will the general public be?

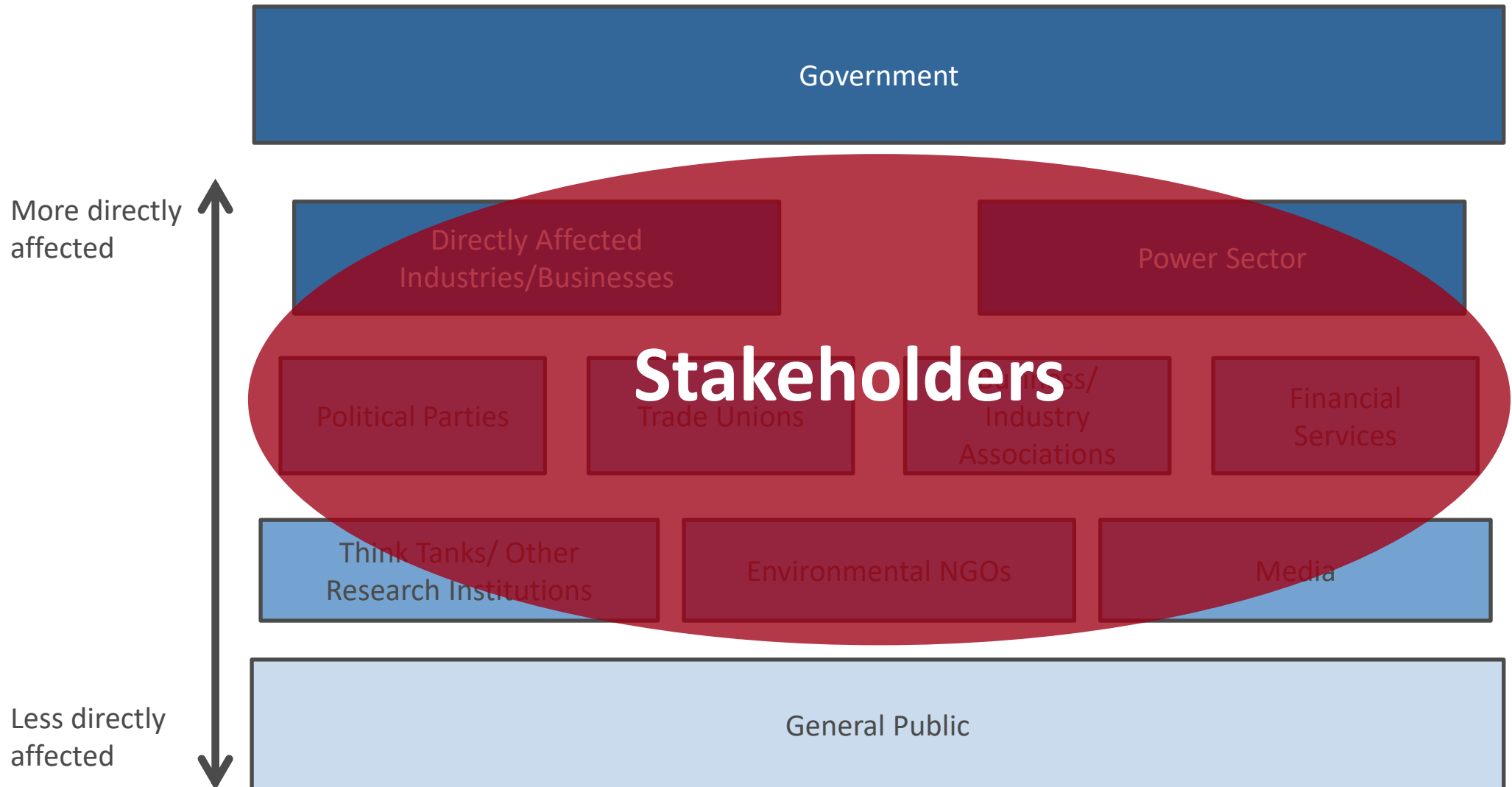
Stocktaking

Level of **knowledge** and **attitude** towards ETS of key stakeholders and general public?

Prime the debate

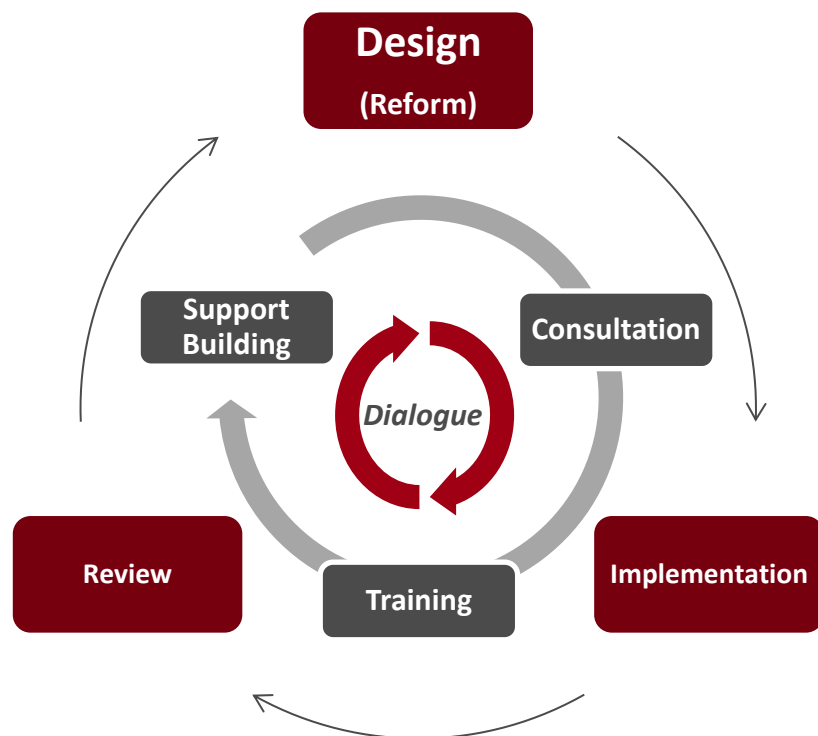
Introduce ETS to political debate, e.g. via a **Green Paper** presenting options and potential solutions to **stimulate discussion**.

Actors and Target Groups



Source: adelphi

Goals and instruments differ by process stages



Goal: Building support
Convey advantages of ETS

Instruments: Media, information publications, websites, social media, FAQs, conferences

Goal: Consultation
Improve policy, foster sense of ownership

Instruments: consultation documents, permanent discussion fora, hearings and debates

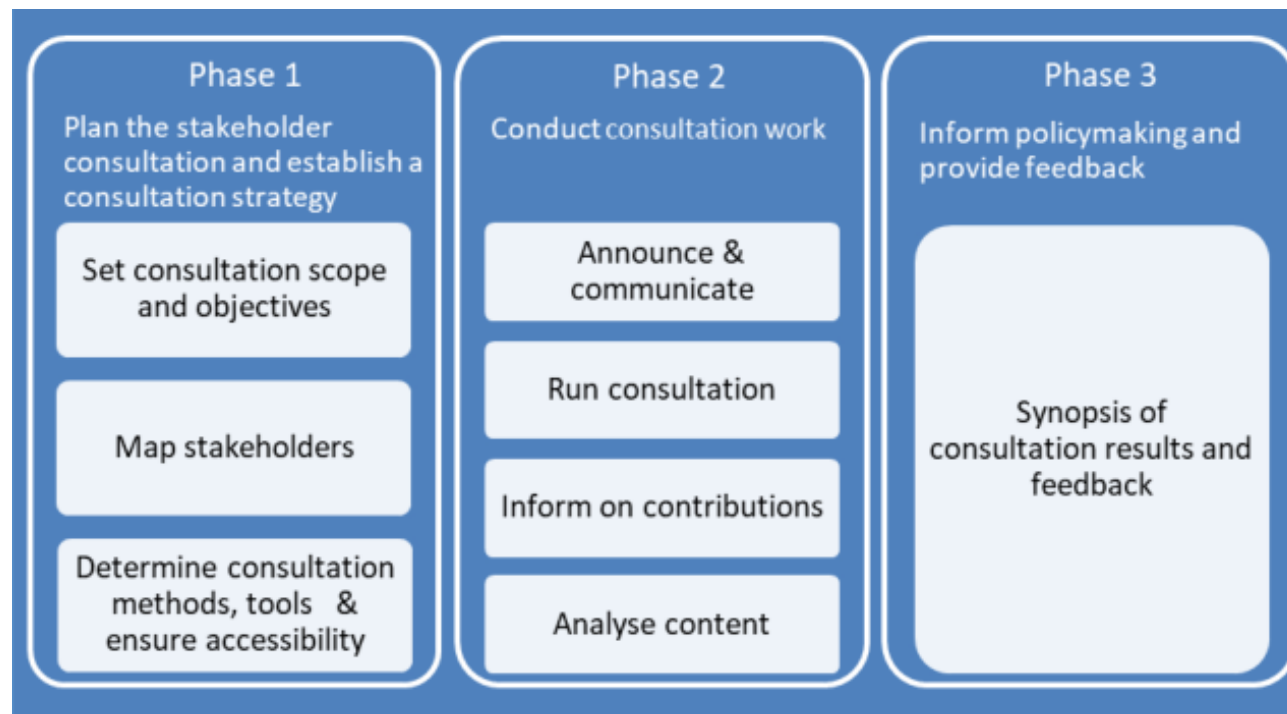
Goal: Training
Facilitate compliance, maximise flexibility

Instruments: workshops, helpdesk, hotline, webinars, simulations (e.g trading)

Note: applicability of instruments may vary by target group. Instruments may be applied for various goals.

Formal stakeholder engagement in the EU

- Regarding the EU ETS, the fundamental decisions on the ETS are taken on EU level.
→ Stakeholder engagement on EU level is of high importance for German stakeholders!
- The European Commission maintains a consultation system that frequently offers opportunities to stakeholders to contribute their perspectives to policymaking.
 - Covers Commission initiatives, legislative proposals, draft acts, suggestions for simplification.



Stakeholder consultation process in the EU.

EU: “Have your say” and “Calls for evidence”

- **Have your say:** central online portal for stakeholder engagement
- **Call for evidence:** streamlined type of document published on *Have your say*
 - Option 1: collecting general views on this document (= **feedback**)
 - Option 2: more formalised input based on this document and additional specific questions (= **consultation**)
- General duration of publication on *Have your say*: 12 weeks



https://ec.europa.eu/info/law/better-regulation/have-your-say_en

Example: EU Consultation on 2026 review of ETS 1



https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/14549-EU-emissions-trading-system-for-maritime-aviation-and-stationary-installations-and-market-stability-reserve-review_en

EU: The Better Regulation Toolbox

Chapter 7 of the EU Commission's **Better Regulation Toolbox** contains useful methods and guidance for stakeholder consultation, many of which remain applicable outside of the EU context.

TOOL #51.	Consulting stakeholders	444
TOOL #52.	Consultation strategy	460
TOOL #53.	Conducting consultation activities	469
TOOL #54.	Analysing data and informing policymaking	476
TOOL #55.	Horizontal matters – publication of responses, data protection, access to documents and transparency register	490

*Five tools for
implementing
stakeholder
consultation.*

https://commission.europa.eu/law/law-making-process/better-regulation/better-regulation-guidelines-and-toolbox_en

Formal Stakeholder Engagement in Germany

Stakeholder consultations in the legislative process:

- **Association participation:** In order to assess the consequences of a law, in particular the costs for the economy, the responsible federal ministry obtains information from the associations/NGOs.
- Once a legislative proposal is submitted to the Parliament, the responsible committee can conduct **public hearings** of experts and stakeholders.

Transparency: The Federal Government participates in the Open Government Partnership. The federal ministries therefore publish the opinions obtained as part of the so-called association participation on the Internet.

Stakeholder engagement and public acceptance matters

- **Planning ahead:** Planning of public / stakeholder communication and participation at the outset of an ETS will help create ownership and facilitate effective implementation
- **Targeted approach:** Different groups have different interests and concerns, and level of knowledge. They need to be targeted with different instruments according to the different purposes of the ETS policy cycle
- **Transparency:** Provide information on how the ETS works and how it will achieve environmental objectives in order to ensure legitimacy
- **Continuity:** Maintain ongoing information availability and continue consultation process after implementation in order to guarantee the sustainability of the policy and involvement of stakeholders

Informal Stakeholder Engagement in Germany

- Working Group Emissions Trading to Combat the Greenhouse Effect (AGE)
of the German Federal Ministry for Economic Affairs and Climate Action
- Stakeholder communication and other services at DEHSt
- Other activities



- Permanent stakeholder consultation concerning questions of emissions trading
 - Established by the German Federal Cabinet in October 2000 at the initiative of the German Ministry for the Environment
 - Financed by the Ministry for the Environment and companies – larger contribution by companies
- Currently ~ 80 members – representatives of companies, trade associations, environmental NGOs, trade unions, parliamentary factions of political parties, federal states and agencies:
 - Companies (more than 25)
 - Trade associations (15)
 - Environmental organizations (3)
 - Trade unions (2)
 - Government agencies / ministries (7)
 - Parliamentary groups (5)
 - Representatives of the federal states (3)

Working Group Emissions Trading to Combat the Greenhouse Effect (AGE) (ctd.)

Principles

- Support (Funding): Financial and human resources come from both the German Federal Government and the private sector
- Capacity Building
- Confidentiality / Chatham House Rules: Communication limited to members of the AGE

Establishment

- Secretariat in Berlin, with staff from industry and research institutes
- Chaired by the Ministry for the Environment, co-chair Ministry of Economics and Technology
- 7-8 meetings per year. 186 meetings so far.
- Additional meetings by four sub-groups focusing on specific issues (cross-cutting issues, administration of the EU ETS in Germany, legal issues, flexibility mechanisms and international aspects, national ETS for fuels).
- Budget: Approx. EUR 180 000 annually

Role and Achievements

- Most important national forum on emissions trading
- Central platform for implementation of the EU ETS in Germany
- Initially, discussions focused on the design and implementation of the European Climate Change Programme
- Since implementation of EU Emissions Trading Directive in national law, focus on issues arising as a consequence of the implementation of the EU ETS in Germany
- Further discussion about other areas of the carbon market, e.g. policy interactions or developments of the flexible mechanisms under the UNFCCC and the Paris Agreement

One unit at the competent authority – the German Emissions Trading Authority (DEHSt) – is dedicated to Communication and Service (Staff of ~15 people)

Tasks:

I. External Communications

Customer service (hotline, e-mail, VPS, CRM, mailings)

Communication (website, publications, reports, fact sheets, FAQs)

Press relations

Events (workshops, fairs, conferences, EU-meetings)

Visitor groups, expert exchange

II. Internal Communications

Share-point

Co-ordination of seminars

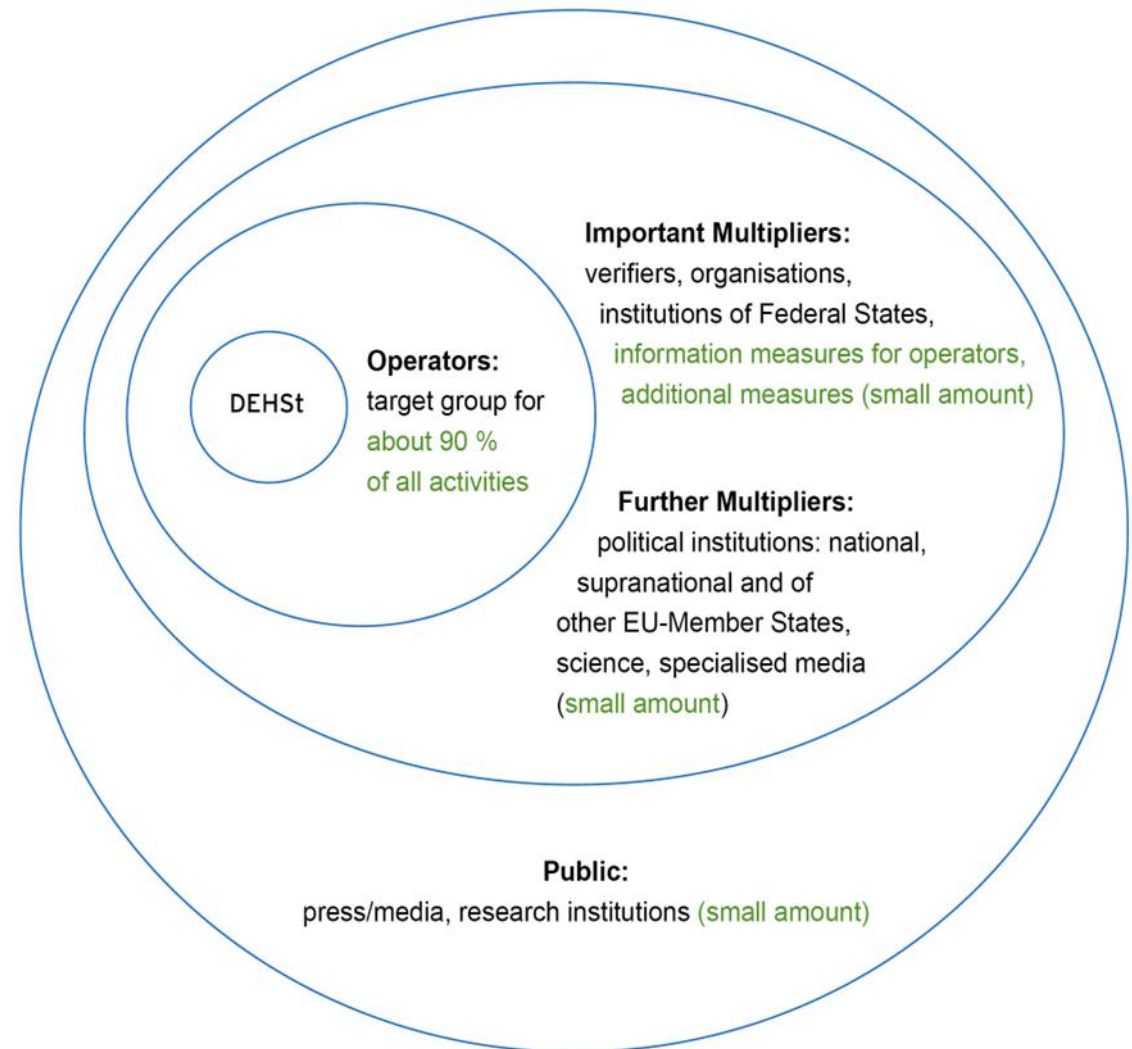
Knowledge transfer

Target Groups for external communication

1. Focus on Operators (about 90% of activities)

2. Other Stakeholders (Verifiers, Political Institutions in Germany and Europe, Science)

3. General Public and Media



Thought experiment: How would a „Taiwan Working Group on Carbon Emission Trading” look like?

台灣碳排放交易工作小組

Taiwan Working Group on Carbon Emission Trading

Who should be the members?

Who could be the chair?

Would the meetings be public or not?

When should the group have its first meeting?

How should the agenda of the first meeting look like?

議程

Agenda

- Item 1
- Item 2
-
-

For more information please contact:

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Federal Ministry
for Economic Affairs
and Climate Action

EMISSIONS TRADING SYSTEM

Capacity Building

ETS and the Climate Policy Mix – Understanding and Managing Interactions

Taiwan delegation visit, Berlin, June 25, 2025

Baran Doda, Senior Advisor, adelphi



- Why is it important to consider overlaps and interactions between ETS and other climate policy instruments?
- What is the Waterbed Effect?
- How can complementary policies support the ETS?
- Which types of climate policy instruments are there?
- How to manage the overlap between ETS and other policy instruments?
- What should be the role of the ETS in the climate policy instrument mix?

- Why is it important to consider overlaps and interactions between ETS and other climate policy instruments?
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Why carbon pricing?

- ETS does not prescribe individual emitters by how much they should reduce emissions, which choices they should make or which technologies they should use.
- Emitters will generally reduce emissions where it is cheapest to do so - up to the point where the cost of reducing emissions equals the cost of an allowance, i.e. the carbon price.
- Carbon pricing (including ETS) hence offers greater flexibility to individual actors than command-and-control policies.
- The regulator does not have to know exactly by how much covered entities can reduce their emissions, at what cost, and through which technologies: this information is revealed through the market

ETS and the Climate Policy Mix – Interactions

- ETS is a broad, general policy instrument that encompasses different sectors, technologies and emitters
 - ETS cap specifies a target level of GHG emissions
 - ETS price creates the necessary incentive to ensure GHG emissions remain within the cap, e.g. switching to clean energy or increasing energy efficiency
- An ETS alone would be sufficient to achieve climate objectives. The ETS cap could be derived directly from the emission target (if all sectors are included or the targets are broken down to sectors).
- Additional policy instruments (“companion policies”) to complement the ETS and lower the costs of achieving the emission target:
 - Address market barriers, e.g. for new technologies or sectors with particularly high abatement costs.
 - If a sufficiently high carbon price is politically difficult to sustain or not possible due to a price ceiling in the ETS.

Why combine an ETS with other policies?

Reasons to consider additional policies:

- A. Other policies have their own (related, but separate) objectives, such as:
- Air quality: reduce air pollutants from fossil fuel combustion
 - Energy efficiency or energy conservation: reduce fossil fuel imports
 - Industrial policy: employment, investment, technology leadership, modernisation

Tinbergen rule: separate policy objectives are best pursued through separate policy instruments

Why combine an ETS with other policies?

Reasons to consider additional policies:

B. Other market failures or barriers:

- Split incentives: e.g. landlord-tenant-dilemma, where one bears the cost and another reaps the benefits;
- Lack of access to finance, e.g. to pay for emission reduction measures, even if they are economically efficient (e.g. energy efficiency measures)
- Lack of information / transaction costs related to obtaining information
- Lack of suitable, affordable or accessible alternatives (e.g. public transport)



Companion policies can explicitly address these barriers

Why combine an ETS with other policies?

Reasons to consider additional policies:

- C. ETS and companion policies have different roles in the transformation process in the short, medium and long term
- In the short term: optimisation based on existing technologies and infrastructure – ***best achieved through a carbon price***
 - In the longer term: innovation and investment support, adjustment of infrastructure, change in social norms, better informed choices by consumers and investors, behavioural change etc. – ***carbon price is necessary, but not sufficient for cost-efficient emission reductions***

Why combine an ETS with other policies?

Reasons to consider additional policies:

D. Companion policies can mitigate undesirable side effects (e.g. distributional impacts of a carbon price), also to reduce political opposition

E. Companion policies can also serve as insurance against policy failure and increase policy credibility – ETS as a fallback if other policies fail or underperform

Why is it important to consider policy interactions?

Climate policy does not start from a blank page. ETS design needs to take existing policies into account, decide how the ETS should fit into the existing policy mix.

EU experience: Energy taxation, energy efficiency policies and policies to promote renewables existed before the ETS – effects of which were mostly taken into account when determining the cap.

Carbon price works best if other incentives are aligned. Framework conditions may need to be adjusted: Remove distortions and barriers, such as fossil fuel subsidies, price controls, enable cost pass-through.

EU experience: Liberalised electricity markets and auctioning of allowances for power generation.

Why is it important to consider policy interactions?

Implementation can build on existing structures. When setting up an ETS, it helps to build on institutional, legal, administrative structures that are already in place.

EU experience: Installation-based approach for determining the cap using existing regulatory structures and their definition of installations.

The policy mix must be consistent to be efficient. Otherwise the overlap of policies may increase the total cost of emission reductions.

EU experience: Additional national measures (e.g. increased energy efficiency targets or national coal phase-out) without adjusting the cap results in a ‘waterbed effect’.

Outline

- Why is it important to consider overlaps and interactions between ETS and other climate policy instruments?
- What is the Waterbed Effect?
- How can complementary policies support the ETS?
- Which types of climate policy instruments are there?
- How to manage the overlap between ETS and other policy instruments?
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What is the waterbed effect?

- If emissions are fixed ex-ante through the ETS cap, complementary policies addressing the same emission sources as the ETS *cannot* deliver additional emission reductions.
- E.g. in the case of renewables support policies:
 1. Higher share of renewable electricity will replace fossil-based power generation and thereby initially reduce emissions;
 2. This will free up allowances held by fossil power generators;
 3. Allowances are sold to other sectors or power generators in other countries;
 4. These can emit more, offsetting the initial emission reduction.

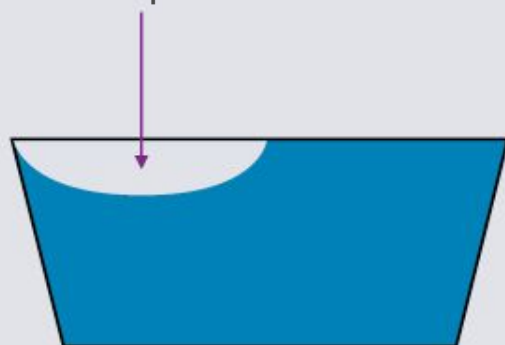
In an ETS, complementary policies have no direct climate benefit. But they reduce mitigation costs and hence allow to adopt a more stringent cap in the first place.

Addressing the Waterbed Effect: the EU ETS answer

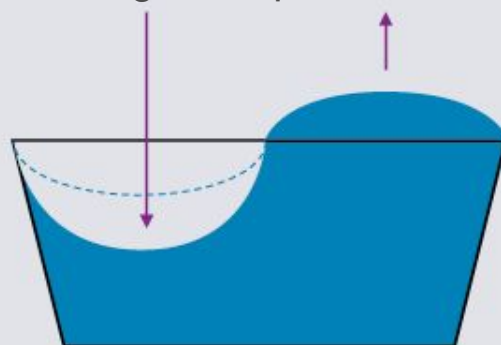
How to enable individual EU Member States to implement policies that reduce emissions by more than what is implied by the EU target:

Prior to the 2018 EU ETS reform

Complementary policies already reflected in the cap



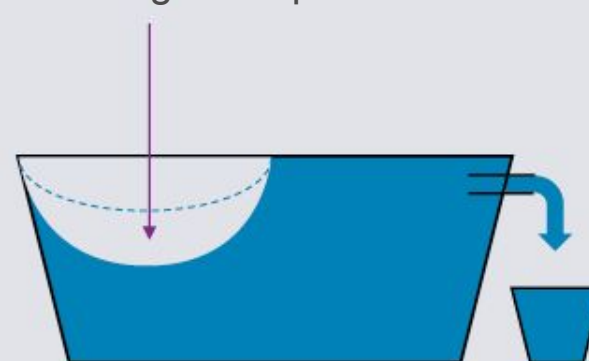
Additional complementary policies not reflected in the original cap **Waterbed effect**



Prior to the 2018 EU ETS reform, most complementary policies and respective targets were already reflected in the cap. But additional complementary policies – or policies that performed better than expected – lead to a waterbed effect.

After the EU ETS reform

Additional complementary policies not reflected in the original cap



After the reform, there will be two overflow valves: Member States can cancel allowances if they take national measures (Art. 12.4). Also, surplus allowances flow into the Market Stability Reserve as of 2018, the majority of which will be cancelled in 2023

Source: Agora Energiewende & Öko-Institut 2018

Outline

- Why is it important to consider overlaps and interactions between ETS and other climate policy instruments?
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How to achieve a coherent and consistent climate policy mix

A coherent and consistent climate policy mix, which is:

- **Effective and reliable:** achieves the climate targets with reasonable certainty
- **Efficient** – achieves climate targets at least cost to society, mobilising the cheapest abatement potentials now and in the future – i.e. also provides incentives for cost-saving low-carbon innovation
- **Politically, legally and administratively feasible** – socially balanced, in line with existing laws and regulations, and can be managed with available resources

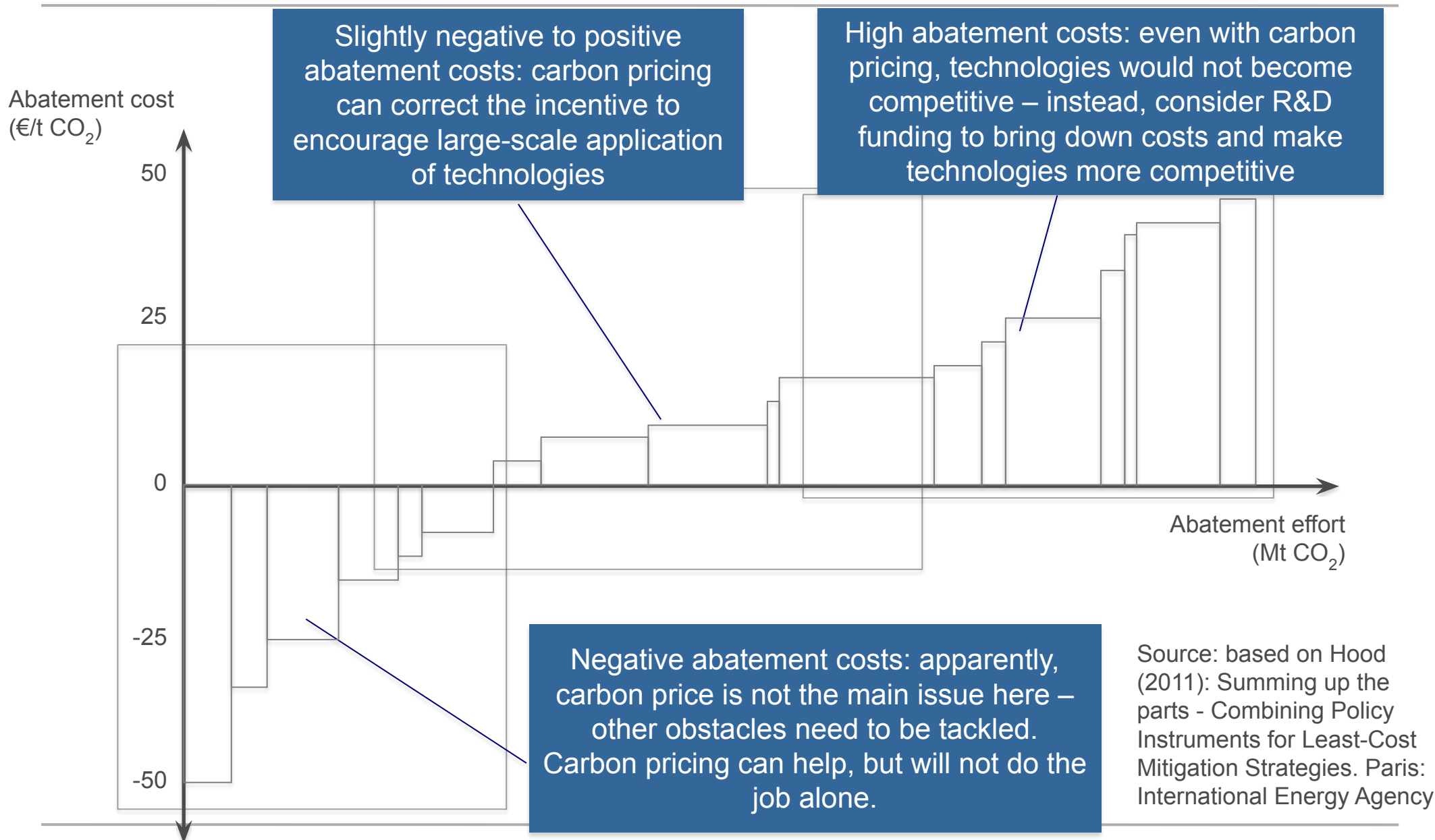
How can complementary policies support the ETS?

As part of a coherent policy mix, complementary policies should go hand in hand with the ETS. This can be achieved in different ways.

1. Address mitigation potentials that the carbon price cannot address:

- Emissions reductions in sectors not suitable for pricing, e.g. because they are difficult to monitor (esp. agriculture)
- Provide long-term impulse for innovation and technology support
- **EU experience:** The EU ETS focuses on the two sectors that are most amenable to carbon pricing – energy and industry. Other sectors are addressed through a suite of other policies, including taxes. The EU has used part of the proceeds from selling emission allowances to support low-carbon innovation (Innovation Fund, complemented by national programmes).

What sectors / technologies are amenable to pricing?



How can complementary policies support the ETS?

As part of a coherent policy mix, complementary policies should go hand in hand with the ETS. This can be achieved in different ways.

1. Address mitigation potentials that the carbon price cannot address
2. **Provide the right framework conditions:**
 - remove other barriers and distortions (e.g. fossil fuel subsidies),
 - align incentives,
 - adjust the regulatory framework (e.g. price controls, market oversight).
- **EU experience:** Since the late 1990s, liberalization of electricity markets, to ultimately arrive at a common, EU-wide market. In this process, the price of emitting carbon is also factored into the price of electricity. However, not all distortions stemming from EU or national policies have been completely removed.

How can complementary policies support the ETS?

As part of a coherent policy mix, complementary policies should go hand in hand with the ETS. This can be achieved in different ways.

1. Address mitigation potentials that the carbon price cannot address
 2. Provide the right framework conditions so that the carbon price will work
 3. **Mitigate unwanted side-effects through flanking measures:**
Increase acceptance or assist vulnerable groups in the transition process
- **EU experience:** Several Member States have used revenue from the sale of emission allowances to fund social assistance programmes (e.g. energy saving advice for low-income households in Germany). EU Member States can also compensate industrial electricity consumers for electricity price increases due to the EU ETS to preserve their competitiveness.

How can complementary policies support the ETS?

As part of a coherent policy mix, complementary policies should go hand in hand with the ETS. This can be achieved in different ways.

1. Address mitigation potentials that the carbon price cannot address
2. Provide the right framework conditions so that the carbon price will work
3. Mitigate unwanted side-effects through flanking measures
4. **Ensure a proportionate and leveled approach:**
A coherent policy mix should provide a similar incentive across sectors to ensure emission reduction at reasonable cost

How can complementary policies support the ETS?

4. Ensure proportionate and leveled approach

EU experience

- Several EU Member States have introduced carbon taxes in addition to the EU ETS (Sweden, Ireland, France) in sectors or to installations not covered by the EU ETS (e.g. road transport or small emitters). The intention is to have a comparable incentive for ETS and non-ETS emitters.
- All EU countries impose taxes on fuels used outside the ETS (in particular transport and heating fuels). The tax level is not always linked to the carbon content, and they are labelled differently (energy taxes or ecotaxes), although their function is similar to a carbon tax.
- In 2013 the UK introduced the Carbon Price Support. National carbon tax (of about € 20) on emissions from electricity generation to augment the ETS price.

Outline

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Which types of climate policy instruments are there?

Policy Types	Rationale
Price-based instruments	Create an economic incentive to encourage low-carbon choices by the covered economic actors (emitters, investors, consumers); do not prescribe a certain technology or outcome (technology-neutral)
Command-and-control regulation	Define a standard that prescribes a certain outcome or the use of a certain technology; standard is typically mandatory for the covered actors
Technology support policies	Encourage certain (low-carbon) technologies through direct or indirect support: make the technologies themselves cheaper, invest into supporting infrastructure, create public demand to cover the learning costs of new technologies
Information and voluntary approaches	Provide better information about the available options (technologies, products) and their environmental performance, change underlying norms and values to encourage climate-friendly behaviour

Examples of climate policy instruments

Policy Types	Policy Instruments
Price-based instruments	Emissions Trading Systems Carbon / CO₂ taxes Other climate taxes (e.g. on vehicles, airline tickets etc.) Subsidies for emission reduction activities
Command-and-control regulation	Technology standards (e.g. minimum energy performance standards) Performance standards (e.g. fleet average CO₂ vehicle efficiency) Prohibition or mandating of certain products or practices Reporting requirements Land use planning, zoning
Technology support policies	Public and private RD&D funding Public procurement Green certificates (renewable portfolio / clean energy standard) Feed-in tariffs Carbon contracts for difference Public investment in clean energy infrastructure Removing financial barriers to acquiring green technology
Information and voluntary approaches	Rating and labelling programmes Public information campaigns Education and training

Outline

- Why is it important to consider overlaps and interactions between ETS and other climate policy instruments?
- What is the Waterbed Effect?
- How can complementary policies support the ETS?
- Which types of climate policy instruments are there?
- How to manage the overlap between ETS and other policy instruments?
- What should be the role of the ETS in the climate policy instrument mix?

Managing the overlap between ETS and other instruments

1. **Start with existing targets and instruments**

Plan / model the expected emission reductions of both currently existing and expected policy instruments based on sectoral targets (esp. energy efficiency or renewables), abatement cost (current and future), abatement potential, etc...

2. **Make assumptions**

about all factors that have an effect on the emissions trend in the covered sectors (other policies, economic growth, fuel prices)

3. **Set the ETS cap**

in line with these assumptions, the contribution of other policy instruments (current and future), and the emission target

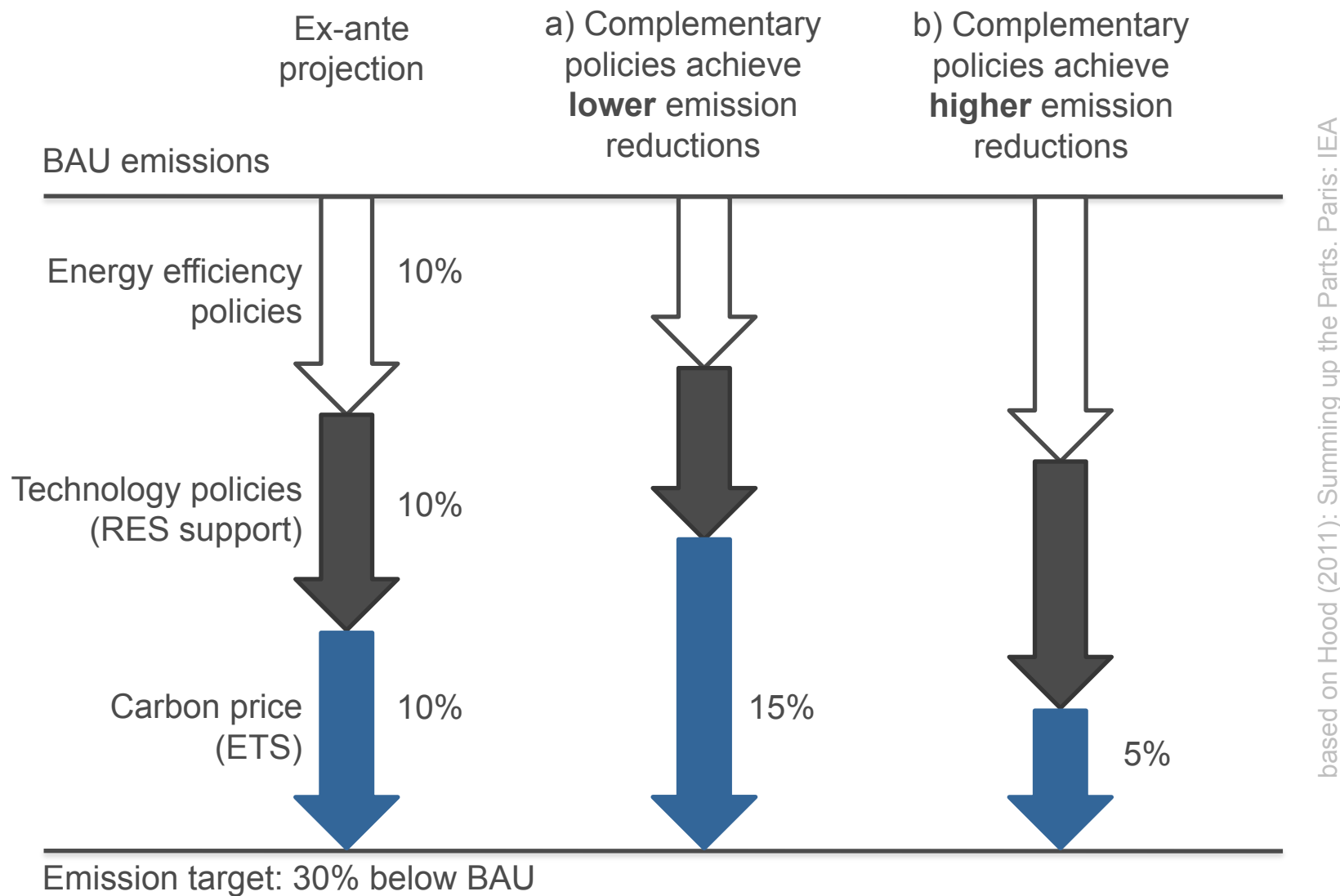
4. **Revisit assumptions periodically**

if necessary, adjust the cap (or the complementary policies)

5. **Implement a market stability mechanism**

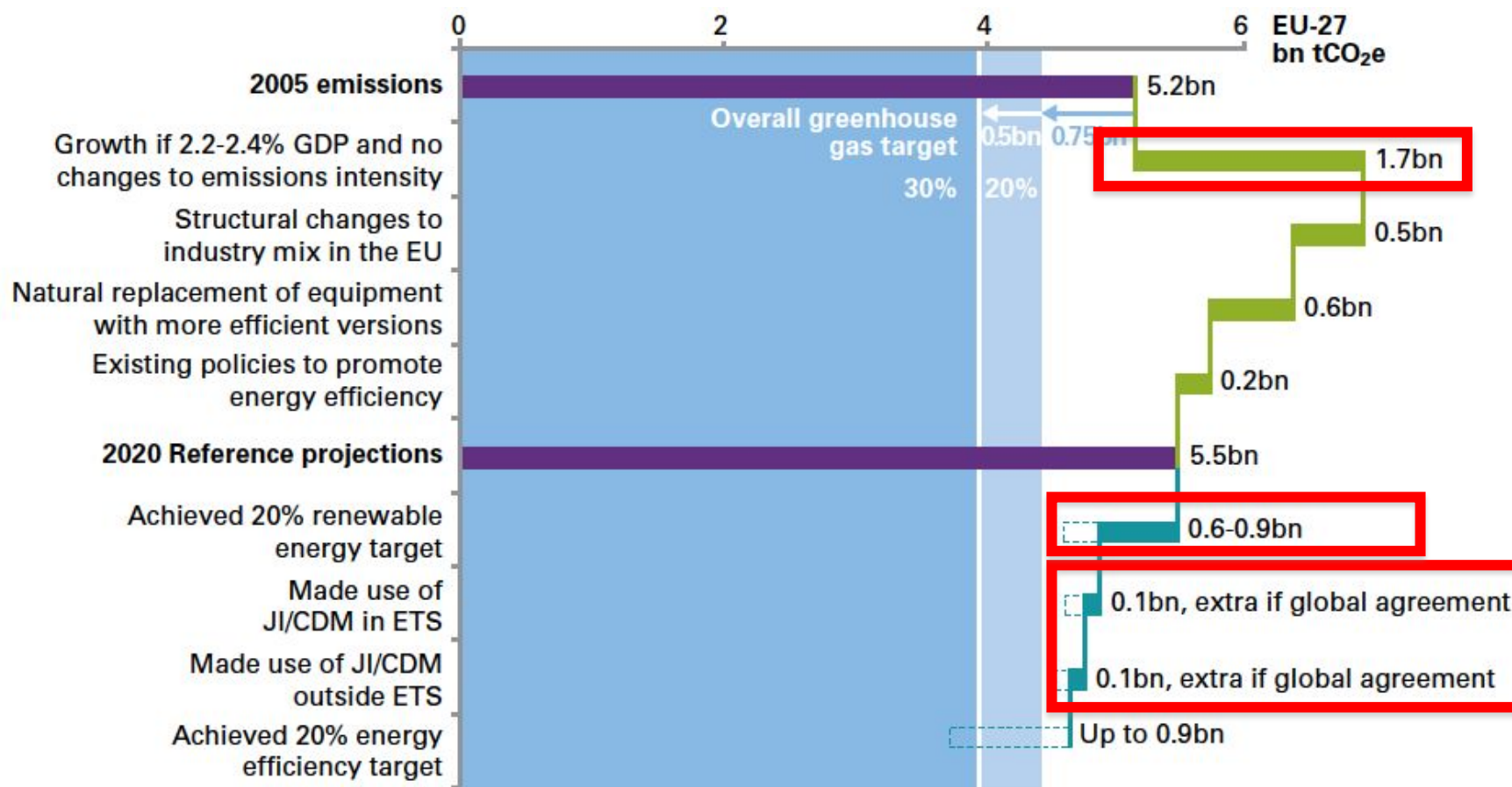
that (automatically) reacts to over- and undersupply of allowances

Accounting for different policies and their influences



Accounting for different policies and their influences:

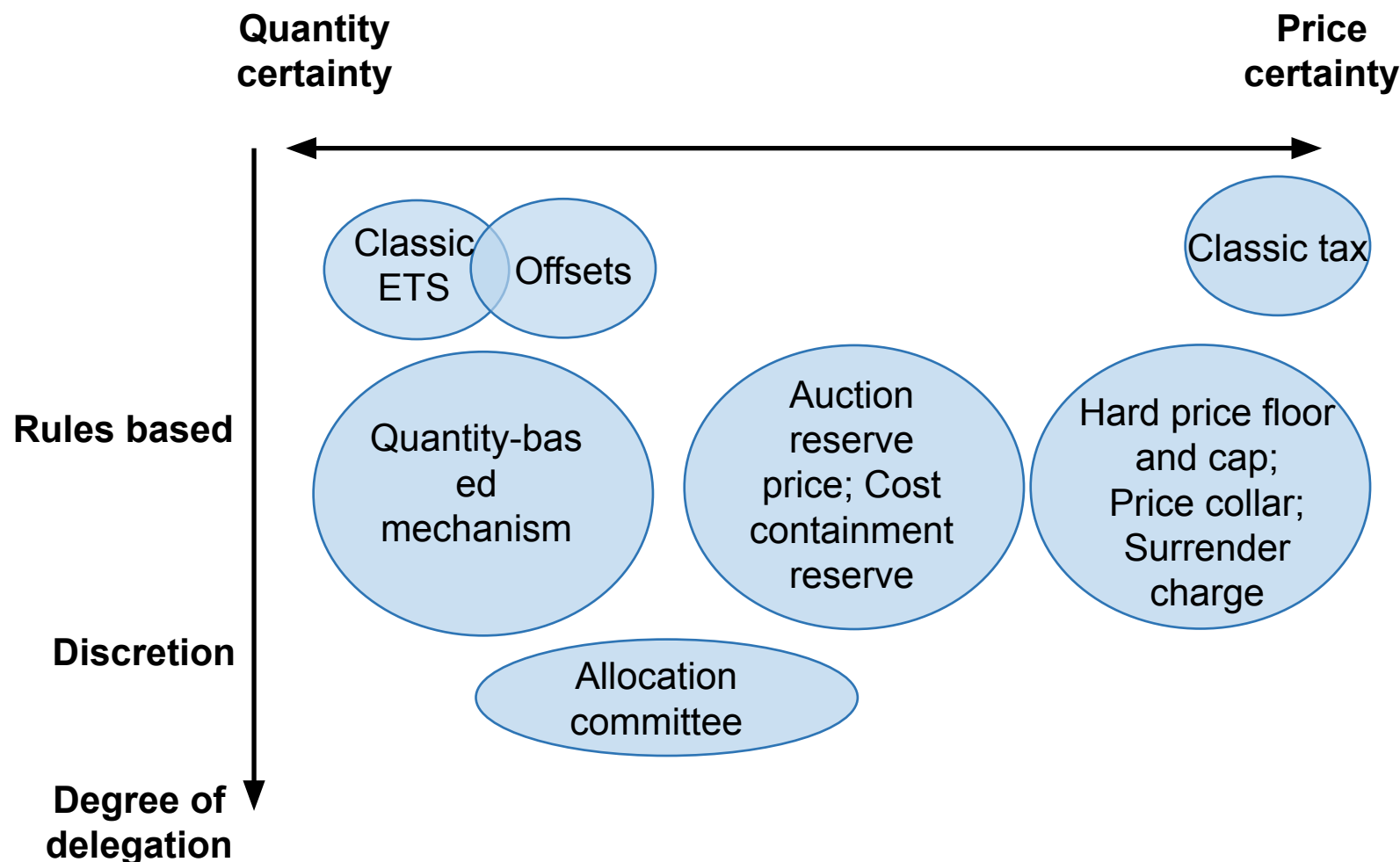
The importance of getting the baseline right: in 2008, the modelling for the EU ETS cap assumed annual GDP growth of 2.2%. In reality, due to the financial crisis, real GDP in the EU only grew by 0.9% per annum on average since 2008.



Source: Carbon Trust 2008, Cutting Carbon in Europe

Implement a market stability mechanism

An ETS can adjust to changing conditions using:

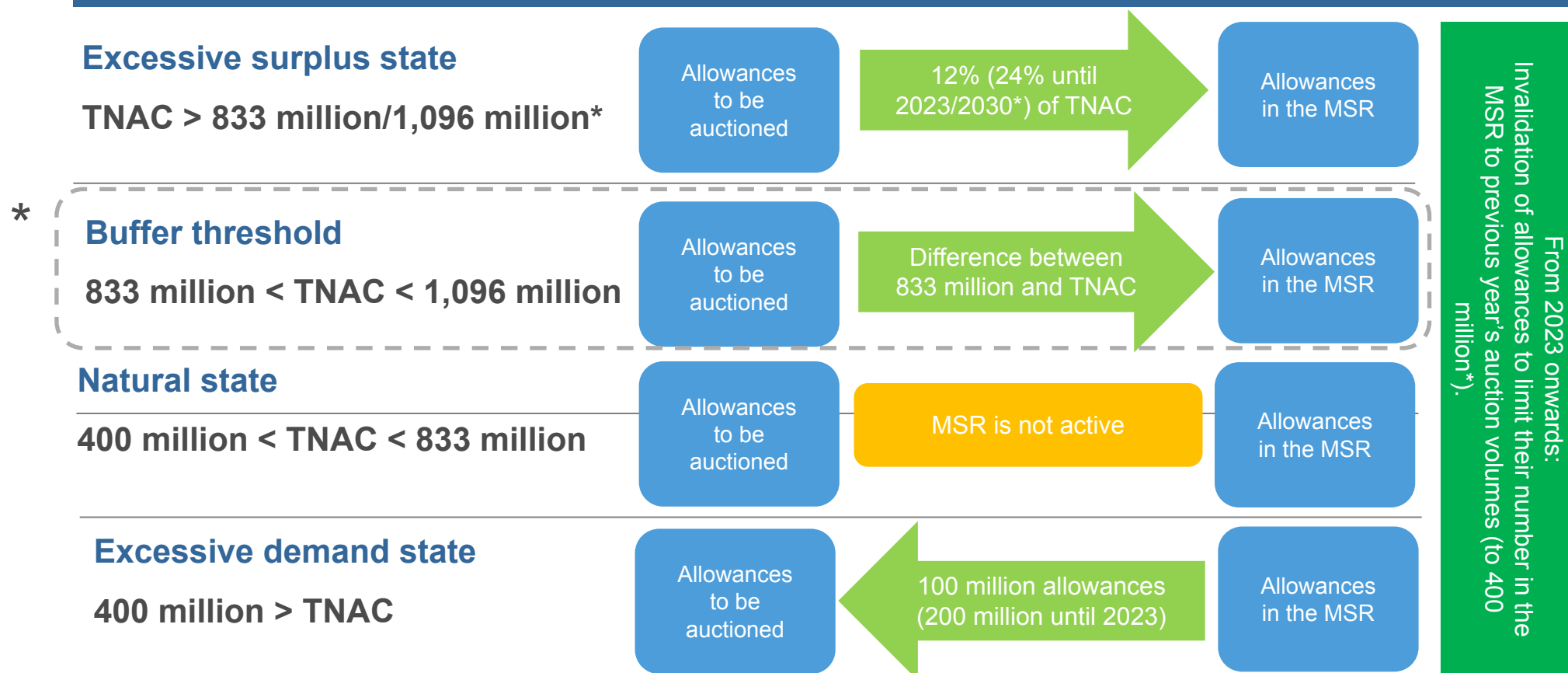


Source: ICAP 2016 based on Grosjean et al. 2014

Case study: EU ETS Market Stability Reserve (MSR)

Total Number of Allowances in Circulation (TNAC)

= allowances issued *minus* verified emissions and cancelled allowances



*According to Fit-for-55 legislative package proposal by European Commission from 14 July 2021

Source: Based on PMR & ICAP 2021

Outline

- Why is it important to consider overlaps and interactions between ETS and other climate policy instruments?
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- What should be the role of the ETS in the climate policy instrument mix?

Role of the ETS in the Climate Policy Mix

- The transition to a low-carbon economy is a complex process that cannot be planned precisely. Climate policy should be efficient but should also be resilient to surprises. ETS provides the quantified frame for climate policy.
- Carbon pricing is efficient, but additional instruments are needed. Each instrument has its function in the policy mix. Interactions between the different instruments need to be monitored and managed.
- Managing the interaction also means revisiting and occasionally changing the system.
- ETS as the flagship instrument of Climate Policy. ETS price signal can and should do some of the heavy lifting in the process of decarbonization.
- ETS as a safety valve to make sure that emissions meet long-term target, no matter how other policies (under-/over-) perform and how other parameters evolve (fuel prices, innovation, consumption, population)

Market Operation under EU ETS & Registry Demo

European Energy Exchange (EEX)

25 June 2025



Agenda

- EEX Group Introduction – Hsin-Yi Huang, Business Developer, EEX
- EEX's role in EU ETS Auction – André Tzschope, Expert Environmental Markets, Environmental Markets, EEX
- A Glance at the Auction System – Andrew Rimmer, Head of Development, KB Tech
- Secondary Markets & FAQ – Steffen Loebner, Head of Environmental Markets, EEX

EEX Group Intro & Products

01



European Energy Exchange Markets and Services

Exchange

- European Energy Exchange (EEX): Leading Energy Exchange in Europe
- Develops, operates and connects secure, liquid and transparent markets for energy and commodity products

Markets

-  Power  Freight  Agricultural products
-  Natural Gas  Environmental  Registry Services  Guarantee of Origins (GO) / Renewable Energy Certificates (RECs)

Settlement

- Clearing and settlement of trades is performed by the clearing house ECC (Europe, Asia) and by Nodal Clear (USA)

Owner

- EEX belongs to Deutsche Boerse Group (75,05%) 
- Saxony's shareholders include the State of Saxony and the City of Leipzig. (7,94%)
- Other shareholders of industrial, energy and financial companies, including Uniper, EnBW, EdF (17,03%)

Group

➤ eex ➤ epexspot ➤ eexasia ➤ ecc ➤ pxe
➤ nodal ➤ nodalclear ➤ getbaltic ➤ grexel

Strength

1

in Power Trading worldwide

2

in Gas Trading worldwide

Growth

More than

850

Trading participants
from 41 countries, thereof >300 for carbon
markets. The list of participants is available
on our website ([Link](#))

1

in the diversity of
environmental products

Trust

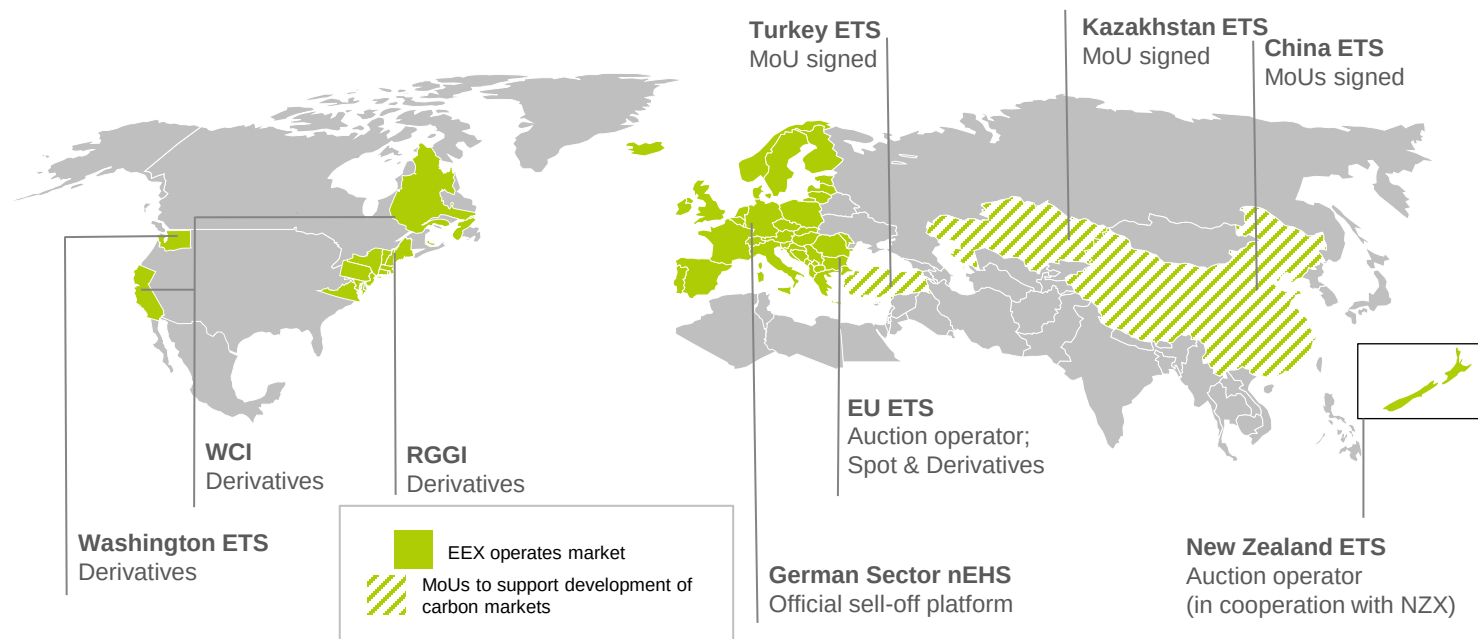
22

offices in 8 time zones on 4
continents

> 3,000

Emissions Auctions in the EU ETS

Carbon markets at EEX Group



Europe – Core market EU ETS1 with EU ETS 2 as enlargement of covered sectors is on the horizon

	EU ETS1	- Auction operator for all EU governments, operating auctions on almost daily basis - Secondary Market (Spot, Futures, Options)
---	----------------	--

	German nEHS	- Official sell-off platform for German Fuel ETS (transport, heat sectors)
---	--------------------	---

NZ – Key tool for meeting NZ and international climate targets

	NZ ETS	- Auction partnership with New Zealand Exchange (NZX)
---	---------------	--

NA – Growing NA markets with new schemes being developed on state level and first offering of VCM products

	RGGI, California, Washington, Western Climate Initiative	- Futures & Options - Other Environmental Markets (RECs, RINs, SO₂/NO_x)
	Voluntary Carbon Market	- VCM product suite (e.g. CORSIA-eligible, Nature-based, Removal) listed at Nodal

International – Supporting the development of emerging carbon markets worldwide

International cooperation	- EEX has signed MoUs with exchanges in China, Kazakhstan and Turkey targeting the development of national carbon markets.
----------------------------------	---

Carbon markets at EEX Group

Toolkit EEX - Market Offering



Registry provider for environmental markets

- Transparent and secure registry, monitoring the carbon stock of the market
- Grexel (part of EEX Group) operates different environmental registries on behalf of the national governmental institutions



Technology provider

- Technology platform for governments and institutional operators
- Cooperation with National stock exchange for New Zealand (NZX) for the New Zealand ETS
- IT portfolio consisting of different solutions to meet the dedicated requirements per market



Service provider

- Operating auctions, sales platforms or RFQ on behalf of governments and other institutional providers
- Operating the EU ETS auctions successfully since 2010



Continuous products for the secondary market

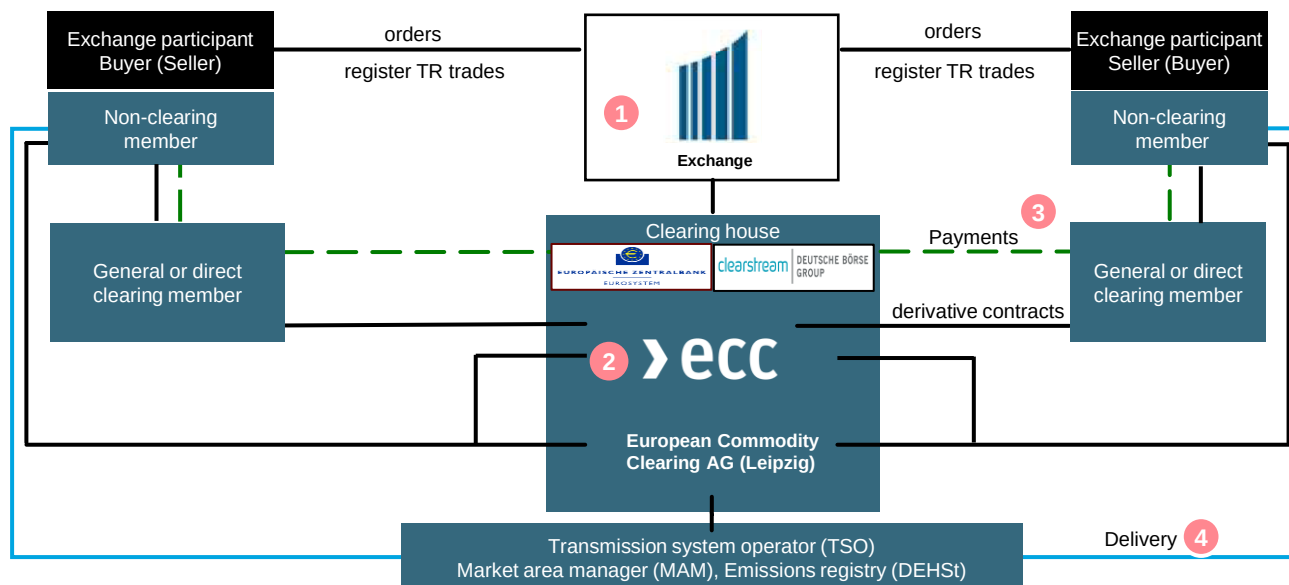
- Launching spot, futures and options with different expiries matching the need of the market to increase liquidity
- Financial clearing of OTC business
- Physical fulfillment of trades through ECC
- Setting clear price signals in carbon markets

Exchange Structure

The EEX group develops, operates and connects secure, liquid and transparent markets

Standardized contracts are listed and traded/registered at European Energy Exchange (EEX AG) and ready for clearing.

Clearing and settlement of all trading transactions are provided by the clearing house European Commodity Clearing (ECC AG).



> eex

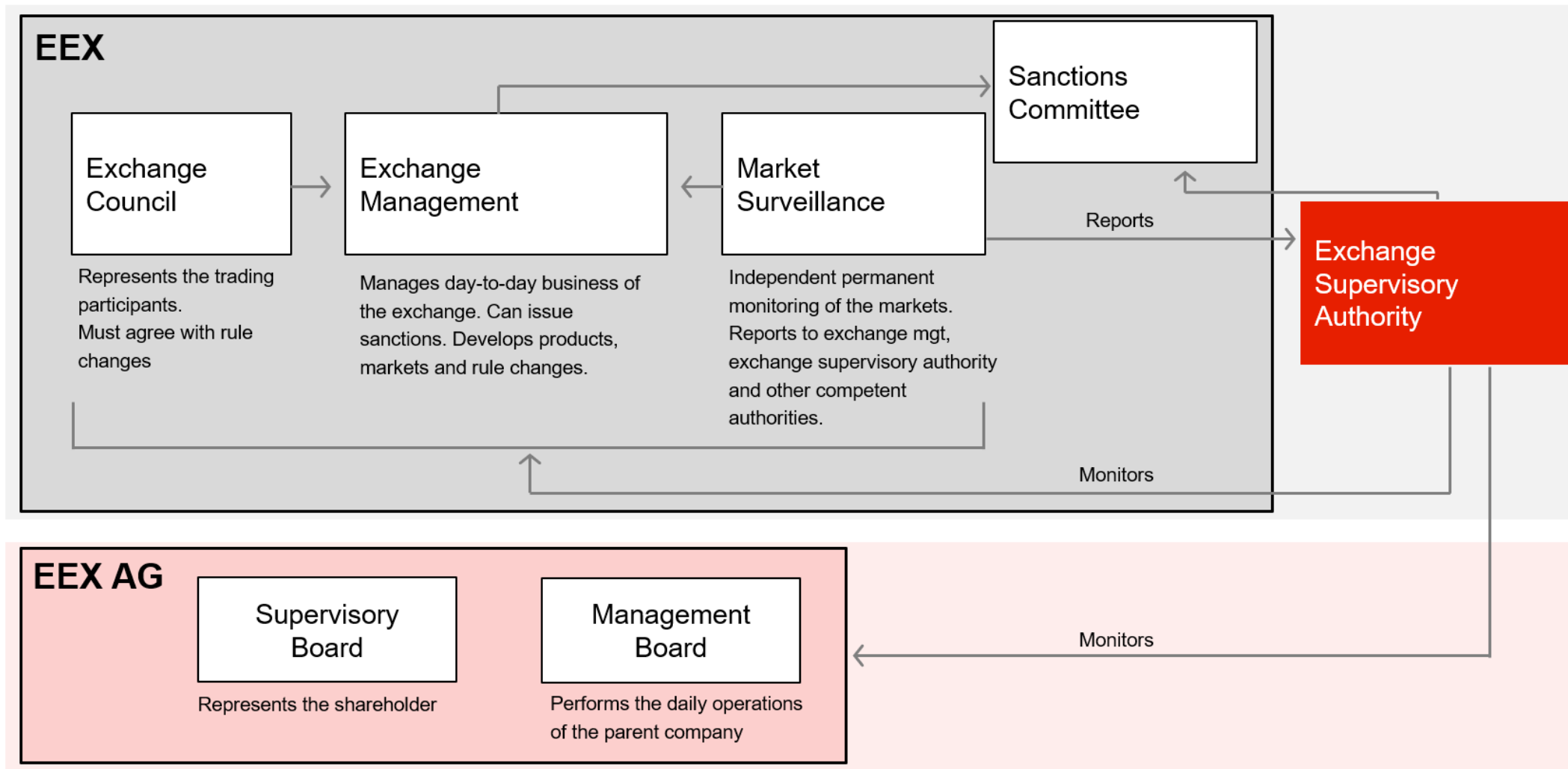
- Transparency: through recognized reference prices and the publication of market data (prices and volumes)
- Concentrated Liquidity: Access to trading participants
- Eliminate counterparty risk
- Anonymity in trading: ensure non-discrimination and equal treatment of all trading participants

> ecc

- Physical settlement (delivery)
- Financial settlement (payment)
- Risk management services
- Straight-Through Processing (STP)
- Reporting Services

Exchange Bodies and Supervision

Various exchange bodies play a part in **ensuring the trustworthiness** of exchanges through both internal and external controlling processes.



EEX's product portfolio in emissions markets

EEX offers companies access to all existing EU ETS markets

A Primary market : EUAs auctioned

Auctions with physical delivery of allowances on the next day for:

- EU Allowances (EUA)

- ✓ Auctioning is the **default allocation method** in the EU ETS. 57% of allowances are auctioned.
- ✓ **As appointed Common Auction Platform, EEX operates auctions** for EU member states, EEA EFTA states and the UK in respect of generation of electricity in Northern Ireland.

B Secondary market : EUAs traded between market participants

Trading with physical delivery of allowances the next day for:

- Spot EU Allowances (EUA)

Trading with physical delivery of EUAs 2 days after expiry of the contract:

- Monthly Futures for the current and next two months
- Quarterly Futures for the current and next 11 quarters
- Yearly Futures with December maturities for the current and next 8 years
- Options of the above futures maturities

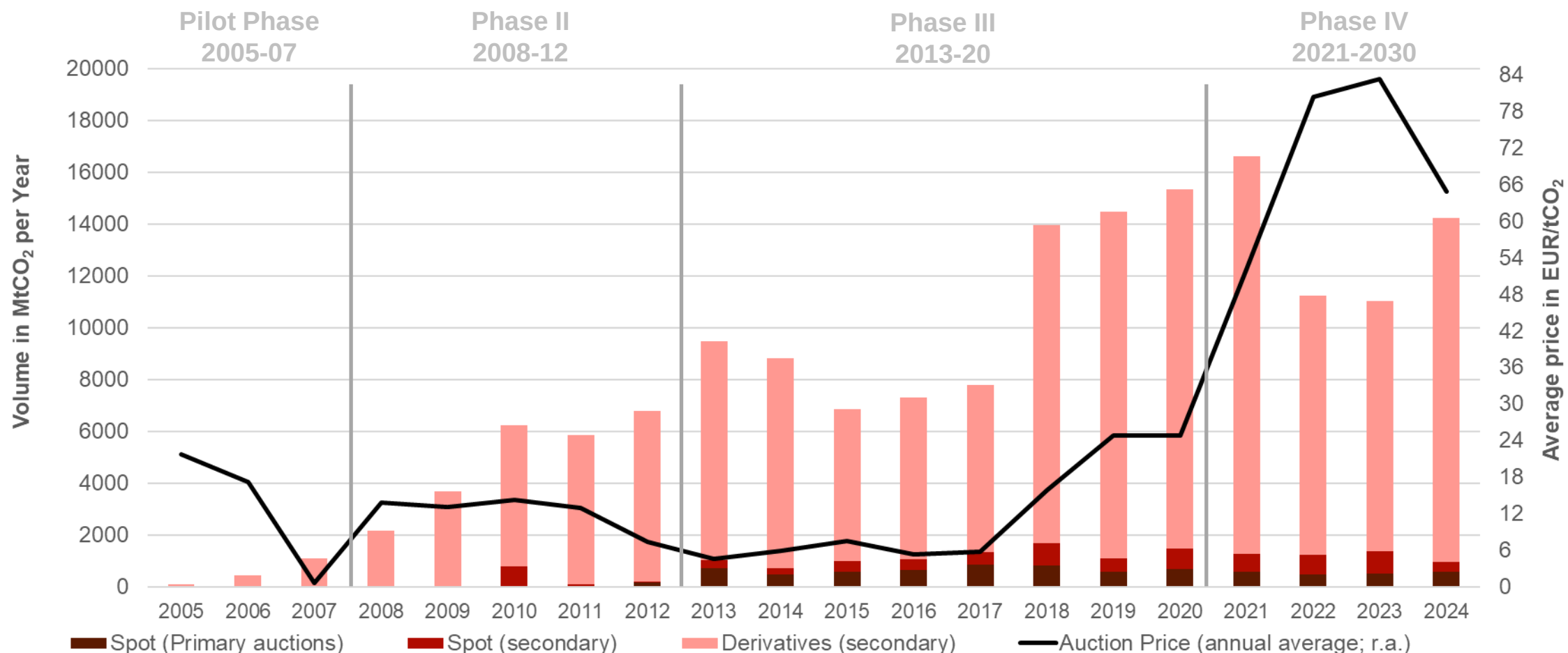
- ✓ EUAs traded between market participants are **traded close to 100% on exchanges, the most secure method.**
- ✓ Comprehensive risk management combining **long-term management of price risk** up to 9 years in advance with **short-term optimization of their portfolio.**

Auction

03

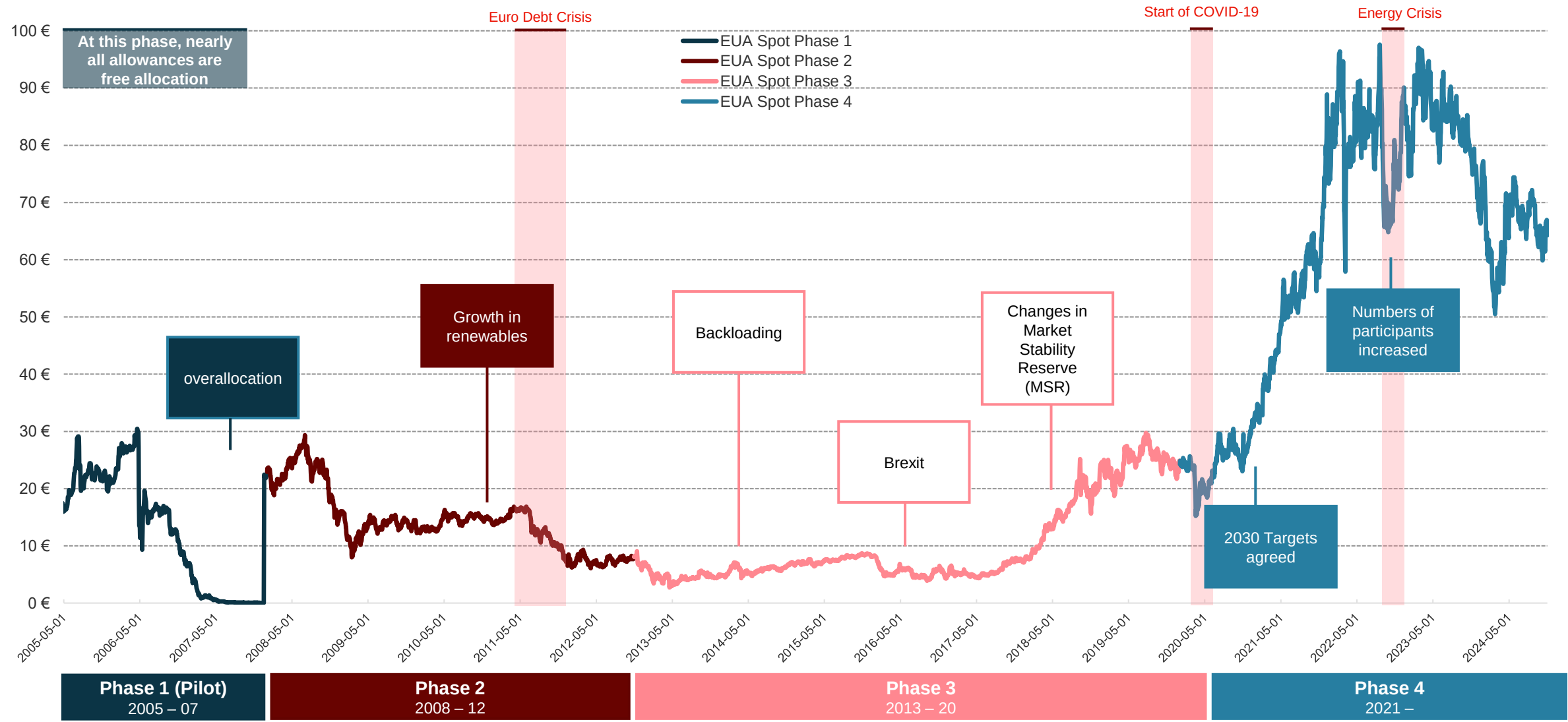


Trading Volumes and Prices – EU ETS



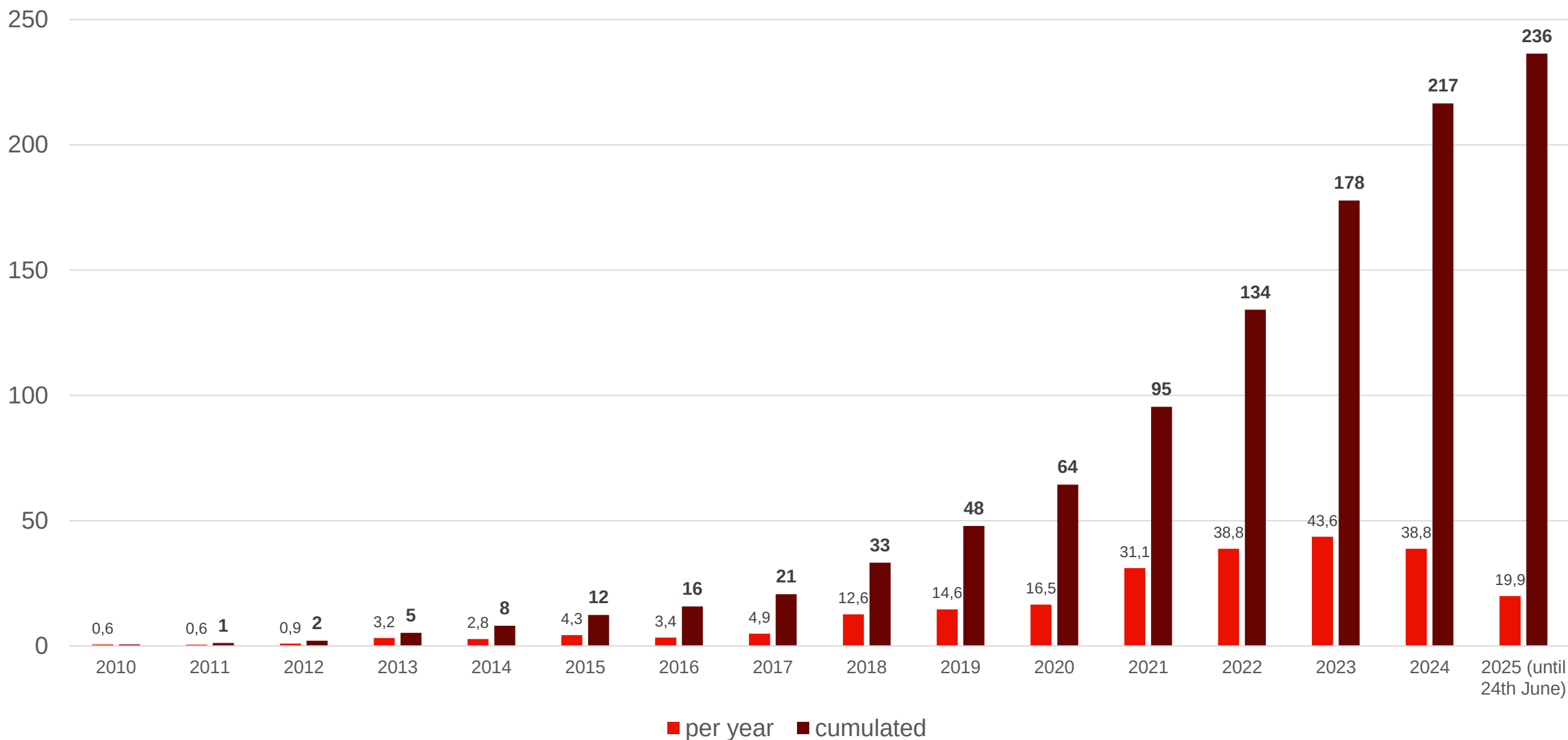
- The **EU ETS** has helped bring down emissions from power and industry by nearly 50% since 2005, and the money raised each year through the auctioning of carbon permits brings in a **substantial amount of income to the bloc**, with billions channeled towards clean energy projects.
- EEX successfully conducted **more than 3,000 EU ETS auctions** since 2010, by running EU ETS auctions almost **every weekday**

EU ETS Allowance (EUA) Historical Prices Development 2009 - 2024



Source: EEX, 2024

Auction Revenues generated for EU ETS countries via EEX auctions in billion EUR



Source: EEX, 2025

What are Emissions Auctions?



Auctioning is the basic principle of allocating allowances within the EU Emissions Trading System (EU ETS).

- Businesses have to buy an increasing proportion of allowances through auctions in accordance with **EU Auctioning Regulation** (Commission Regulation (EU) No.2023/2830).
- EEX allocates **100%** of all allowances auctioned in the EU ETS



Auction Product	Delivery Day	Contract size	Contract Size	Minimum Size	Tick Size	Fulfillment
EU Allowances valid for compliance in the EU ETS	T+1	1 EUA	1 EUA	500 EUAs (=500 t CO2eq)	EUR 0.01 per allowance	Delivery versus payment

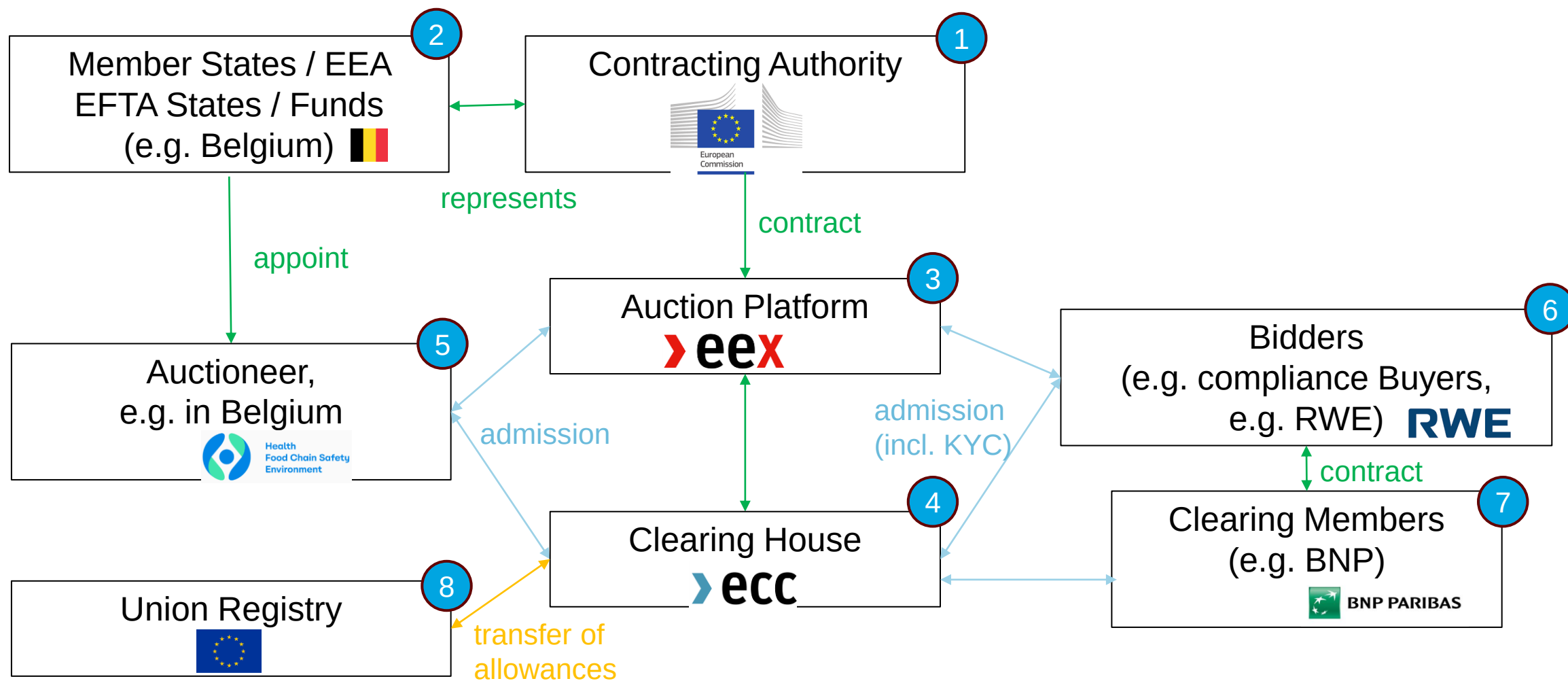


Eligibility: all participants have to fulfil admission requirements according to EU and EEX rules

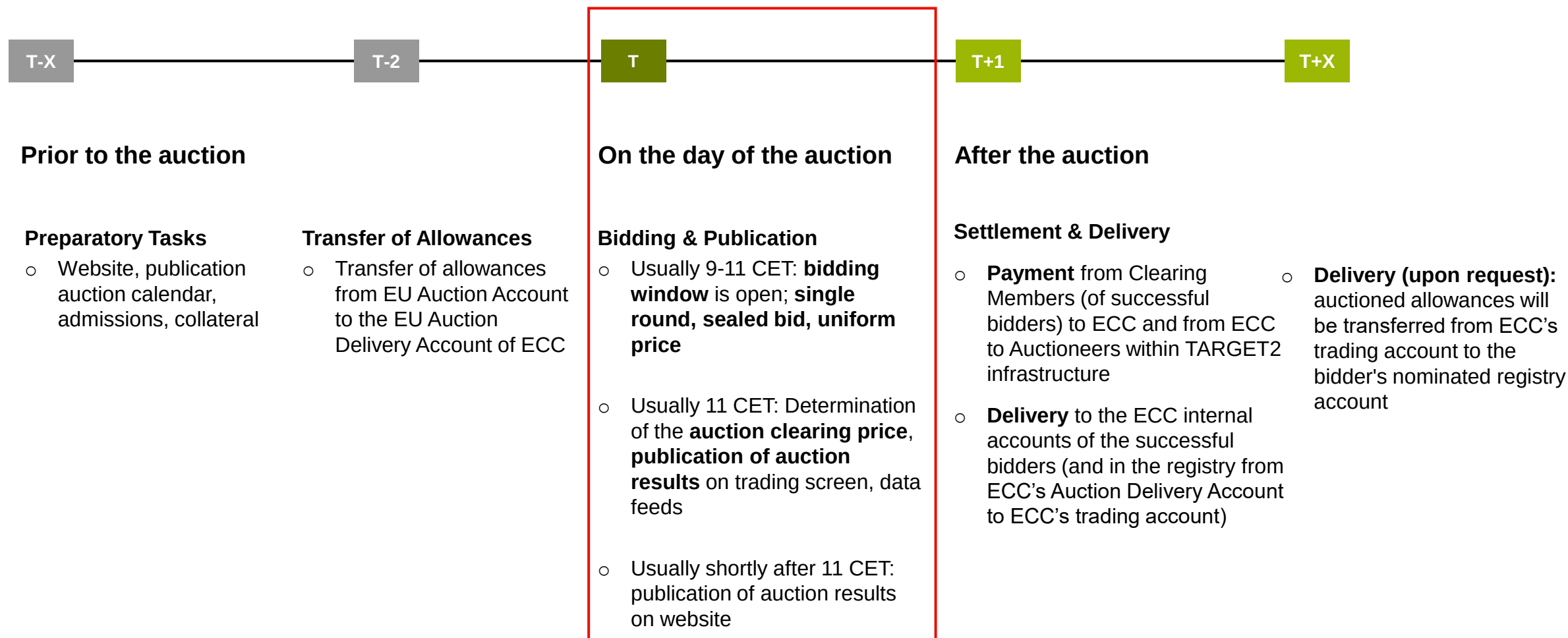
Participants (currently 116 admitted):

1. Compliance buyers (operators of stationary installations, aircraft operators, shipping companies)
2. Investment firms and credit institutions bidding on their own account or on behalf of their clients
3. Business groupings of compliance buyers
4. Other intermediaries specifically authorised by the home Member State

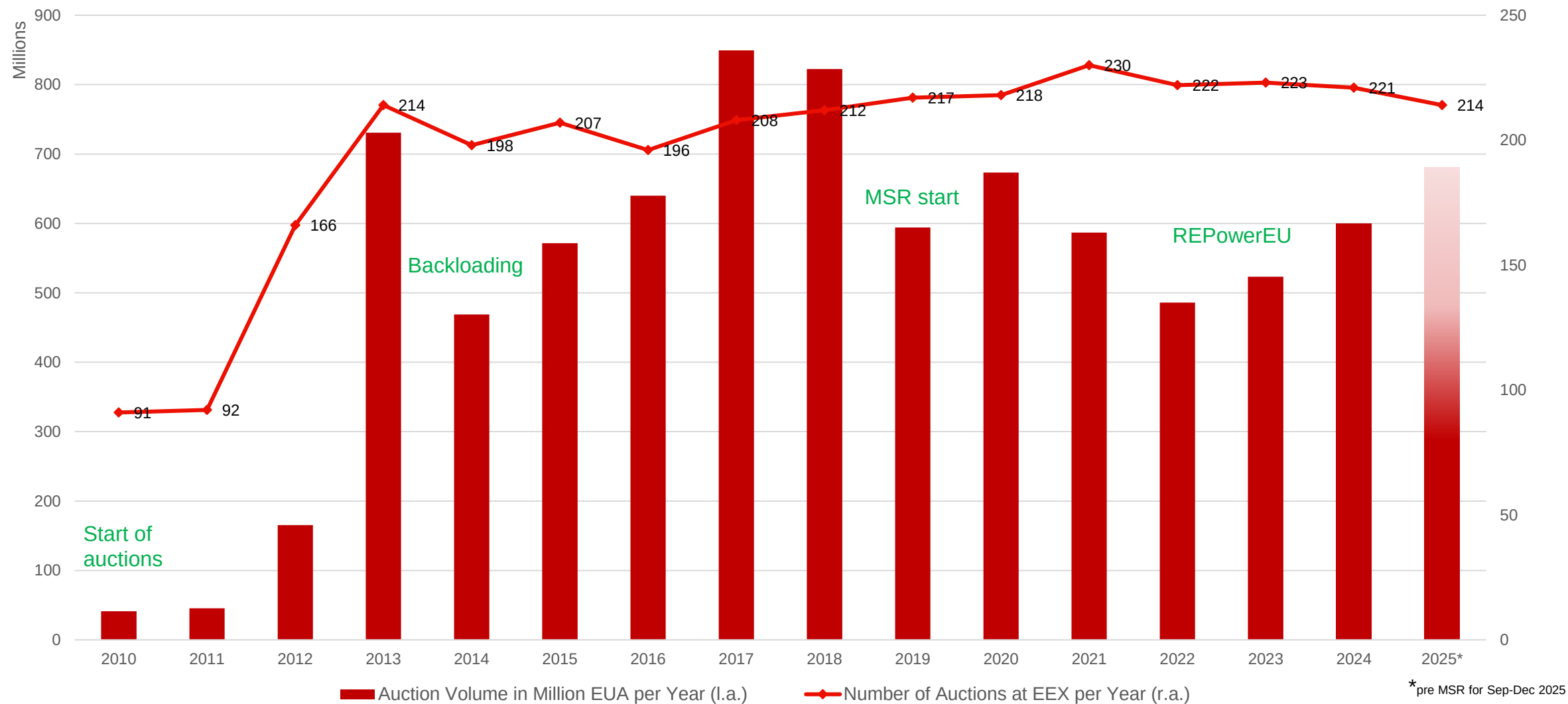
EU ETS auctions: main roles



EU ETS Auctions: auction processes



EEX auctions for the EU ETS



➔ More than 3,000 successful auctions (+12 cancelled auctions) to date for more than 8 quadrillion allowances

Comparison of current EEX emission allowances auction mandates

	EU ETS 	nEHS 	NZ ETS 
Jurisdictions	All 27 EU Member States + 3 EEA EFTA States	Germany	New Zealand
Start of operation	2005 (auctions since 2010)	2021 (auctions planned as of 2026)	2008 (auctions since 2021)
Sectoral coverage	Power, Industry, Domestic Aviation	Transport, Buildings	Power, Industry, Domestic Aviation, Forestry, Waste, Transport, Buildings
Contractual relationship	EEX/ECC contracts with European Commission, Germany, Poland individually	EEX/ECC contract with Germany	EEX contract with local exchange NZX as provider of auction system and knowledge
Cap 2024	~ 1,414 MtCO ₂ e (EUA)	~ 280 MtCO ₂ e (nEZ)	~ 22 MtCO ₂ e (NZU)

Auction System Demo

02



Secondary Markets

03



Comparison Primary and Secondary Emissions Market

Topic	Primary Market	Secondary Market
EEX worldwide	#1	#2
Trading	Auction (in M7 Auction) EUA usually 9-11am (almost daily)	Continuous Trading (in T7) 8am – 6pm (daily)
Participants can	Buy	Buy and Sell
Determination of Calendars and Tables	●	
Admission	●	●
Reserve Price	●	
Reporting	●	●
Market Surveillance	●	●
Registry	●	●
Clearing and Settlement	On T+1	Secondary Spot: On T+1 (if concluded until 4pm) Secondary Futures: second ECC business day after the last trading day

EEX's product portfolio in emissions markets

All important compliance instruments are offered for trading:

Spot

Derivatives

Primary Market

Spot auctions with T+1 delivery

EU Allowances (EUA)

Secondary Market

Spot trading with T+1 delivery

EU Allowances (EUA)

*Futures trading with T+2 delivery after expiry, incl.
related spreads*

EU Allowances (EUA) up to 2027

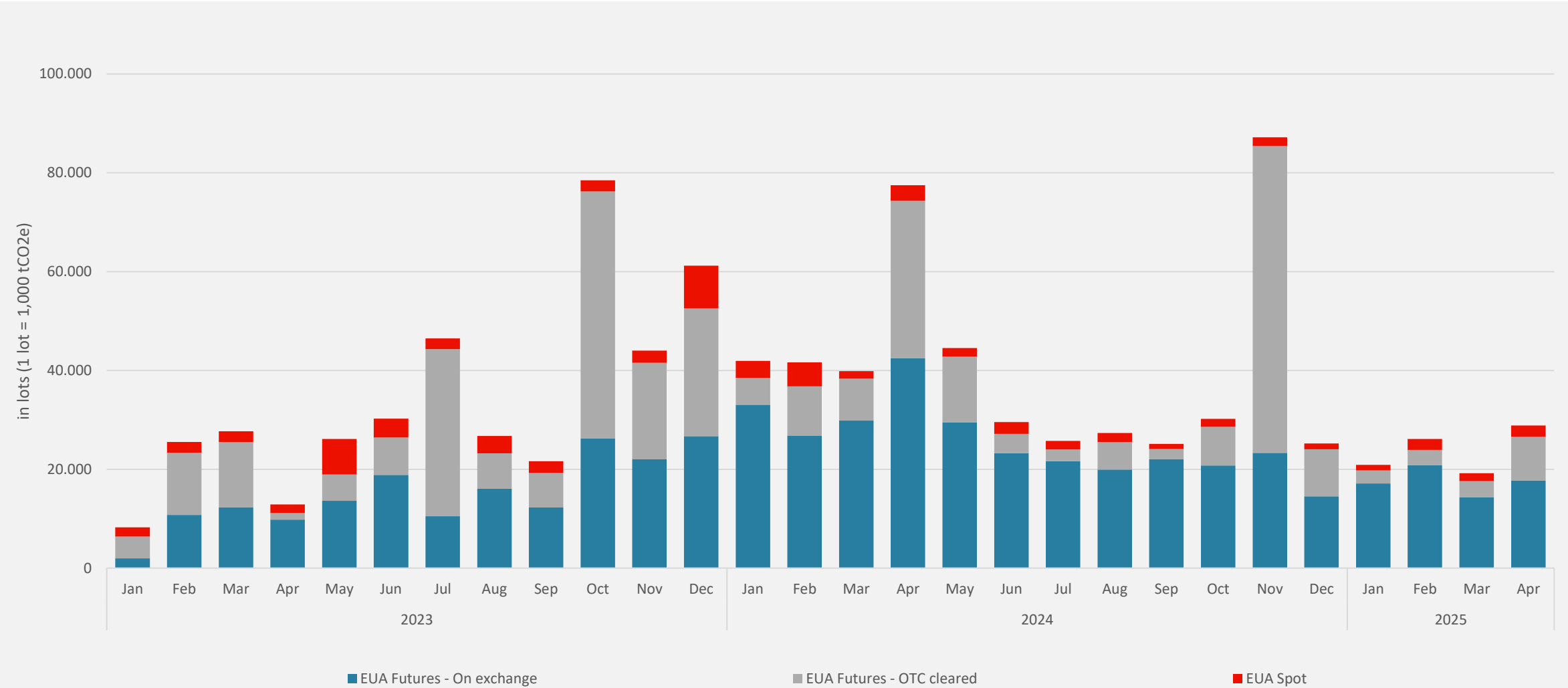
Options trading on Futures

EU Allowance (EUA) Futures

Clearing and settlement of trades are rendered by EEX's clearing house European Commodity Clearing AG.

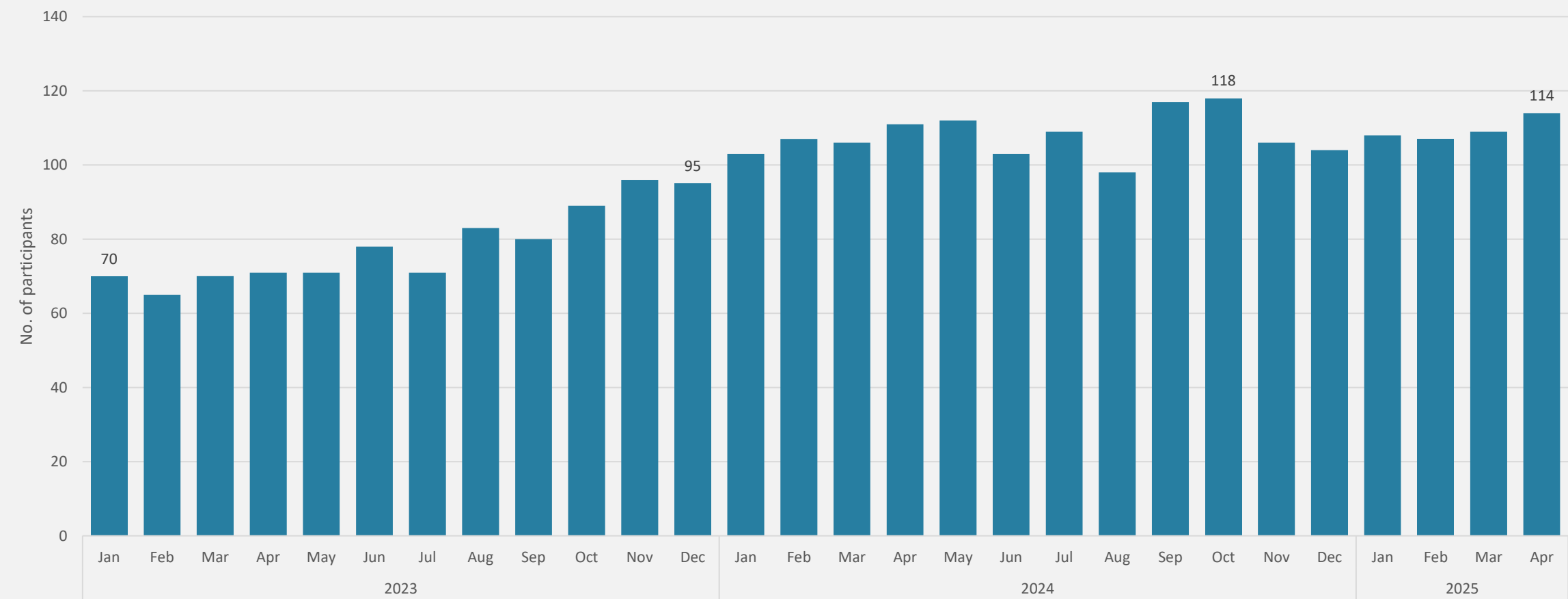
EUA Secondary Market

EEX Volume development in lots



EUA Secondary Market

Active participants per month





part of eex group



Frequently Asked Questions

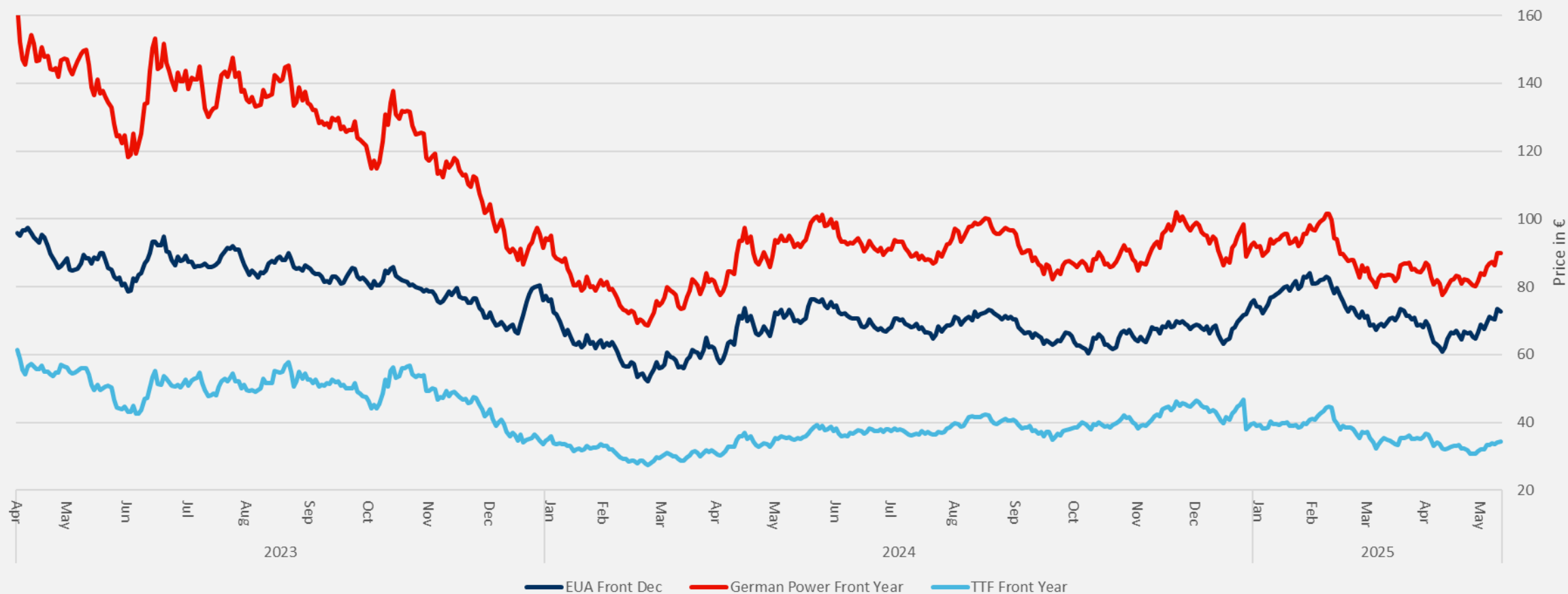
Interaction Carbon Price with Energy Prices



Power traders often refer to fuel prices and carbon prices as basis for price changes. Carbon traders on the other hand refer to power, gas and coal prices. Both kind of traders are also very interested in (Clean) Dark and Spark Spreads. (gross margins of power plants from selling a unit of electricity, having bought the fuel (+ emission allowances) required to produce this unit of electricity)

EUA Secondary Market

EUA Front Dec, German Power Front Year, and TTF Front Year – Price Development



Following a six-month low on April 9th due to geopolitical disruptions, EUA prices have steadily recovered, reaching pre-tariff levels by early May.

part of eex group



Q&A

Contacts

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環境部

Ministry of Environment

Taiwan's carbon fee and carbon pricing plans

*Climate Change Administration,
Ministry of Environment*

25 June, 2025



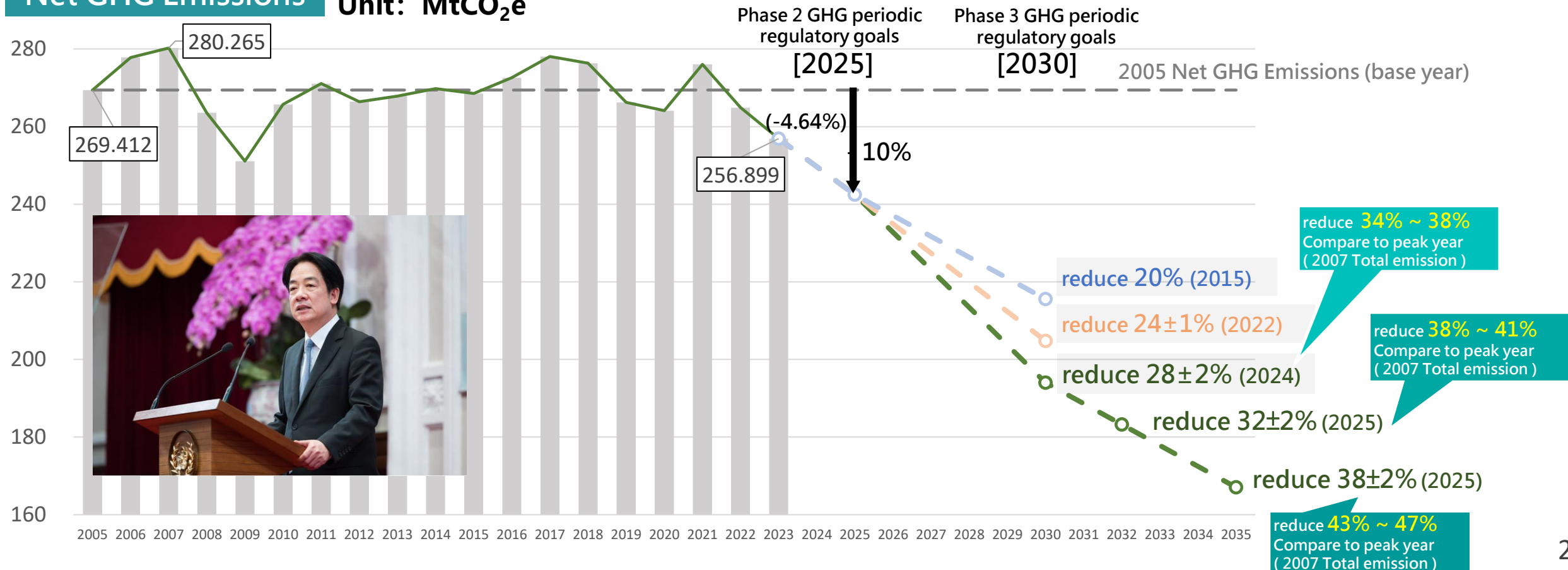


Setting Carbon Reduction targets

- Taiwan promulgated amendment for "Climate Change Response Act" in 2023, initiating the implementation of net zero emissions by 2050.
- President Lai proposed a draft proposal on 23 Jan. 2025, setting Taiwan's new 2035 NDC targets at emissions reductions of $38 \pm 2\%$, compared with 2005, to keep up with the global NDCs 3.0 submission trend.

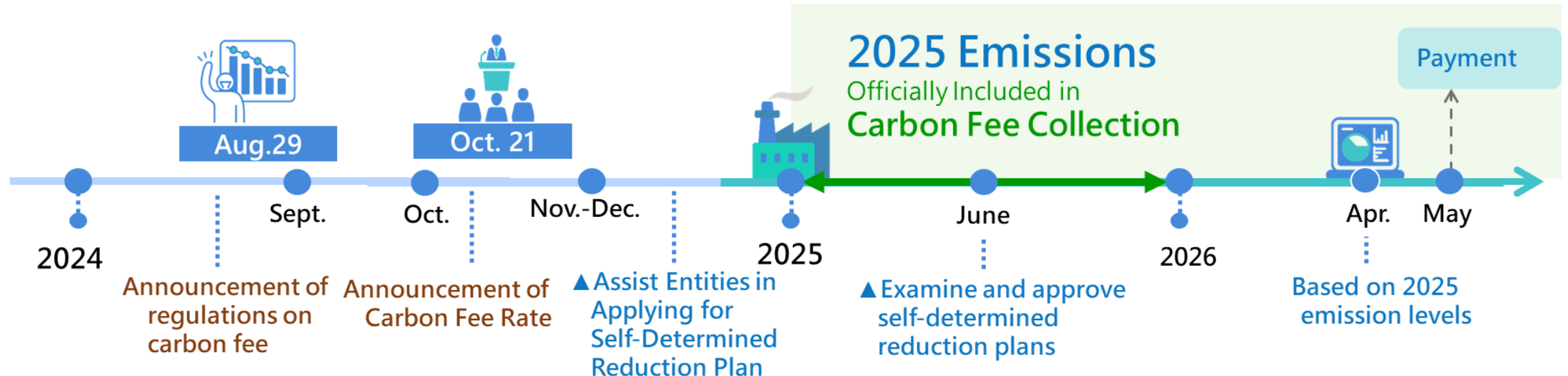
Net GHG Emissions

Unit: MtCO₂e



Implementation of Carbon Pricing

- On **August 29, 2024**, the Ministry of Environment (MOENV) announced the three regulations for the carbon fee system, **officially putting the policy into effect**.
- The carbon fee rates announced on **October 21, 2024**, **have taken effect in 2025** :
 - Standard Carbon Fee Rate: NT\$300 (US\$9.34)** per ton of carbon dioxide equivalent (tCO₂e) for general entities subject to the carbon fee.
 - Preferential Carbon Fee Rate A: NT\$50 (US\$1.56)** per ton of carbon dioxide equivalent (tCO₂e) for entities that apply for a self-determined reduction plan and meet the industry-specific designated reduction rate.
 - Preferential Carbon Fee Rate B: NT\$100 (US\$3.11)** per ton of carbon dioxide equivalent (tCO₂e) for entities that apply for a self-determined reduction plan and meet the technology benchmark designated reduction rate.





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 CO₂e or more.

Payment timing: The fee rates **take effect on January 1, 2025**, the payment for the 2025 emissions must pay carbon fees by the end of May 2026.

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

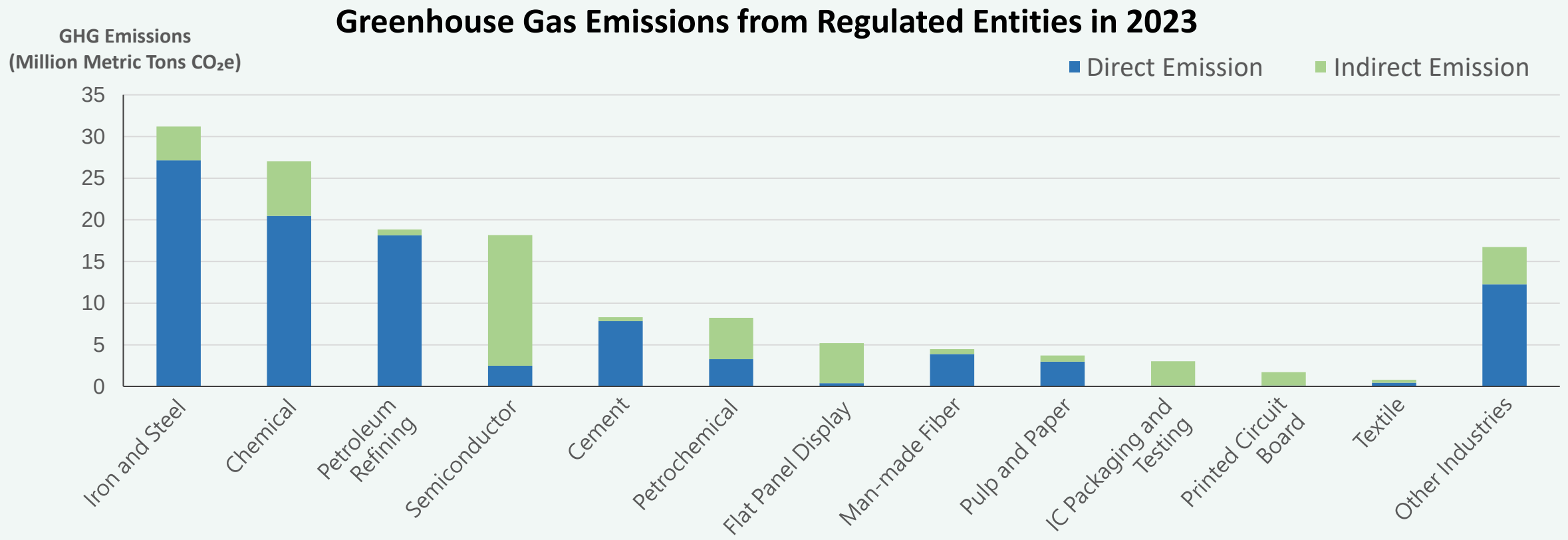
Transitional adjustment mechanism: chargeable emissions = (annual emissions – K) × **emission adjustment coefficient**

1. **For industries classified as emissions-intensive trade-exposed (EITE) industry** (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 EITE industry**, 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%



Sectoral Analysis of Industries Subject to Carbon Fee

- Based on the 2023 inventory registration and verification results of emission sources subject to greenhouse gas inventory, registration, and verification requirements, it is estimated that approximately **260 companies (474 facilities)** will be subject to the carbon fee.
- The greenhouse gas emissions from these regulated entities amount to approximately 147 million metric tons of CO₂ equivalent, accounting for about **54.8% 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 MOENV 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*

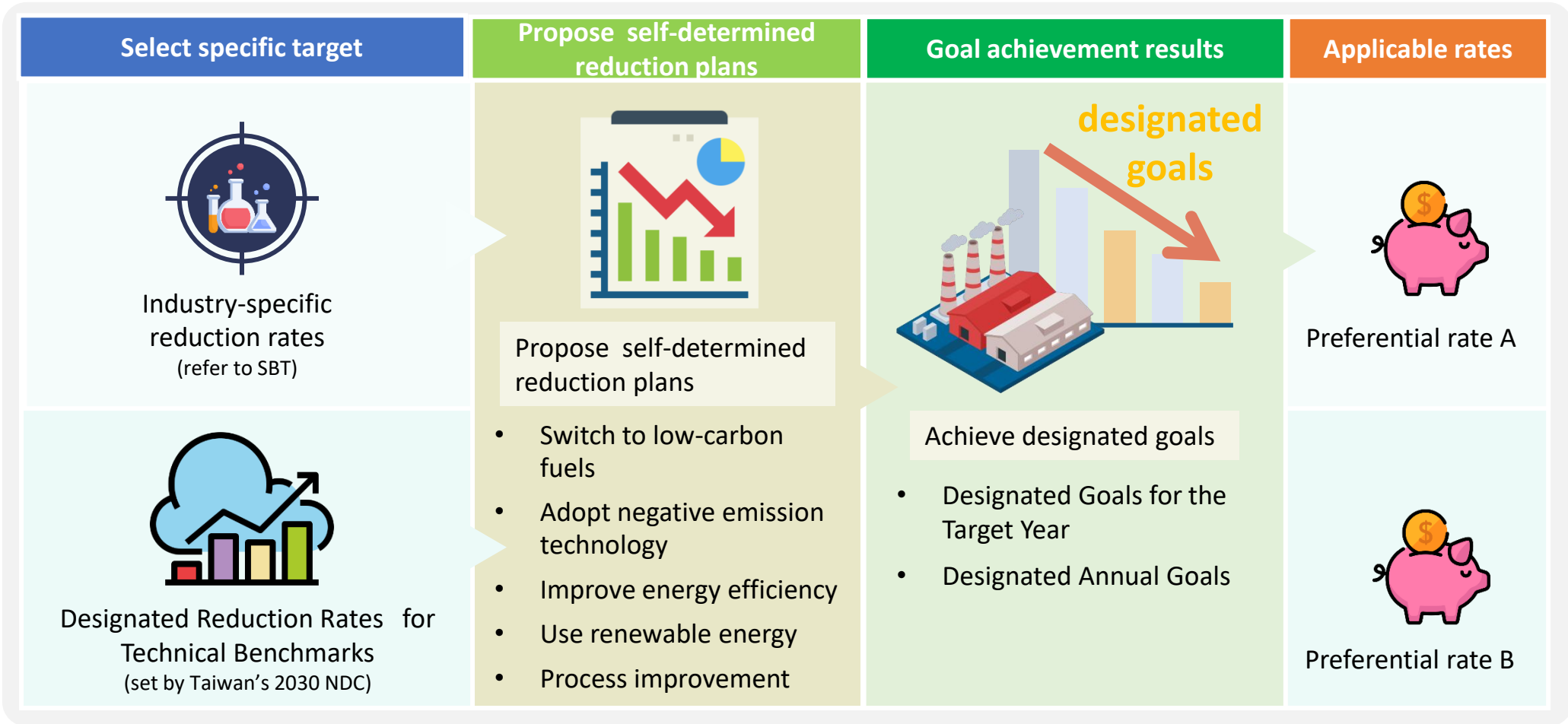
With 2030 as the target year, two designated reduction rates will apply to different preferential rates:

- 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.**



Self-Determined Reduction Plans and designated goals

- Those who can effectively reduce greenhouse gas emissions and meet the targets designated by the central competent authority may propose Self-Determined Reduction Plans and apply to the central competent authority for approval of preferential rates.
- The target year of the specified target is 2030; two calculation methods are provided for enterprises to choose.





High Carbon Leakage Risk Identification

Objective

Preventing carbon leakage risks and reducing the competitiveness challenges faced by regulated entities due to carbon fee policy

Approach

Determine the eligibility of entities for **high carbon leakage risk discount** by considering:
(1) **industry classification** and (2) **maintaining the international competitiveness of industries**

Level 1 : Industry Classification

• Considerations and Conditions

Referring to international practices, considering trade intensity and emission intensity, industries with a Carbon Leakage (CL) indicator exceeding a specified threshold are defined as **high carbon leakage risk industries**.

Eligibility applies through 2030 upon approval

Level 2 : International Competitiveness Consideration

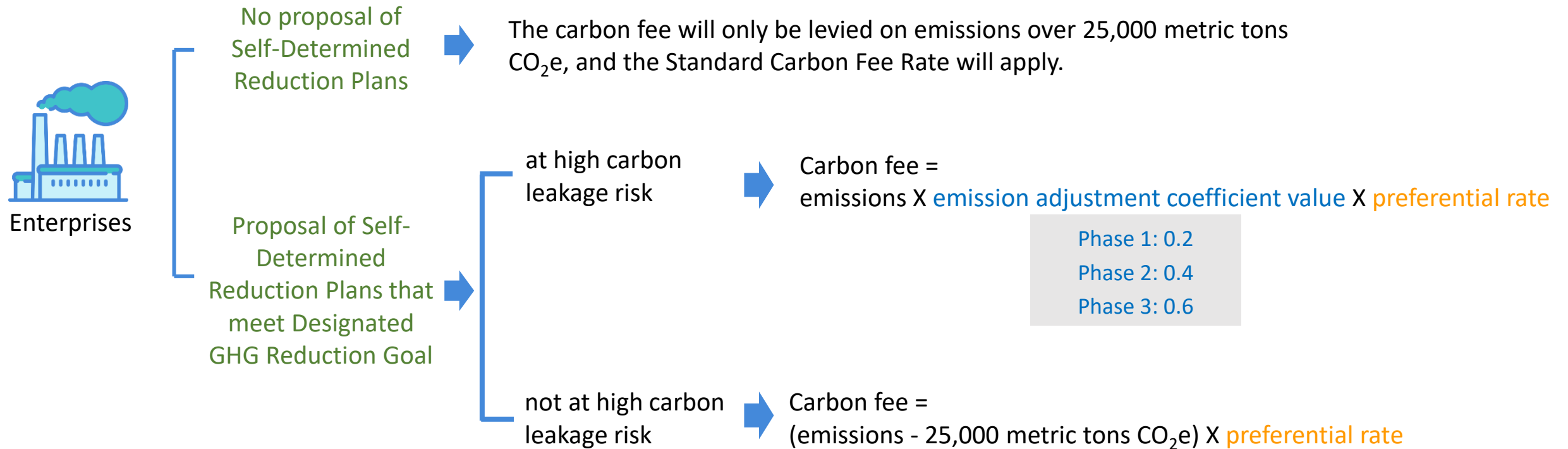
• Considerations and Conditions

Considering carbon leakage risks from **additional carbon costs** (e.g., US tariffs), regulated entities with negative annual gross profit, high carbon fees relative to gross profit, or exposure to international dumping may apply for a carbon leakage risk discount to protect their international competitiveness.

Subject to annual application and approval for that year

The entities should submit and pass the review of self-determined reduction plan to receive a carbon leakage discount to reduce carbon fee.

Taiwan's Carbon fees are a tool for reduction, not a financial tool





The Reduction Effectiveness of the Carbon Fee System

- 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.

Appendix 1

Industry-specific designated reduction rate

With 2030 as the target year
using 2021 as the baseline year

42%

Iron & Steel 25.2%
Cement 22.3%

reference to SBTi

qualifies for
Preferential Rate A

Appendix 2

Technology benchmark designated reduction rates

With 2030 as the target year
Using 2018-2022 as the baseline years

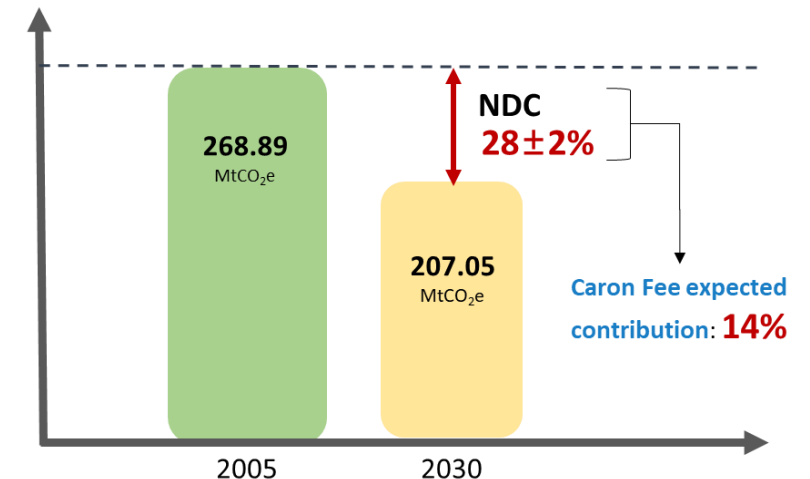
23%

considers the emission types of each
source, including fuel types, processes,
and electricity usage

To achieve the 2030 Taiwan's NDC

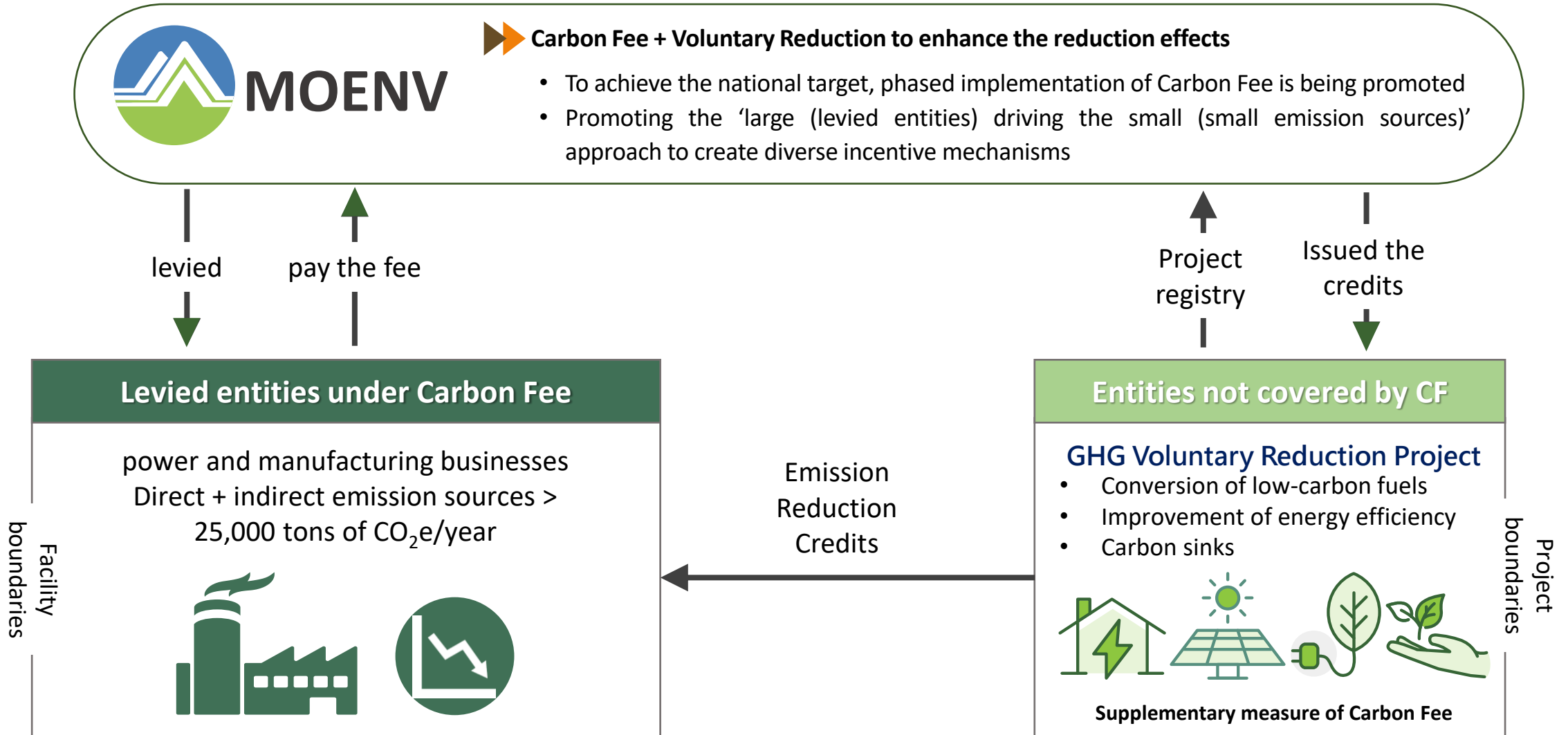
qualifies for
Preferential Rate B

- If all carbon fee collection entities submit **Self-determined Reduction Plans** and meets the **Designated Reduction Goal**, it is estimated that by 2030, CO₂e emissions could be reduced by 37 million metric tons, equivalent to **about 14%** of the 2005 emission levels.





Carbon Pricing Mechanisms & Voluntary emission reduction mechanism



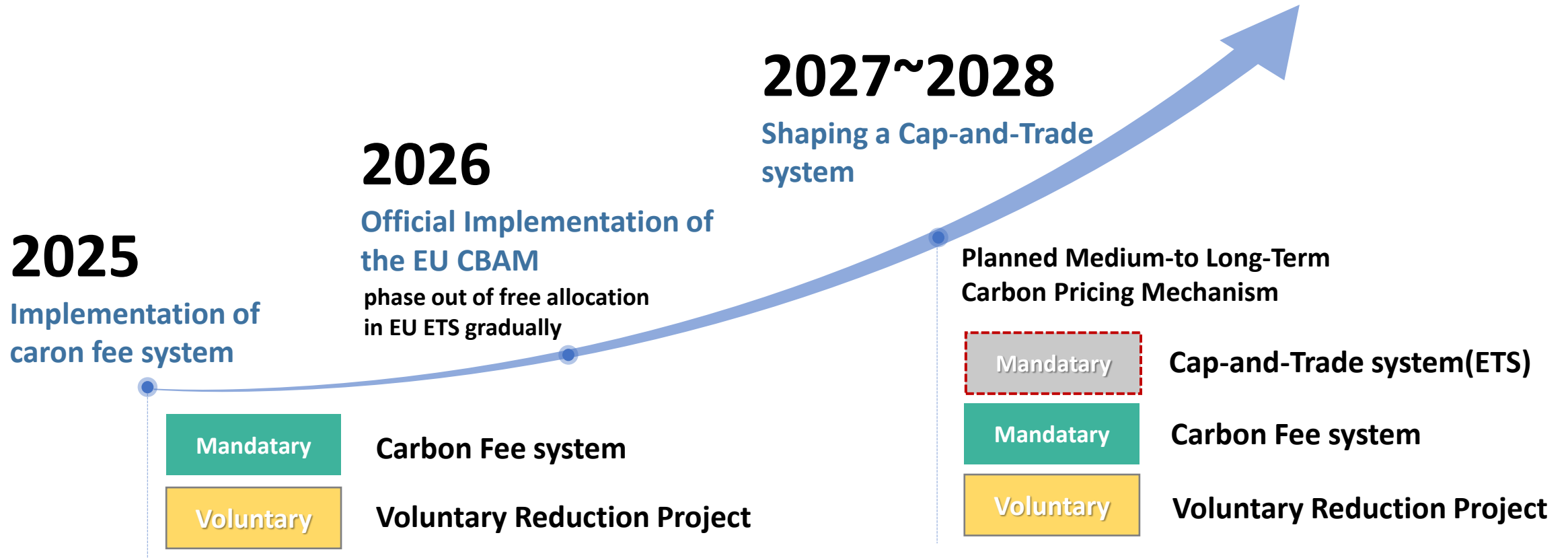


The prospects of carbon pricing in Taiwan



Aligning with international practices to promote domestic carbon pricing system

- Implementation of Carbon fee system first, preferential rates to encourage substantial reductions
- If all carbon fee collection entities submit **Self-determined Reduction Plans** and meets the **Designated Reduction Goal**, it is estimated that by 2030, CO₂e emissions could be reduced by 37 million metric tons, equivalent to **about 14% of the 2005 emission levels**.





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Ministry of Environment

THANK YOU





International
Carbon Action
Partnership

TAIWAN DELEGATION VISIT TO ICAP

25 June 2025

AGENDA

1. About ICAP

2. Emissions trading around the world

3. ETS and the power sector

4. Case study: Korea ETS

4. Q&A

1

ABOUT ICAP

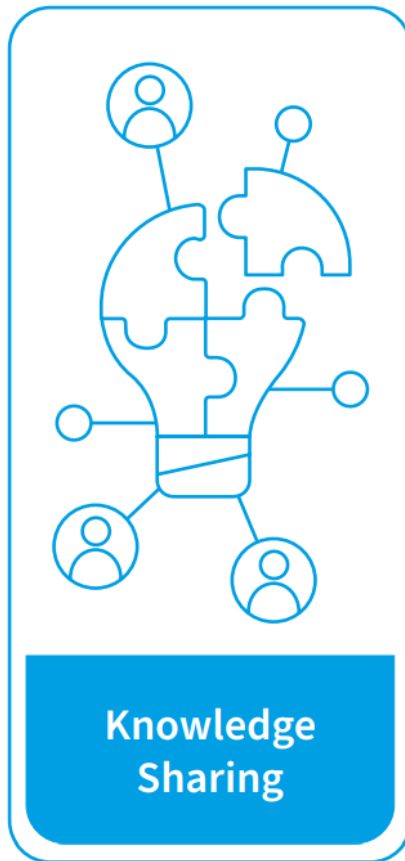


- Share **best practices** & learn from each others' experiences
- Facilitate **development and improvement** of carbon markets
- Explore the **role** of emissions trading in decarbonization



KNOWLEDGE SHARING

Sharing information about ETS and acting as a knowledge hub



- **ICAP Status Report and ETS Map**
- **ICAP News & ICAP Newsletter**
- **ICAP Website and social media**
- **ETS Briefs and educational materials**
- **Allowance Price Explorer**
- **Events:**
 - Regional Climate Summits
 - Innovate4Climate
 - COP

CAPACITY BUILDING

Building capacity and promoting readiness for ETS implementation



- **ICAP ETS Academy**
- **Regional training courses**
- **Advanced trainings**
- **In-country trainings**
- **Technical deep-dives**
- **Alumni activities**

TECHNICAL DIALOGUE

Promoting government exchanges on ETS design



- **Research and dialogues on key topics related to ETS design and implementation**
- **Recent work includes:**
 - ETS Scope expansion
 - ETS and net zero caps
 - ETS in the policy mix: companion policies
 - Offset use in ETS
 - Article 6 and ETS linking
 - ETS and Carbon Capture and Storage (CCS)
 - Integration of removals in ETS

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News

ICAP publishes regular news updates covering ETS developments worldwide as well as ICAP governance, publications, courses, and events.

[All jurisdictions](#)

[All categories](#)

[All dates](#)

Displaying 5 - 12 out of 392



Feb 11, 2025 | ETS-News

Vietnam approves carbon market roadmap, pilot ETS to launch in June 2025

[Learn more >](#)



Feb 06, 2025 | ETS-News

Germany adopts law to transition from national ETS to EU ETS 2

[Learn more >](#)



Jan 25, 2025 | ICAP-News

ICAP extends partnership with the World Bank and IETA for Innovate4Climate 2025 in Seville

[Learn more >](#)

The image displays three overlapping copies of documents from a series titled 'Briefing'. The top document is 'Brief #1' and the middle one is 'Brief #2'. Both documents feature a blue header with a logo and the title 'Brief #1' or 'Brief #2'. The content includes various sections with text, diagrams, and charts. For example, 'Brief #1' has a section titled 'WHAT IS ENVIRONMENTAL TRAINING?' and another titled 'HOW TO GET...'. 'Brief #2' has a section titled '1. REASONS FOR ENVIRONMENTAL TRAINING' and another titled '2. THE Importance of environmental training'. The bottom document is 'Brief #3' and features a large circular chart titled 'Sources generated by 1000 cars per year' and a section titled 'Sources generated by 1000 cars per year'. The documents are laid out on a light-colored surface, with the top document partially covering the middle one, and the middle one partially covering the bottom one.

Over USD 224 billion in raised revenues since 2008

Over USD 63 billion in raised revenues in 2022

2022 Revenue Breakdown:

- Republic of Korea (USD 245.4 million)
- Qatar (USD 1,038 million)
- Chinese Pilsa, Haaschuhalla, Nova Scotia and Switzerland (USD 203.8 million)
- Germany (USD 6,740 million)
- UK (USD 7,861 million)
- RSG (USD 1,104 million)
- New Zealand (USD 1,208 million)
- California (USD 1,087 million)
- EU ETS (USD 40,268 million)

Annual Revenue Growth (USD million):

- 2004: 100
- 2005: 100
- 2006: 100
- 2007: 100
- 2008: 100
- 2009: 100
- 2010: 100
- 2011: 100
- 2012: 100
- 2013: 100
- 2014: 100
- 2015: 100
- 2016: 100
- 2017: 100
- 2018: 100
- 2019: 100
- 2020: 100
- 2021: 100
- 2022: 100

Key Milestones:

- 2008: + California = EU ETS
- 2010: + Qatar + Chinese Pilsa
- 2011: + Switzerland
- 2016: + Haaschuhalla
- 2017: + Republic of Korea
- 2018: + Nova Scotia
- 2022: + Germany + UK

The image displays three book covers. The leftmost cover is for 'EMISSIONS TRADING IN PRACTICE: A Handbook on Design and Implementation, SECOND EDITION', published by PMR and ICAP, with a 'DOWNLOAD' button. The middle cover is for 'EMISSIONS TRADING WORLDWIDE STATUS REPORT 2024', published by ICAP and the International Carbon Action Partnership, featuring a city skyline at night.

ICAP Allowance Price Explorer

Currency: \$ Start date: 16/03/2005 End date: 27/12/2022 + Systems

The chart displays the price of allowances in dollars per ton (\$/ton) for several major carbon markets. The EU ETS (blue line) shows high volatility, peaking above \$100 in late 2021. The UK ETS (purple line) also shows a sharp increase, reaching over \$100 by late 2021. Other markets like Germany ETS (green), China ETS (light green), and Switzerland (red) show more moderate price levels, generally below \$50, with some fluctuations. The x-axis marks the years 2010, 2015, and 2020, while the y-axis ranges from 0 to 100 \$/ton.

2

EMISSIONS TRADING AROUND THE WORLD

KEY TRENDS AND OUTLOOK

Momentum for ETS continues, particularly in emerging economies

- New ETSs are being developed and launched worldwide. Key G20 economies such as India, Brazil and Türkiye are leading the charge on the next generation of trading systems

Innovative system designs and use of offset credits are at the core of the next generation of ETSs

- Hybrid and intensity-based systems are shaping the next generation of ETS designs. The use of offset credits, predominantly domestic, is increasingly central in the design of new ETSs

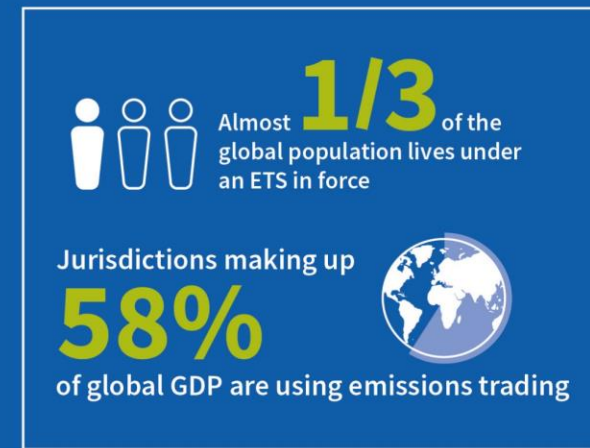
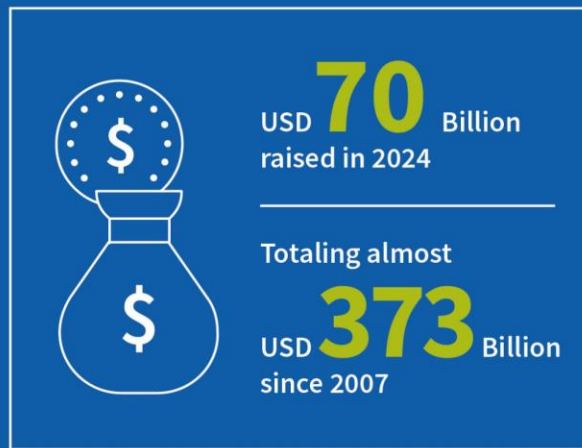
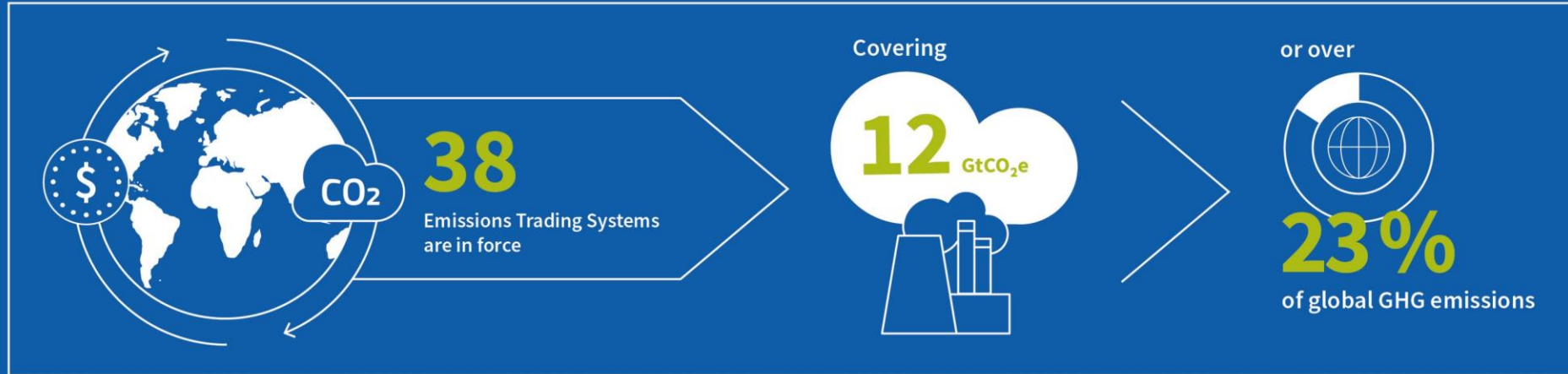
Established systems evolve and eye net-zero alignment

- Scope expansion and system reviews are the priority in many jurisdictions, with increasing attention to the integration of removals and the alignment process with net-zero targets

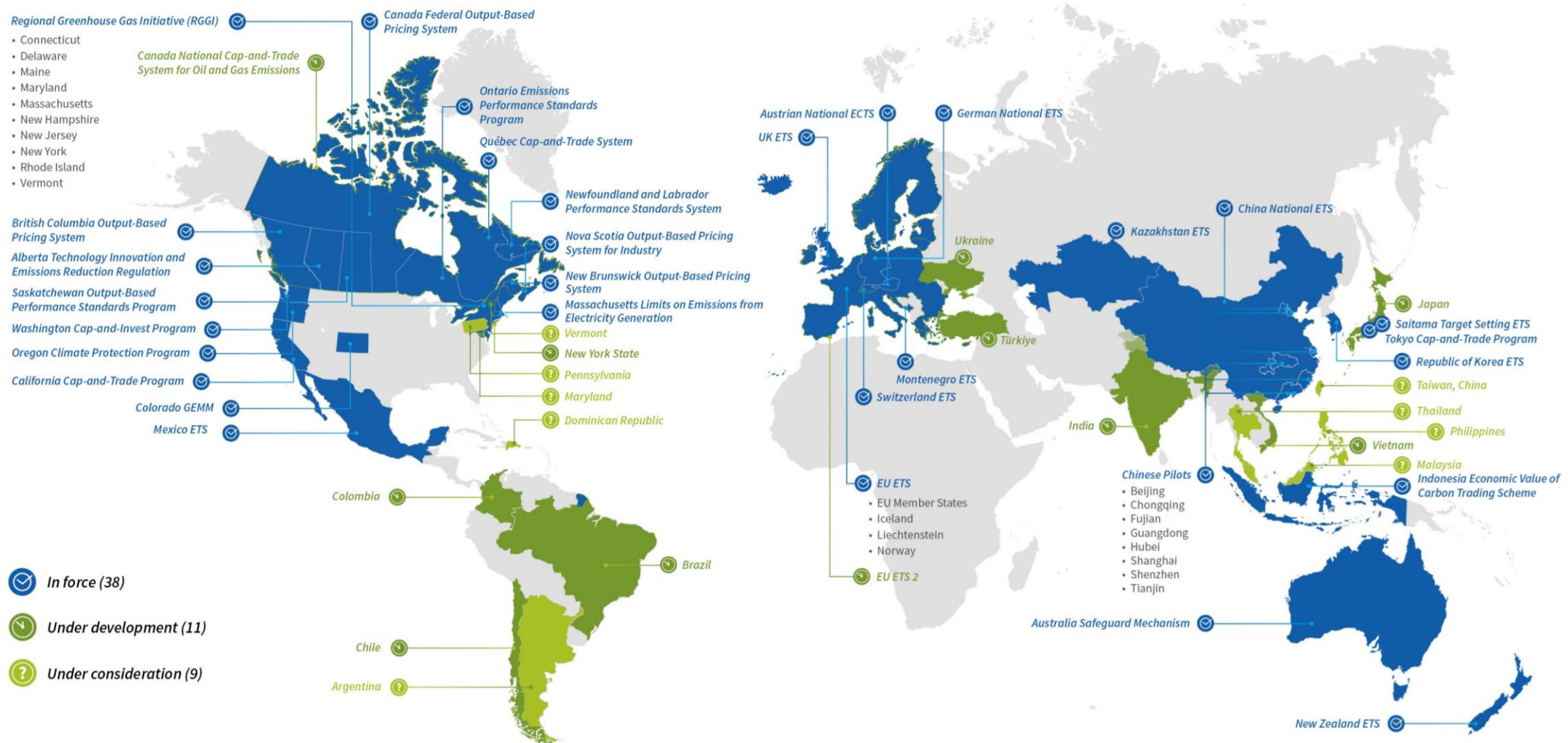
Challenges loom on the horizon

- Geopolitical and economic uncertainties pose risks to ETS stability and acceptability. Measures to support both covered entities and consumers, including through the use of revenues, will be key going forward

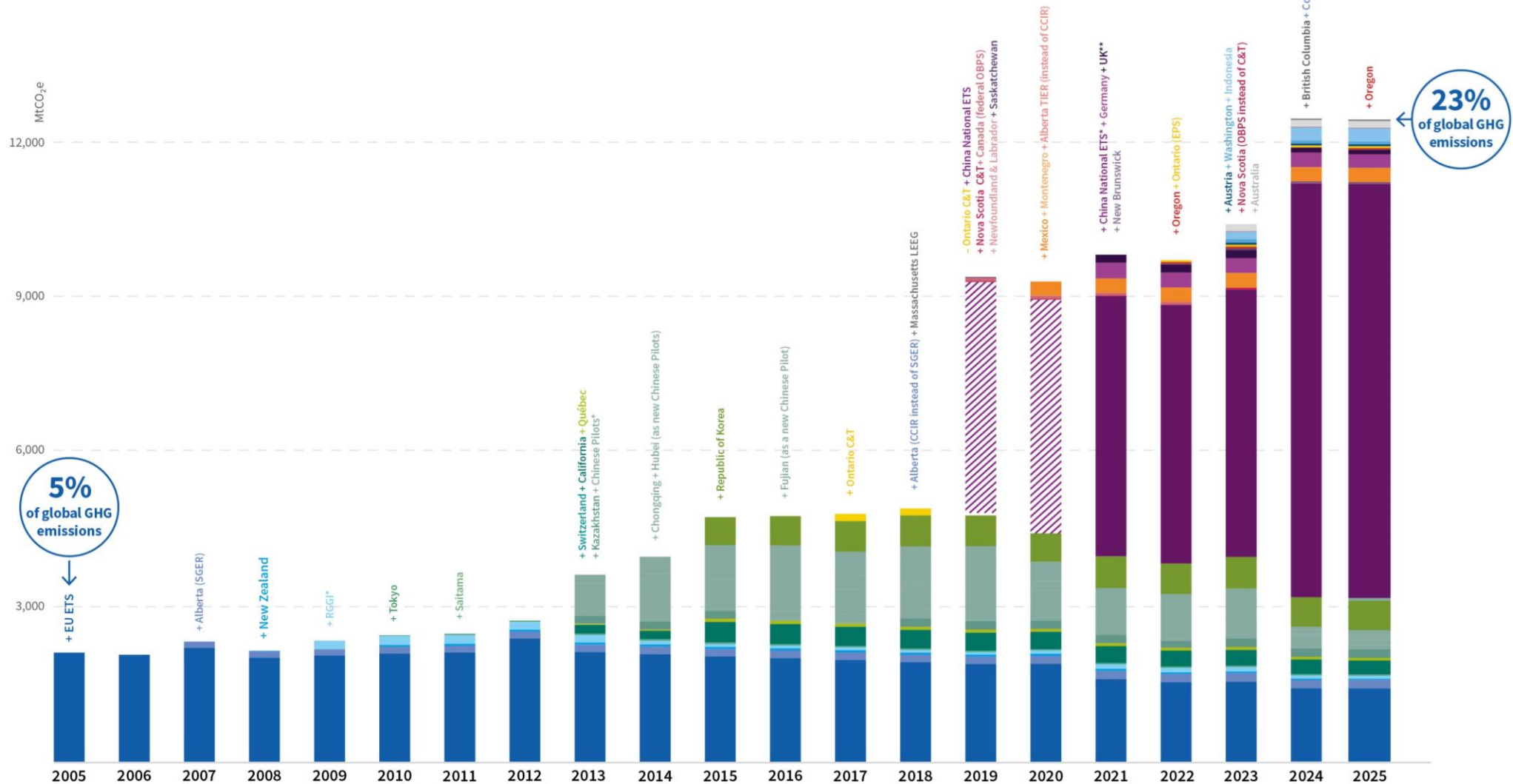
EMISSIONS TRADING IN NUMBERS



EMISSIONS TRADING WORLDWIDE



GLOBAL EXPANSION OF ETS



* As of 2020, RGGI Includes New Jersey. Between 2021 and 2023, it also included Virginia.

* Beijing, Guangdong, Shanghai, Shenzhen, Tianjin

* The Chinese National ETS came into force in 2021 but has retroactive compliance obligations in 2019 and 2020, indicated above by the striped bar.

** In 2021, the UK launched its own ETS which required an adjustment in the EU ETS cap.

SECTOR COVERAGE



* The Beijing ETS covers one power company. The Shanghai ETS covers oil-fired generators

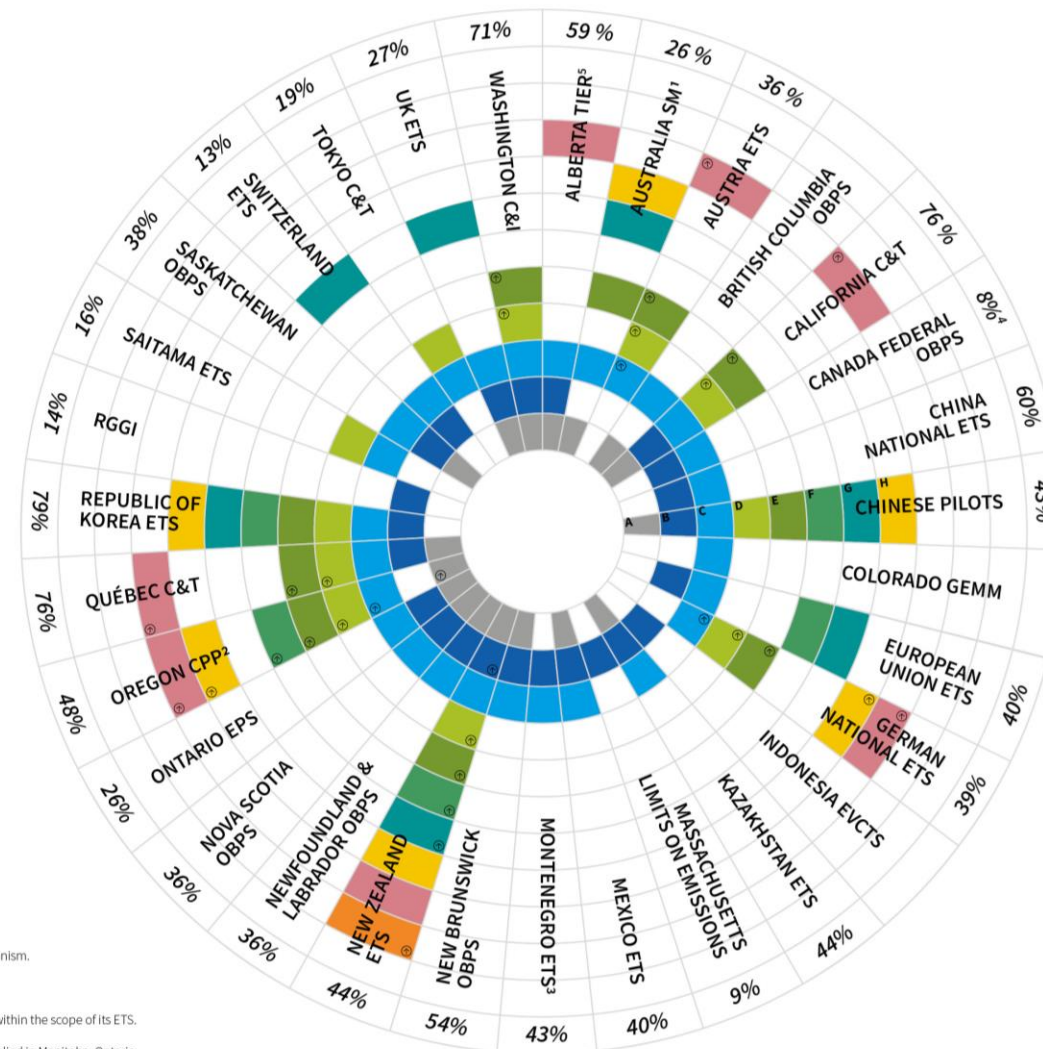
⊕ Indicates which sectors are covered upstream

1 Only a very small share of emissions (>5%) from the waste and transport sectors are covered by the Safeguard Mechanism.

2 Emissions resulting from fuels used in petroleum and natural gas production are excluded.

3 While only one power sector entity is currently operational, Montenegro has explicitly included industrial processes within the scope of its ETS.

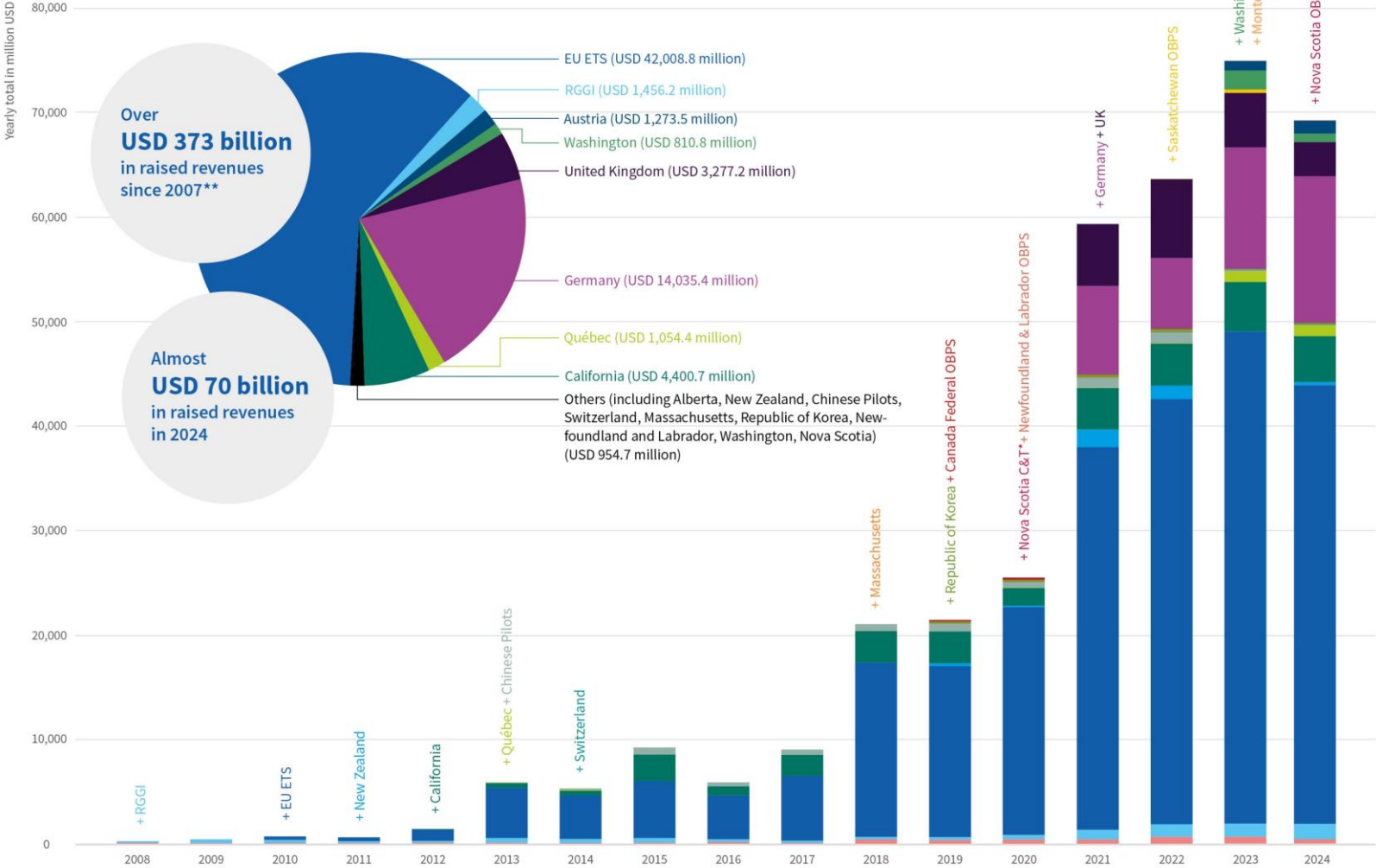
4 The 2021 value of 8% is not consistent with the current application of the federal OBPS. In 2021, the federal OBPS applied in Manitoba, Ontario, Prince Edward Island, Yukon, Nunavut and partially in Saskatchewan. The federal OBPS no longer applies in Ontario and Saskatchewan.



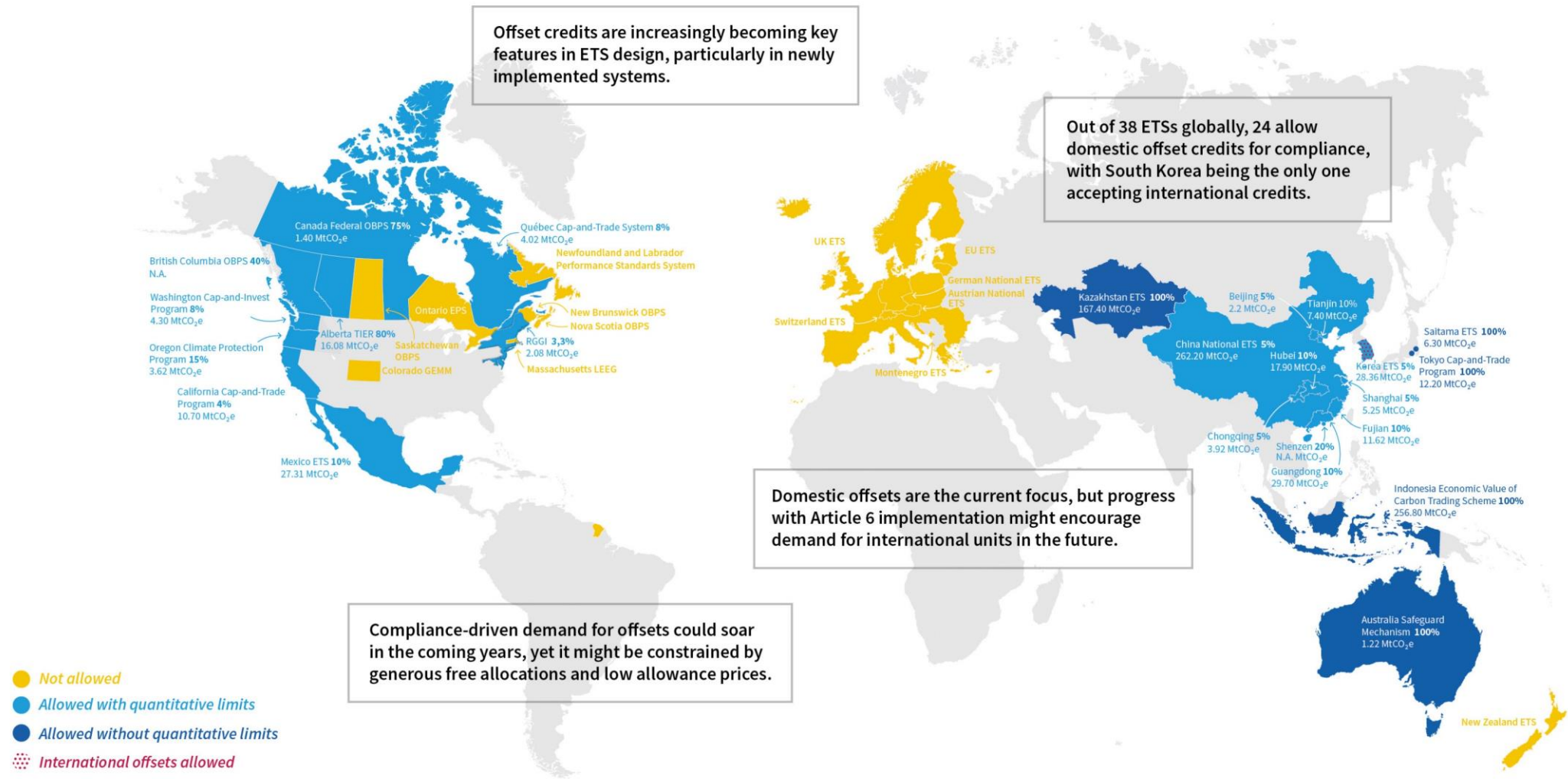
YEARLY ETS REVENUES

YEARLY REVENUES RAISED BY EACH SYSTEM

* Revenues in 2023 collected from the last auctions under the cap and trade program.
** Revenues collected by the Canada federal OBPS are reported only until 2022. Data for Saskatchewan are only reported until 2023-2024 (reported here as 2023). Data on New Brunswick and on Ontario is not yet publicly available.
Note that the graph displays revenues when they were collected, instead of the compliance year to which they correspond.



CARBON CREDITS USE IN ETS



3

ETS & THE POWER SECTOR

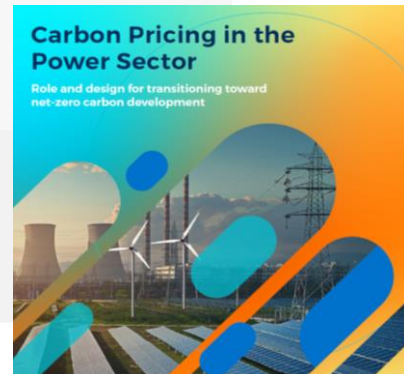
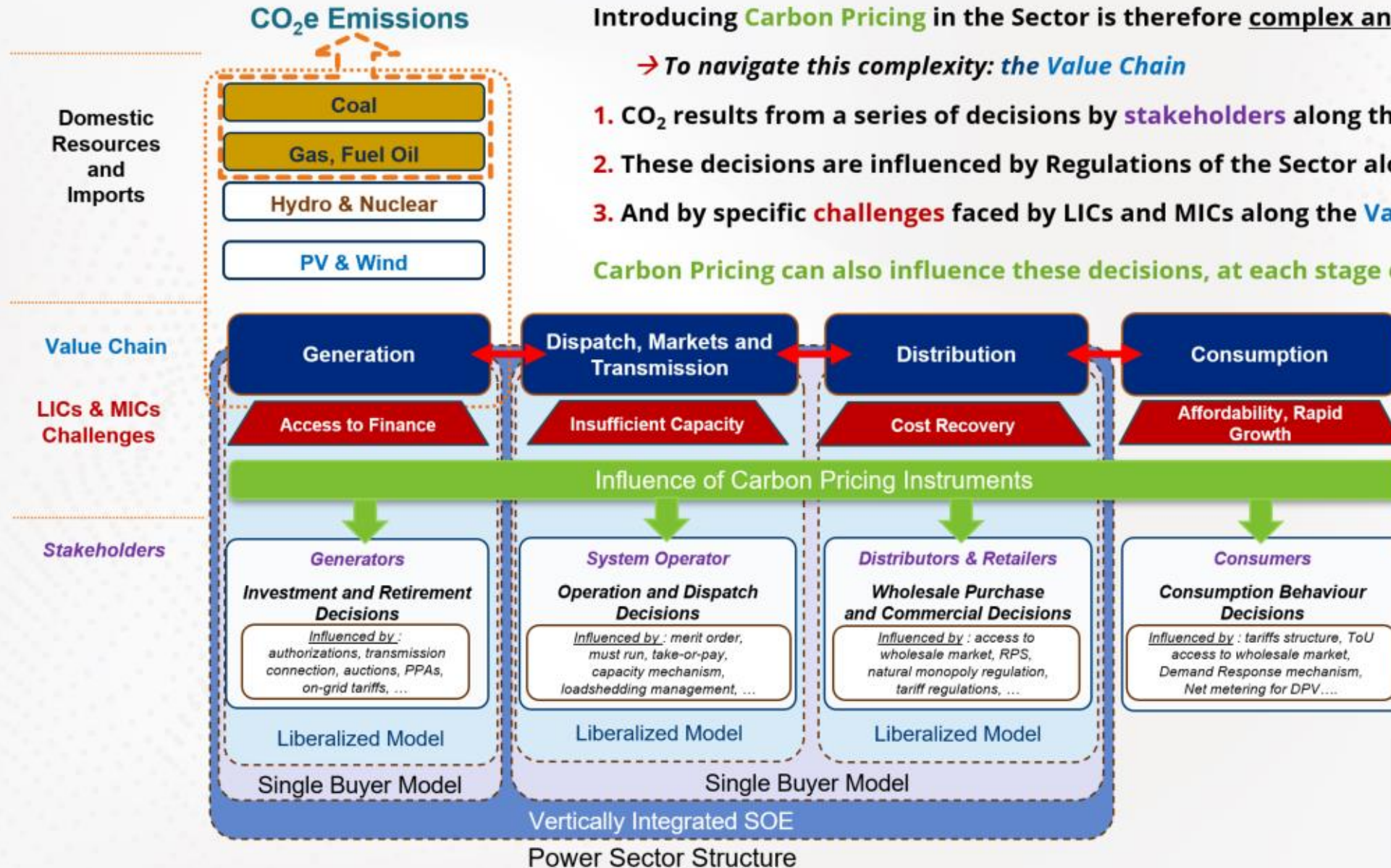
The Power Sector is complex and diverse

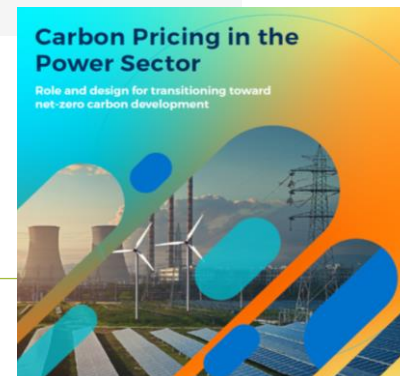
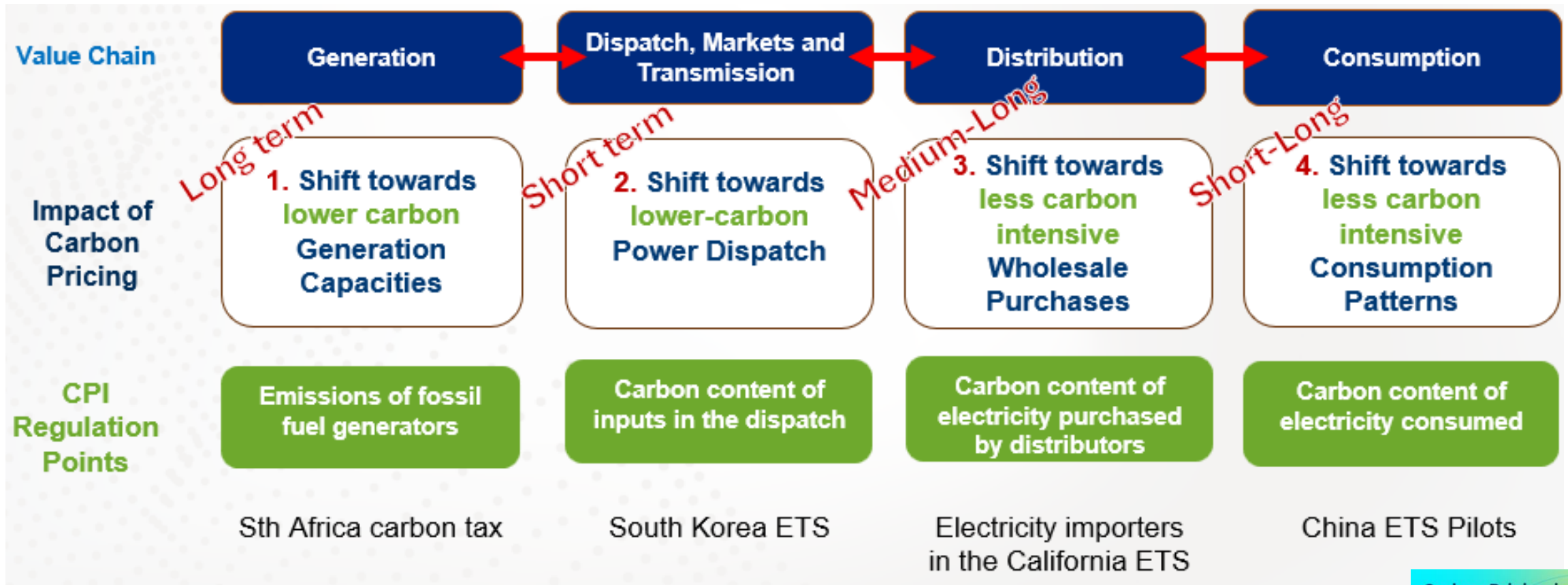
Introducing **Carbon Pricing** in the Sector is therefore complex and diverse

→ To navigate this complexity: *the Value Chain*

1. CO₂ results from a series of decisions by **stakeholders** along the **Value Chain**
2. These decisions are influenced by Regulations of the Sector along the **Value Chain**
3. And by specific **challenges** faced by LICs and MICs along the **Value Chain**

Carbon Pricing can also influence these decisions, at each stage of the **Value Chain**

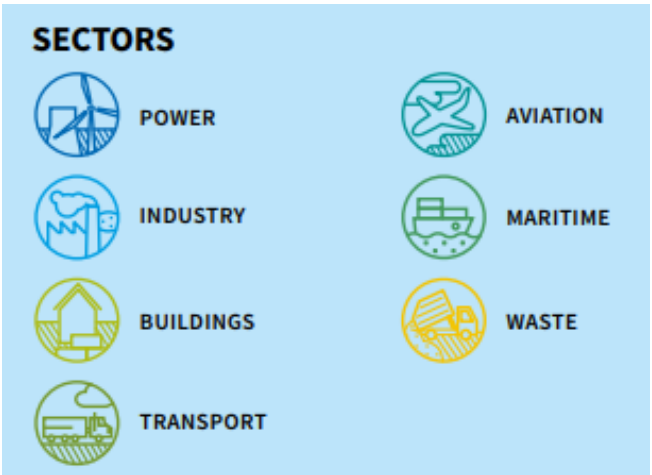




4

CASE STUDY: KOREA ETS

KOREA ETS



GREENHOUSE GASES

CO₂, CH₄, N₂O, HFCs, PFCs, SF₆

OFFSET CREDITS

Domestic and international offset credits are allowed with quantitative limits

ALLOCATION

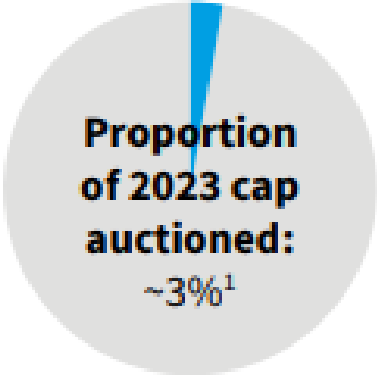
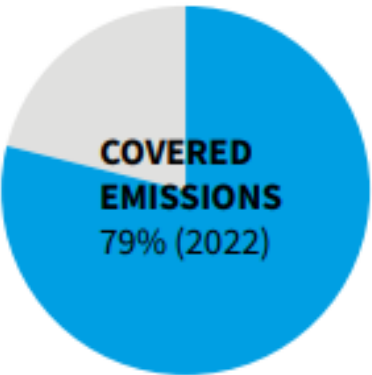
Free Allocation: Grandparenting
Free Allocation: Fixed Benchmarking
Auctioning

AVERAGE 2024 PRICES

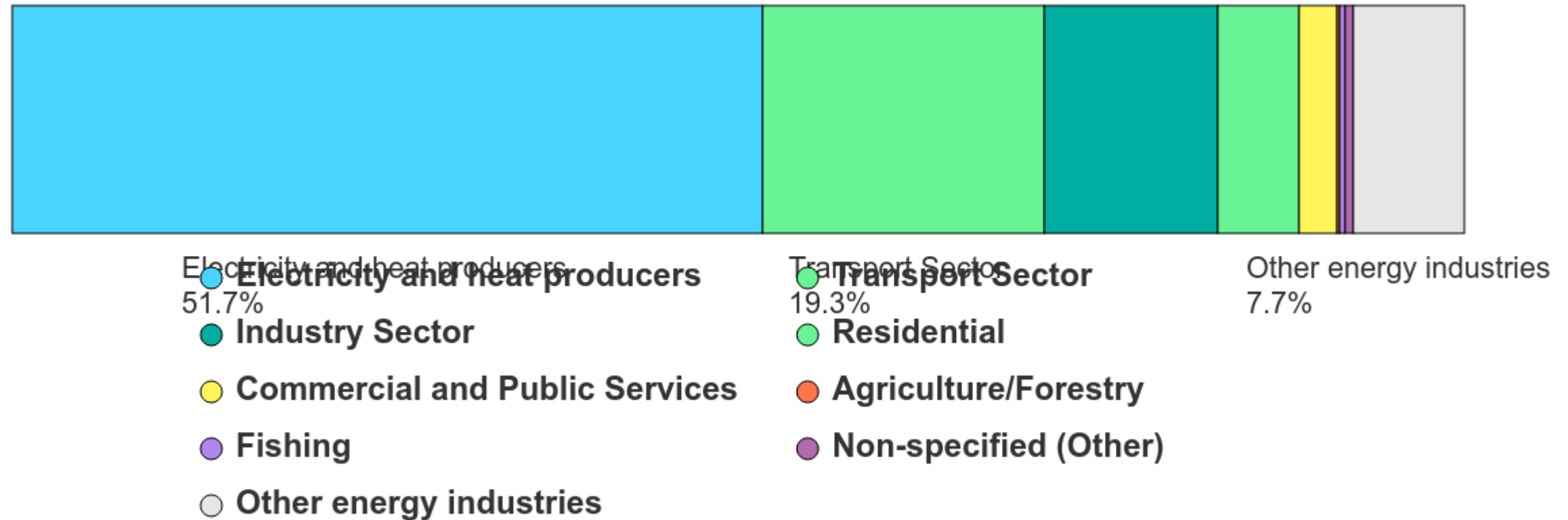
Average auction price: KRW 10,355 (USD 7.60)
Average secondary market price: KRW 9,238 (USD 6.78)

TOTAL REVENUE

KRW 1.4 trillion (USD 1 billion) since beginning of program
KRW 185.9 billion (USD 136.4 million) in 2024



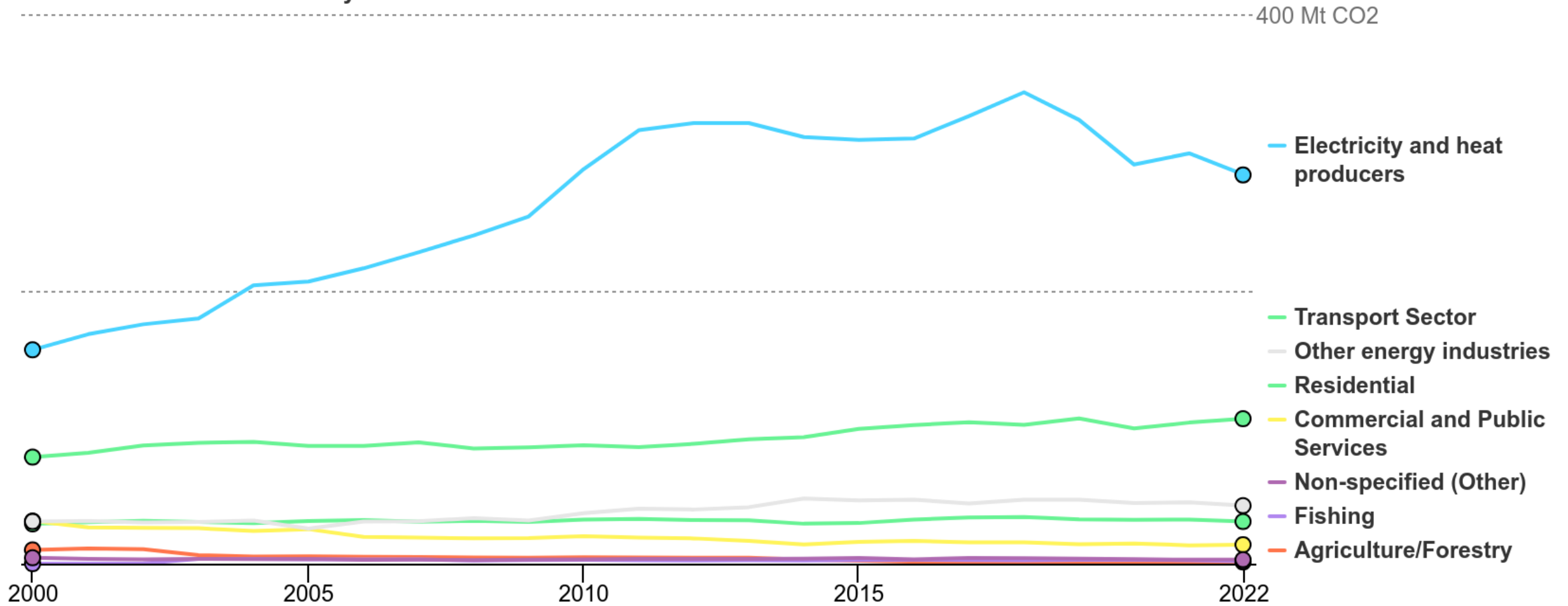
CO2 emissions by sector, Korea, 2022



Source: International Energy Agency. Licence: CC BY 4.0



Evolution of CO2 emissions by sector in Korea since 2000



Source: International Energy Agency. Licence: CC BY 4.0

DIFFICULT CARBON COST PASS THROUGH

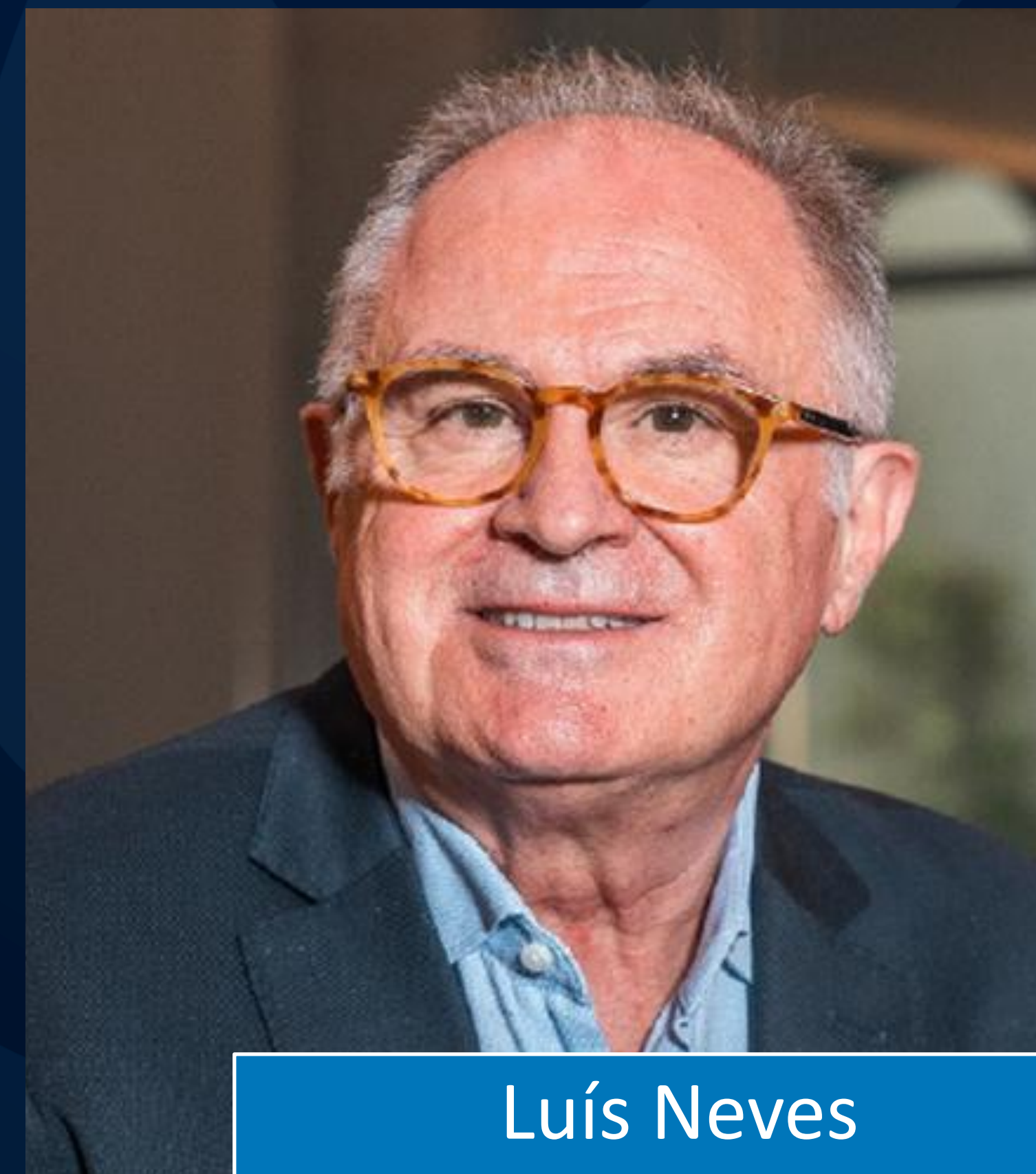
- **Direct & indirect emissions**
- **Free allocation/auctioning**
- **Compensations**
- **Environmental dispatch**
- **Climate/environmental surcharge**
- **Carbon contracts for difference?**

THANK YOU!

Lecture

Voluntary Carbon Market for Digital Solutions

*Organised by the Taiwanese Ministry of Environment
Berlin, 2025*



Luís Neves
GeSI CEO



About GeSI



Our North Star

Lead the MOVEMENT that
***defines,
demonstrates and
takes ACTION***

on the enabling role of digital
solutions in sustainability.





Why do we need GeSI?

Dramatic changes in our politics.

Softening of regulatory requirements.

A competitive environment for sustainability organizations.

Need for more business outcomes for members: relevant, measurable impact.

Frame the promise of AI in sustainability as fundamentally central to the role of digital and the importance of GeSI as the market leader.



GeSI: Our role and position in the market

Active private sector voice in policy, across all geographies.

Serve as a door opener and business broker for members across vertical industries and sectors.

Elevate communications to feature GeSI members in action.

Credible, quantifiable impact and business outcomes for the exponential role of enabling technologies

GeSI has two decades of experience driving the sustainability agenda.



Cross Sector Engagement

convene industry, government and society for action on sustainability challenges

Private sector members represent over \$3.4T+ of market capitalization.

100+ governmental and social sector partners



Strategic Partnerships

set the stage for policy with critical voices from global, regional and local organizations

UN Framework & Convention on Climate Change (UNFCCC)

European Green Digital Coalition

Taiwan Electrical and Electronics Manufacturers' Association



Research and Tools

publish credible, standard-making and evidence-based thought leadership

GeSI Smart Reports

ICT Sector Guidance



Sector Expansion

focus on the enabling role of digital solutions, not just the providers of digital

ICT and Technology Sectors

Adjacent Verticals
Energy & Utilities
Transportation & Logistics
Connected Living

Policy Influencers
Consortiums & Alliances
Think Tanks & Global Nonprofits

GeSI is guided by six tactical principles.

1. MEMBER-CENTRIC PURPOSE

Put the member experience first and use their feedback as GeSI's North Star to align on vision, investments, offerings, and strategic priority setting.

2. DATA-DRIVEN DECISIONS

Leverage data, analytics and member feedback to rigorously monitor KPIs associated with offering impact (thought-leadership, events, and tool) to continuously assess program and asset ROI.

3. GLOBAL INDUSTRY AGGREGATOR

Act as an industry aggregator bringing together the diverse parties addressing ICT issues for SMEs, not-for-profits, large for-profits, academia, policy makers, and consumers.



4. OUTCOME-BASED PILOTS

Deploy agile principles in working groups with rapid ideation, piloting and roll-out of ambitious, yet tangible and pragmatic initiatives that will deliver real benefit to members.

5. COLLABORATIVE WORKING

Create a safe space for members to work together in non-competitive, joint collaborative teams, inspiring and learning from each other, to create the right solution for their sustainability challenges.

6. INNOVATIVE THOUGHT LEADER

Serve as a thought leader for the ICT sector, continuously pushing the agenda ahead through relevant research on behalf of the industry

The **GeSI** Portfolio: eight impactful initiatives.

1

PROGRAMS
member-focused
initiatives

AI with Purpose
Circularity
Scope 3 and ESG Reporting
Water Digitalization Initiative (WDI)

2

PLATFORMS
proprietary,
scalable movements

Digital with Purpose (DWP)
• Digital with Purpose Summits
• Digital with Purpose Framework

3

PARTNERSHIPS
cross-sector
collaborations

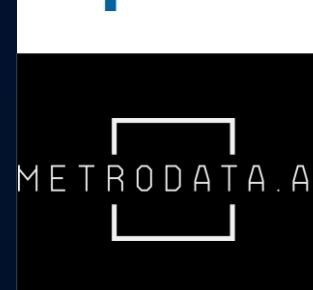
European Green Digital Coalition
(EGDC)
UN Global Innovation Hub (UN GIH)
Smart Cities

GeSI Partner Network Supporting Portfolio Implementation



Net Carbon Impact Assessment Methodology for ICT Solutions

- Deploy the EGDC's science-based methodology at scale to assess GHG emission reductions through ICT solutions across multiple sectors.



United Nations Global Innovation Hub Digital Solution for Cities Marketplace

- Develop a digital platform to create a marketplace for solutions addressing climate challenges and basic human needs.



Digital with Purpose (DWP) Performance Framework Certification and Summit

- Deploy an ESG certification framework to help companies improve impact performance and align with global reporting standards.



Voluntary Carbon Market for Digital Solutions

- Establish a mechanism to trade offsets from digital solutions with net-positive impact, based on the EGDC methodology.



Smart Cities Project

- Leverage digital technologies to develop smart cities that are more efficient and beneficial to citizens.



SMART Project on AI

- Conduct a comprehensive analysis of AI's enabling impacts, addressing challenges and considering social, environmental, governance, and policy aspects.



Cooperation for COP30 in Brazil

- Establish a pavilion at COP30 to share with partners and showcase collaborative efforts in sustainability.

GeSI Members - \$4T+ of Market Capitalization



GeSI Partners





GeSI Offices
Brussels
Washington DC
Lisbon
Singapore



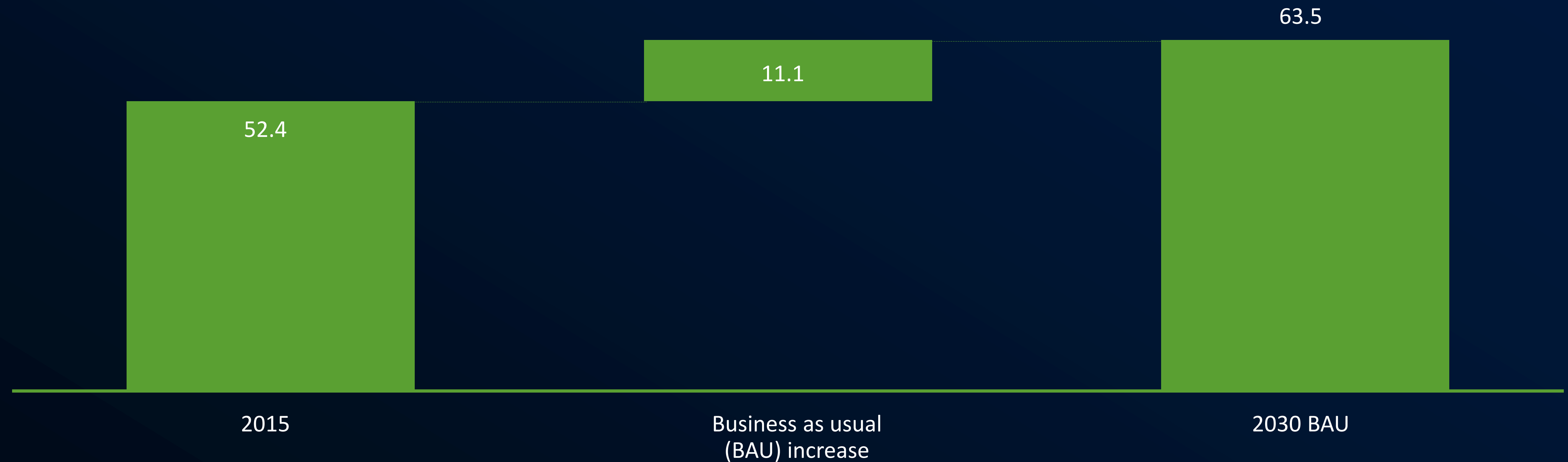


Setting the Scene

ICT Solutions for 21st Century Challenges

The world is not on track: under business as usual, CO_{2e} emissions will continue to grow

CO_{2e} emissions forecast (Gt CO_{2e})



Historically each 1% of growth in GDP equated to a 0.5% increase in CO_{2e} emissions

Source: WRI, IPCC, World Bank, GeSI, Accenture analysis & CO₂ models

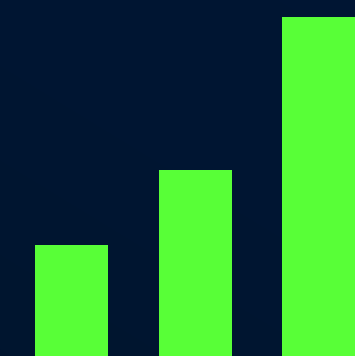


ICT can decrease global carbon emissions, stimulate economic growth and deliver benefits to society

SMARTer 2030 report main Findings



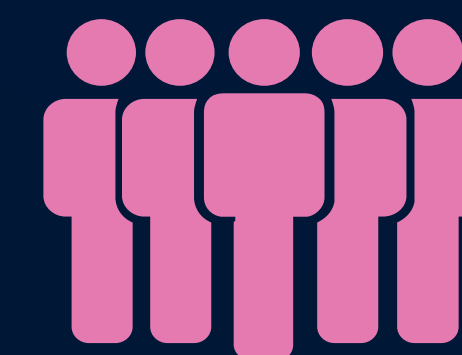
- ICT has the potential to enable a 20% reduction of global CO_{2e} emissions by 2030, holding them at 2015 levels
- At the same time, ICT can reduce the consumption of scarce resources



ICT is good for growth. An assessment of eight economic sectors* shows that it could generate:

- Over 6 trillion USD in new revenues in 2030
- Close to 5 trillion USD in cost savings in 2030, including 2.3 trillion USD from energy efficiency

* Energy, food, health, learning, buildings, mobility & logistics, work & business, manufacturing



ICT could connect 2.5 billion previously unconnected people to ICT services by 2030, enabling a total of:

- 1.6 billion people connected to e-health
- 0.5 billion e-learning participants

ICT could realize a benefit 9.7 times higher than its own emissions in 2030, while its own footprint is expected to fall

ICT benefits factor in 2020 and 2030 (Gt CO_{2e})

**SMARTer
2030**



**SMARTer
2020 (2012 report)**



**SMART
2020 (2008 report)**



Source: Source: WRI, IPCC, GeSI, SMARTer2020, Accenture analysis & CO₂ models



ICT enables improved customer centricity and new business models building on increased digital density

Context 2015 – Main changes compared to SMARTer2020 in 2012

Improved user centricity



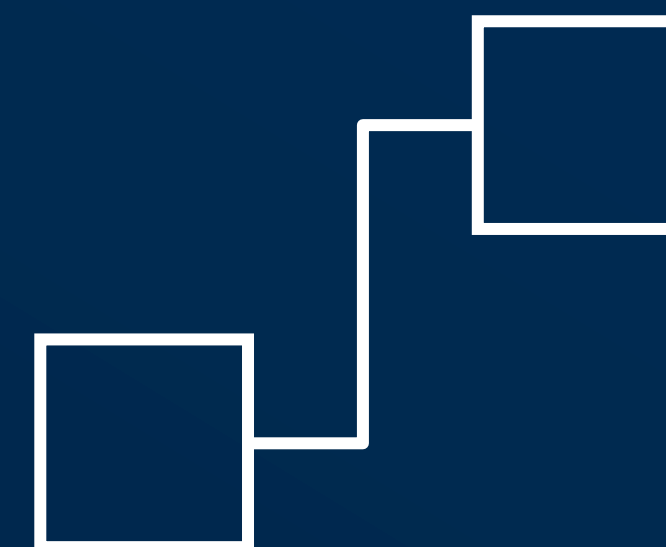
ICT is now genuinely putting people at the center, allowing for more compelling service offerings that “deliver it all”: better experience, reduced cost, improved sustainability

New business models



The business case for ICT-enabled business is now stronger than ever. Digital disruptors have grown into multibillion dollar businesses, far beyond what seemed possible in 2012

Increased digital density



Internet access and smartphone ownership are at much higher levels and the number of connected devices is expected to grow to 100 billion by 2030

Source: International Energy Agency, More Data Less Energy, 2014

ICT offers further environmental benefits across the sectors beyond CO2, from better yields to reduced consumption of scarce resources

+900 kg crop yield increase per hectare from Smart Agriculture



-25 billion oil barrels saved across all sectors analyzed



-135 million cars reduced from total installed base



-300 trillion liters of water saved across all sectors analyzed

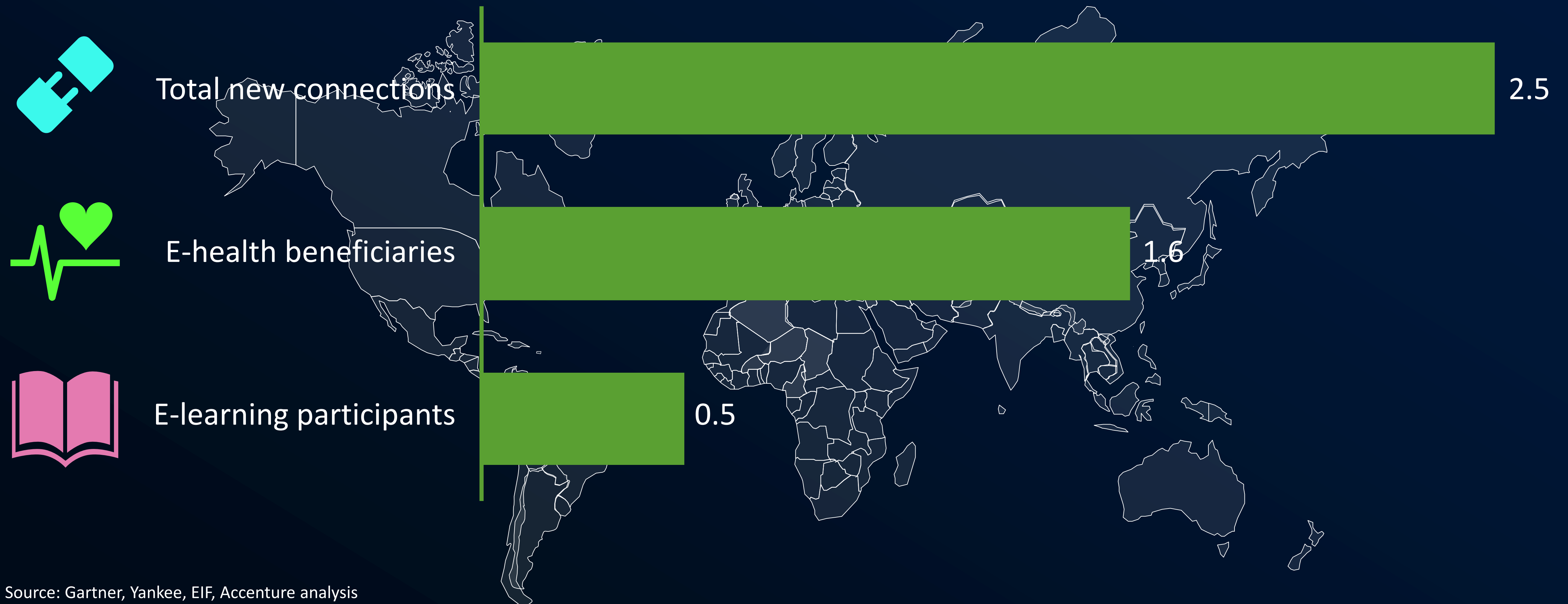


Source: WRI, IPCC, Gartner, FAO, GeSI, Accenture analysis & CO2 models



ICT will connect 2.5 billion more people thereby making a broad range of benefits available

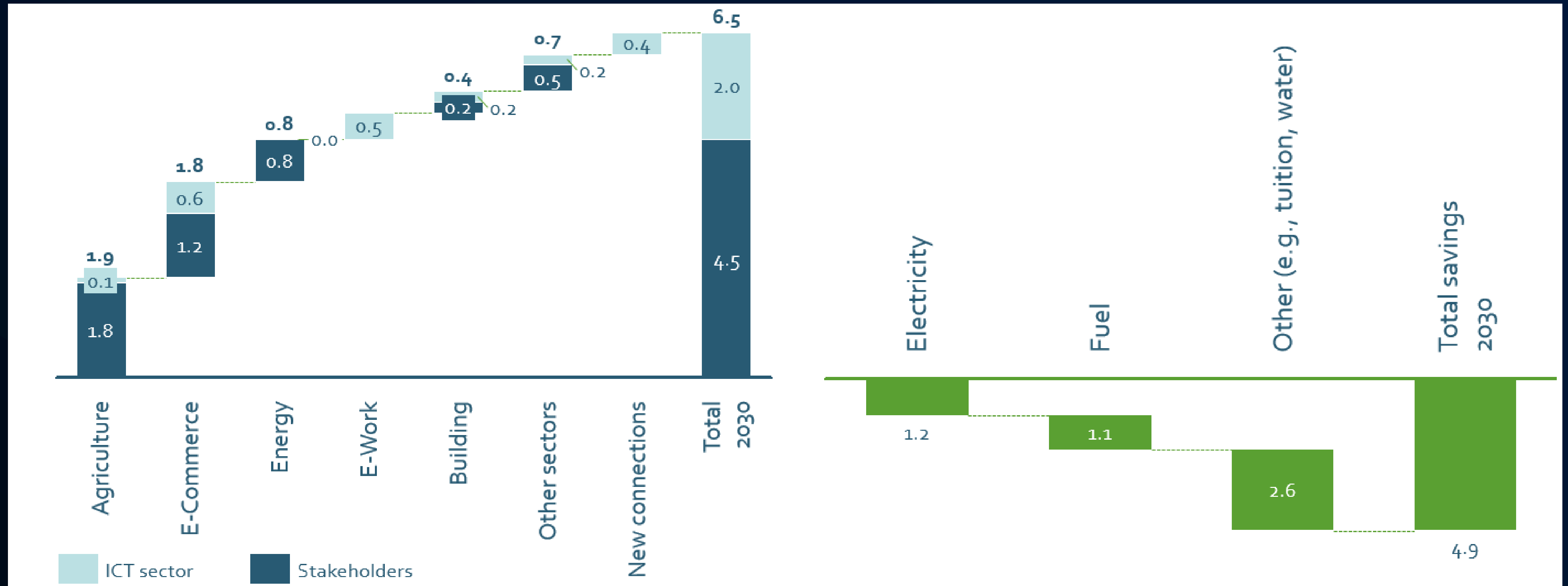
New ICT connections 2015-2030 (billion connections)



Source: Gartner, Yankee, EIF, Accenture analysis

ICT is good for growth and could deliver over \$6 trillion in revenues and close to \$5 trillion USD in cost savings

ICT-enabled revenues and cost savings p.a. (2030, USD trillion)



Source: WRI, IPCC, Gartner, FAO, GeSI, Accenture analysis & CO2 models

More recent studies show an even greater potential – notably if we consider AI's opportunities

- AI and digital solutions could help avoid **5–10%** of global greenhouse gas emissions by 2030- equal to the EU's total annual emissions.
- Key sectors for impact: **Energy, industry, transport, and agriculture offer the largest opportunities** for AI-driven emissions reductions.
- AI-enabled efficiency: In Europe, AI can boost large building energy efficiency by **20–40%**, directly cutting emissions.
- Generative AI's economic potential: Could add **€1.2 trillion** to Europe's economy in a decade while supporting climate goals.
- Unlocking impact requires policy action: Investment in **digital infrastructure, open data, and cross-sector partnerships** is essential to realize these avoided emissions.
- AI's climate benefits depend on responsible deployment: Policies must ensure energy-efficient AI and data centers to **maximize net avoided emissions**.

Source: Google. *The AI Opportunity for Europe's Climate Goals - a Policy Roadmap*. March 2025.



To fully realize ICT's potential, stakeholder action is required with policy action as a key priority

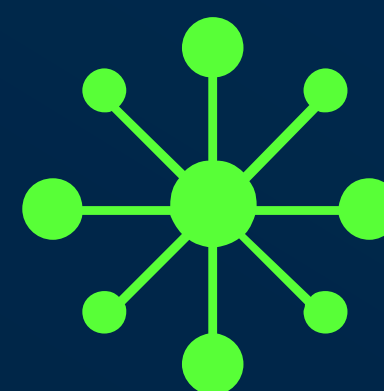
Prioritised policy action areas

National CO2 targets



Set national CO2 targets and recognize ICT solutions as an effective and necessary tool to decrease carbon emissions while enabling continued economic growth and sustainable living

Investment incentives in infrastructure deployment



Create investment incentives in infrastructure deployment to connect the unconnected and enable more people across all income segments to have access to ICT solutions

Fair, balanced & consistent regulatory approach



Establish a fair, balanced and consistent regulatory approach to ICT solutions that promotes innovation and investment, protects intellectual property rights and ensures consumer privacy and security

Source: WBSD, We mean business coalition, UN, GeSI



Prospect

Navigating the future of Voluntary Carbon
Markets: trends, challenges and opportunities

Long-term outlook for VCMs

Navigating the future of Voluntary Carbon Markets: trends, challenges and opportunities

Market Growth Potential

- Projections suggest significant growth, with BloombergNEF estimating annual demand for carbon offsets could reach 5.9 billion tons by 2050, potentially creating a market valued at over \$1.1 trillion annually ([Source](#)).

Shift Towards Quality

- There's a clear transition from low-quality to high-quality carbon credits, reflecting a growing emphasis on credibility and impact ([Source](#)).

Technological Advancements

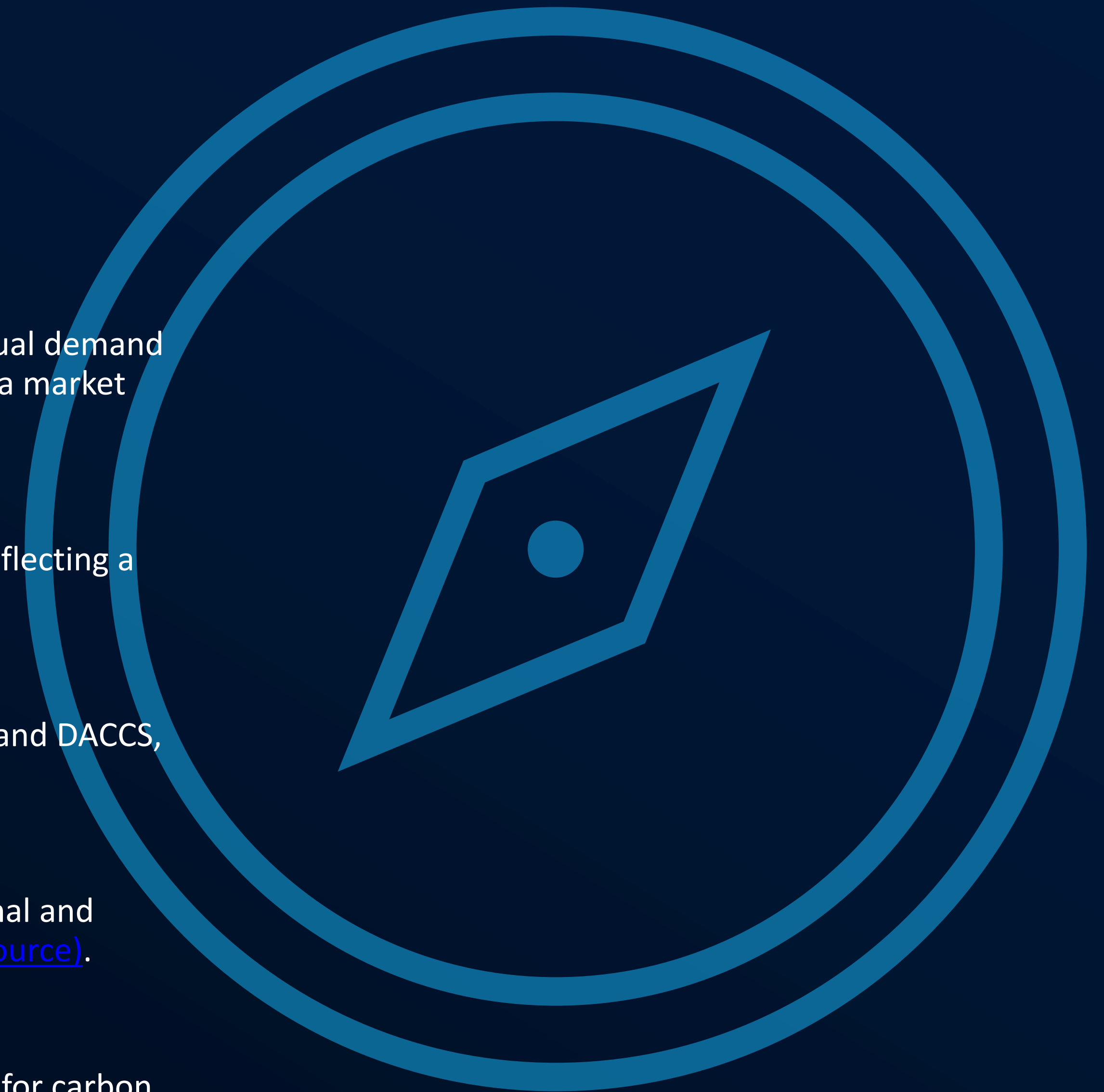
- The rise of technical Carbon Dioxide Removal (CDR) credits, such as BECCS and DACCS, is driving market value despite lower volumes ([Source](#)).

Regulatory Support

- Upcoming guidance and regulations are likely to support VCMs, with national and supranational organizations working to promote market-wide standards ([Source](#)).

Corporate Demand

- Increasing corporate net-zero commitments are expected to drive demand for carbon credits ([Source](#)).



Challenges

Navigating the future of Voluntary Carbon Markets:
trends, challenges and opportunities

Market Volatility

- The market experienced a decline in 2023, with prices slumping across all categories of carbon credits [\(Source\)](#).

Credibility Concerns

- High-profile studies have pointed to systemic problems with credits generated from nature-based projects, leading to reputational risks for companies [\(Source\)](#).

Standardization Issues

- Lack of standardization, integrity, and transparency remain significant challenges [\(Source\)](#).

Supply-Demand Imbalance

- Forecasts indicate that long-term global demand for carbon credits will exceed supply without drastic changes to new project origination rates [\(Source\)](#).



Current Attempts to Improve VCMs

Navigating the future of Voluntary Carbon Markets:
trends, challenges and opportunities

Integrity Standards

- Organizations like the Science Based Targets initiative and the Voluntary Carbon Credit Integrity Initiative are working to tackle credibility challenges [\(Source\)](#).

Financial Market Oversight

- Increased oversight by financial market regulators is expected to improve market integrity [\(Source\)](#).

Government Initiatives

- For example, the U.S. Department of Energy's Voluntary Carbon Dioxide Removal Purchase Challenge aims to create a public leaderboard for voluntary carbon removal purchases [\(Source\)](#).



Concept

Proposition: a Voluntary Carbon Market for
digital solutions

Voluntary Carbon Market for Digital Solutions

Current Status of Carbon Markets

Verified Carbon Standard (VCS)

- Operated by Verra, this is a cornerstone of voluntary carbon trading, providing a trusted platform for certifying carbon credit projects.

The Gold Standard

- Initiated by a coalition led by the World Wildlife Fund (WWF), this standard certifies projects that contribute to both emissions reduction and sustainable development.

The Climate Action Reserve (CAR)

- Based in the United States, this organisation serves as both a standards developer and registry operator for carbon offset projects.

Global Voluntary Carbon Market

- While not a single entity, this refers to the overall international marketplace for voluntary carbon credits, which reached a market value of nearly \$2 billion in 2021.

London Stock Exchange (LSE) Voluntary Carbon Market

- The LSE has proposed a new market designation to increase transparency and regulatory frameworks for global voluntary carbon trading.

All these
trade carbon
saved from
the same
sources &
solutions



Forestry and Land Use

- Reforestation and afforestation projects
- Forest conservation (REDD+) initiatives



Renewable Energy

- Solar, wind, and hydroelectric power projects
- Biomass energy generation



Energy Efficiency

- Industrial process improvements
- Building efficiency upgrades



Waste Management

- Landfill methane capture
- Waste-to-energy projects



Agriculture

- Regenerative agriculture practices
- Methane reduction in livestock management



Carbon Capture and Storage (CCS)

- Direct air capture technologies
- Industrial CCS projects



Transportation

- Electric vehicle initiatives
- Fuel efficiency improvements

Voluntary Carbon Market for Digital Solutions

Concept

To launch a Voluntary Carbon Market mechanism to trade off-sets resulting from the application and deployment of digital solutions which generate a net-positive impact

Core Principles and Standards

- Core Carbon Principles (CCPs) and taxonomy of attributes for high integrity and market liquidity.
- Standardized contracts for carbon credits to enable efficient trading.

Regulatory Framework

- Clear regulatory framework, even though voluntary markets are not strictly regulated.
- Aligned with international initiatives like the Voluntary Carbon Market Integrity initiative (VCMI) to ensure quality and clarity.

Project Development Processes

- Procedures for project design, feasibility studies, and methodology selection.
- Systems for monitoring, reporting, and verification (MRV) of emissions reductions.

Market Infrastructure & Mechanisms

- Systems for Monitoring, Reporting, and Verification (MRV) to streamline data collection and processing.
- Transparent pricing mechanisms based on factors such as quality, and risk.
- Platforms for trading tokenized carbon credits to improve liquidity and market access.

Transparency and Credibility

- Systems in place for radical transparency into the carbon credit supply.
- Differentiated credit supply based on project types, risk levels, and co-benefits.

The untapped potential of digital technologies to save carbon emissions



Global Enabling Sustainability Initiative

ANCHORAGE

- **Article 6.2:** Enables countries and other actors to engage in cooperative approaches through the transfer of Internationally Transferrable Mitigation Outcomes (ITMOs).
- **Article 6.4:** Establishes a global carbon market overseen by the United Nations, where reduction or removal credits called Article 6.4 Emission Reductions Units (A6.4ERs) can be traded.
- **Article 6.8:** Creates a non-market framework for countries to support other countries without trading carbon credits.



Digital Technologies

- Net-positive impact of the deployment of digital technologies

A strong and recognised global methodology (EGDC)

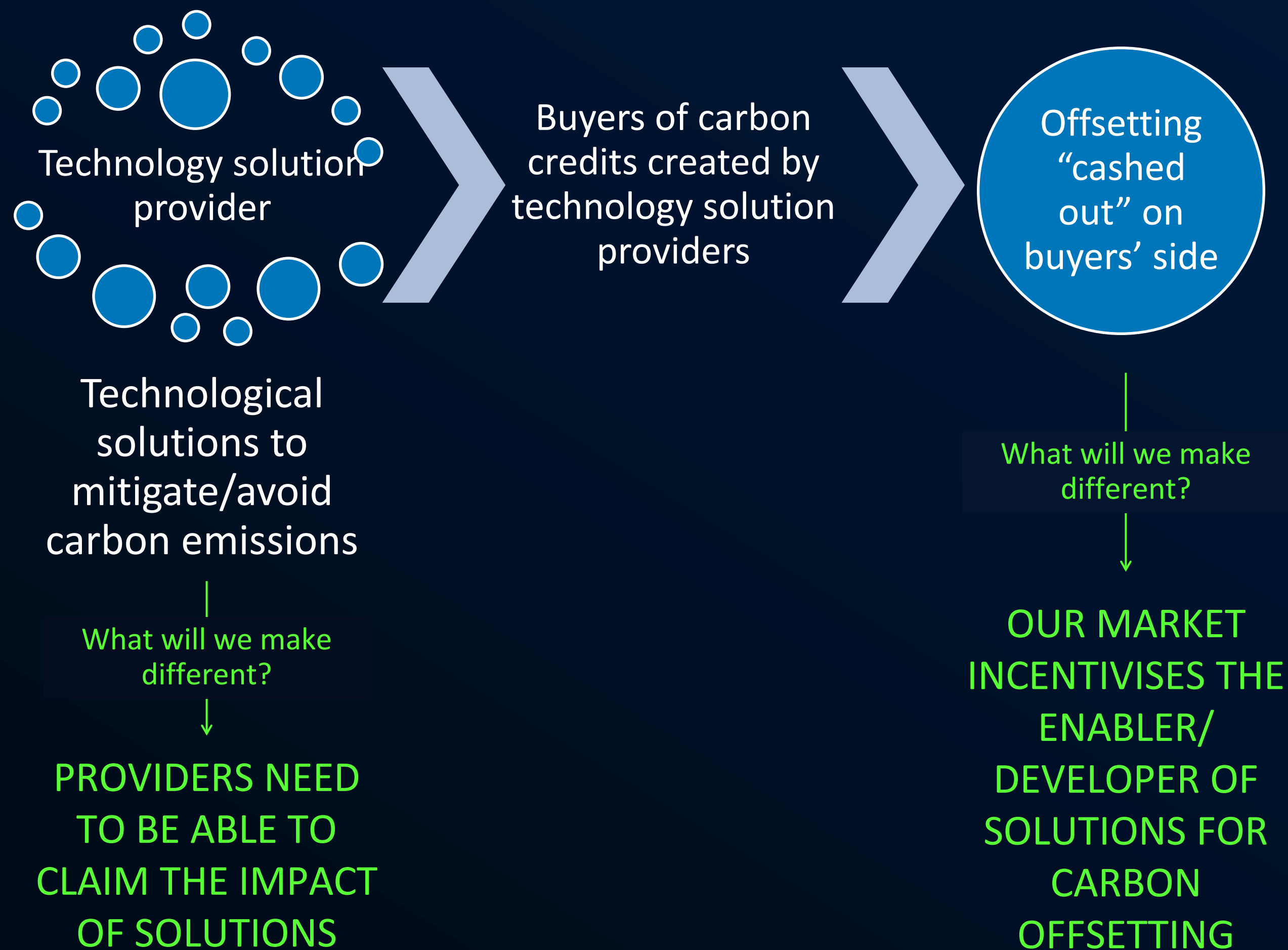


The partnership with the UNFCCC-UGIH



Potential trading providers

Why and How is this Market Different?



BENEFITING THOSE WHO ACTUALLY PROVIDE ADDITIONALITY

- Additionality in carbon markets defines that a carbon offset initiative must result in greenhouse gas (GHG) emissions reductions or removals **that would not have occurred without the incentive provided** by the sale of carbon credits;
- Additionality ensures that the project delivers genuine, measurable environmental benefits beyond what would have happened under a "business-as-usual" scenario;

WHAT IS THE PROBLEM, THEN?

- Current VCMs do not allow **the very providers of solutions that generate additionality** to claim the offsets produced by their solutions;
- Our proposition acknowledges that additionality was only possible because those solutions were produced by companies **who should then be able to claim those credits**;
- This would generate **further incentives** to develop, apply and scale up the use of digital solutions to sustainability.

Credibility by Design

EGDC's standardized, science-based approach to quantifying the climate impact of digital solutions could form the foundation for a credible and effective voluntary carbon market.

Credit Generation

- EGDC's standardized approach to quantify the net carbon impact of ICT solutions used to generate carbon credits based on the emissions avoided or reduced by implementing digital technologies.

Project Validation

- EGDC's rigorous assessment process, including defining baselines and calculating effects, could serve as a framework for validating digital solution projects in the carbon market.

Additionality Demonstration

- By comparing the emissions in reference and enabled scenarios, the methodology helps demonstrate additionality - a crucial concept in carbon markets.

Quality Assurance

- The methodology's emphasis on uncertainty analysis and critical review enhances the credibility of the calculated impacts, which is essential for high-quality carbon credits.

Sector-Specific Applications

- The complementary sector-specific methodologies for energy, construction, smart cities, agriculture, transport, and manufacturing allow for tailored assessments in these key areas.

Policy Alignment

- The methodology's alignment with EU Taxonomy criteria could help ensure that credits generated are compliant with evolving regulatory frameworks.



EUROPEAN GREEN DIGITAL COALITION

Key Considerations

Common Areas of Concern and How This VCM Approach Addresses Them

How our approach tackles Scope 3?

- Digital solutions can accurately measure and report the emissions reductions they enable across supply chains, providing a more precise picture of Scope 3 impacts.
- By allowing suppliers to claim carbon credits, this VCM encourages the development and deployment of more effective digital solutions for emissions reduction.
- Digital platforms can automate the tracking and reporting of emissions reductions, making it easier for companies to account for their Scope 3 emissions.

How our approach ensures credibility?

- EGDC's methodology provides a consistent, science-based framework for assessing the net carbon impact (footprint – handprint) of ICT solutions across different sectors. This standardization allows for more reliable and comparable results, which is crucial for establishing credibility in carbon markets.

How it contributes to mitigation (which should come before compensation)?

- Net Impact Methodology allows for a comparison to a scenario where no digital solution is deployed, credibly calculating the mitigation value of individual digital solutions.

How do we differentiate our approach from the low-quality carbon compensated X high carbon footprint emitted?

- Data transparency is imbued in product design – there's a real capability to assess the quality of the carbon emitted x compensated.
- EGDC's methodology addresses directly the net impact (footprint minus handprint), already offering perspective on the true quality of the impact of a given solution.



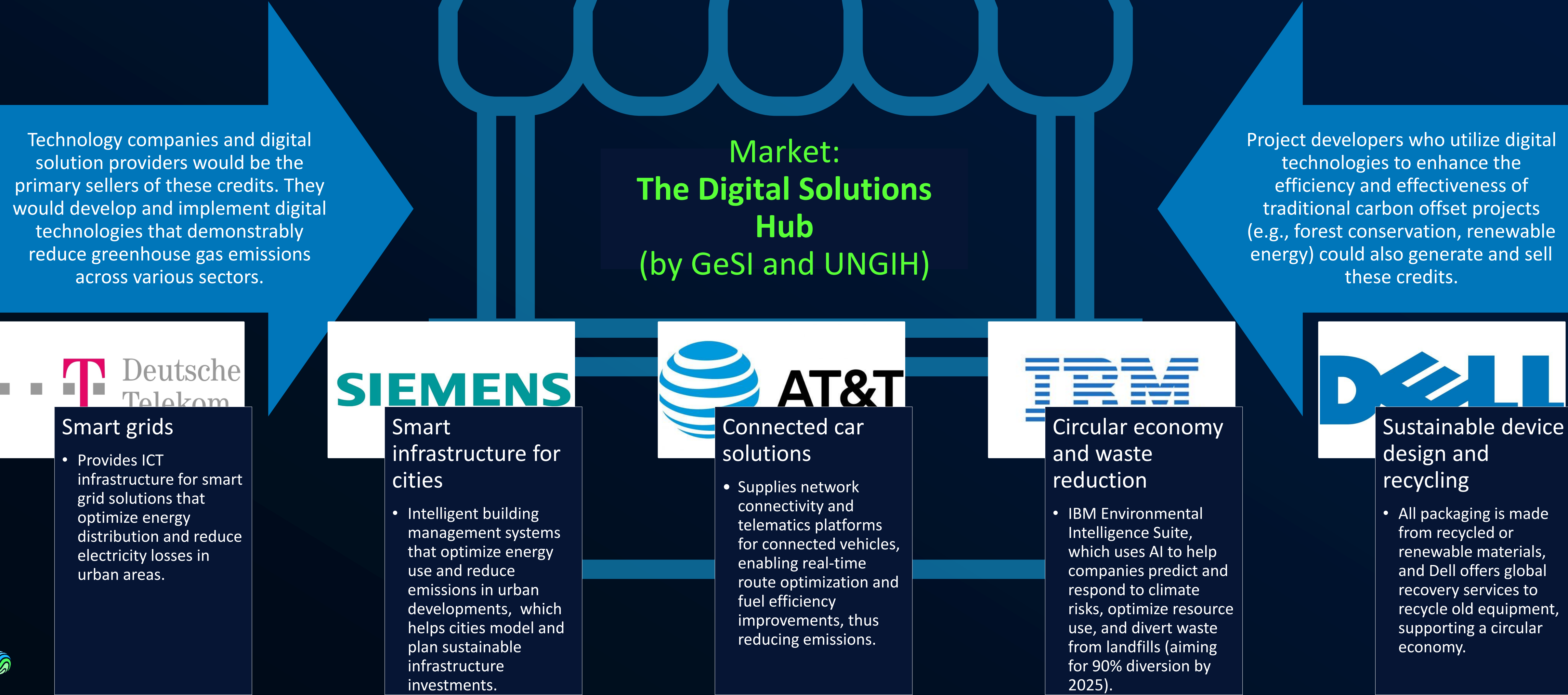


Structure

How a Voluntary Carbon Market for Digital
Solutions Would Work

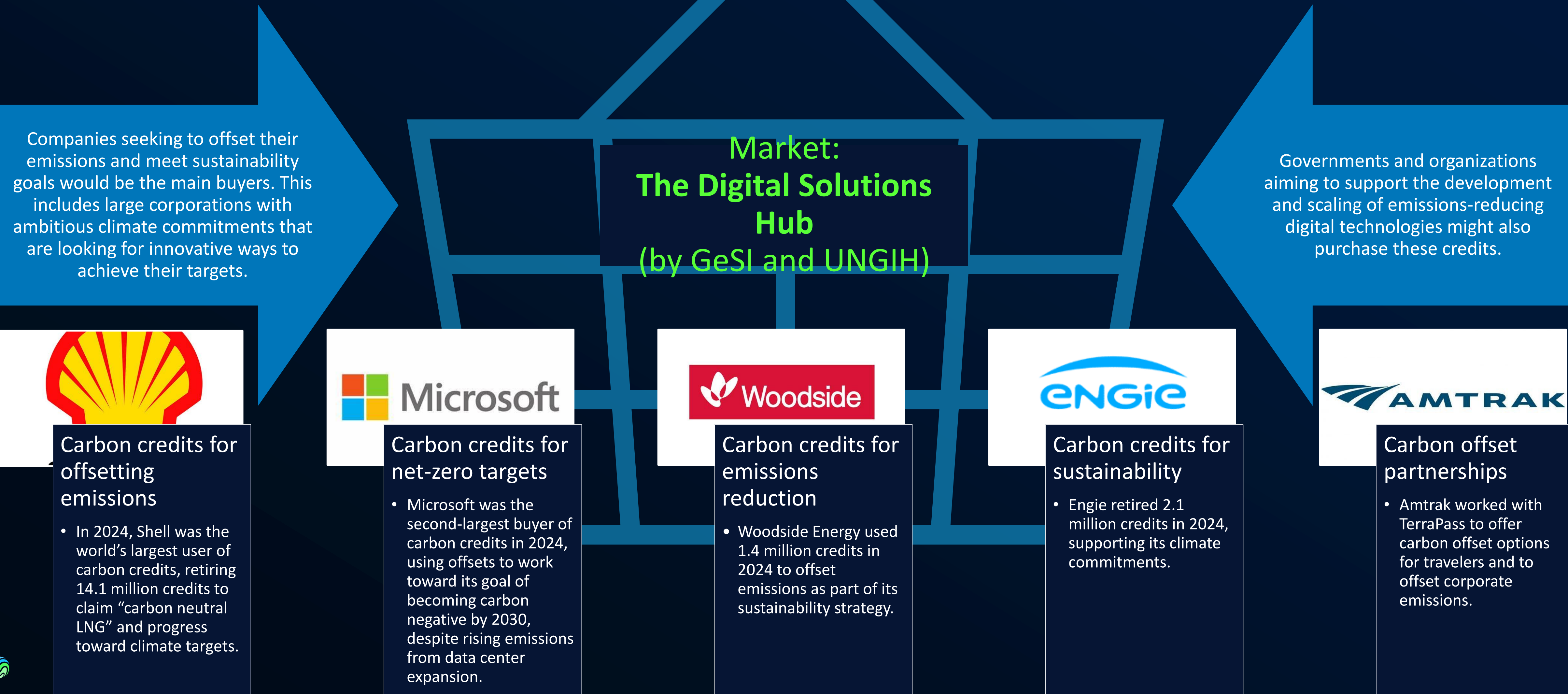
Sellers of Credits

Innovators Driving Digital Climate Solutions



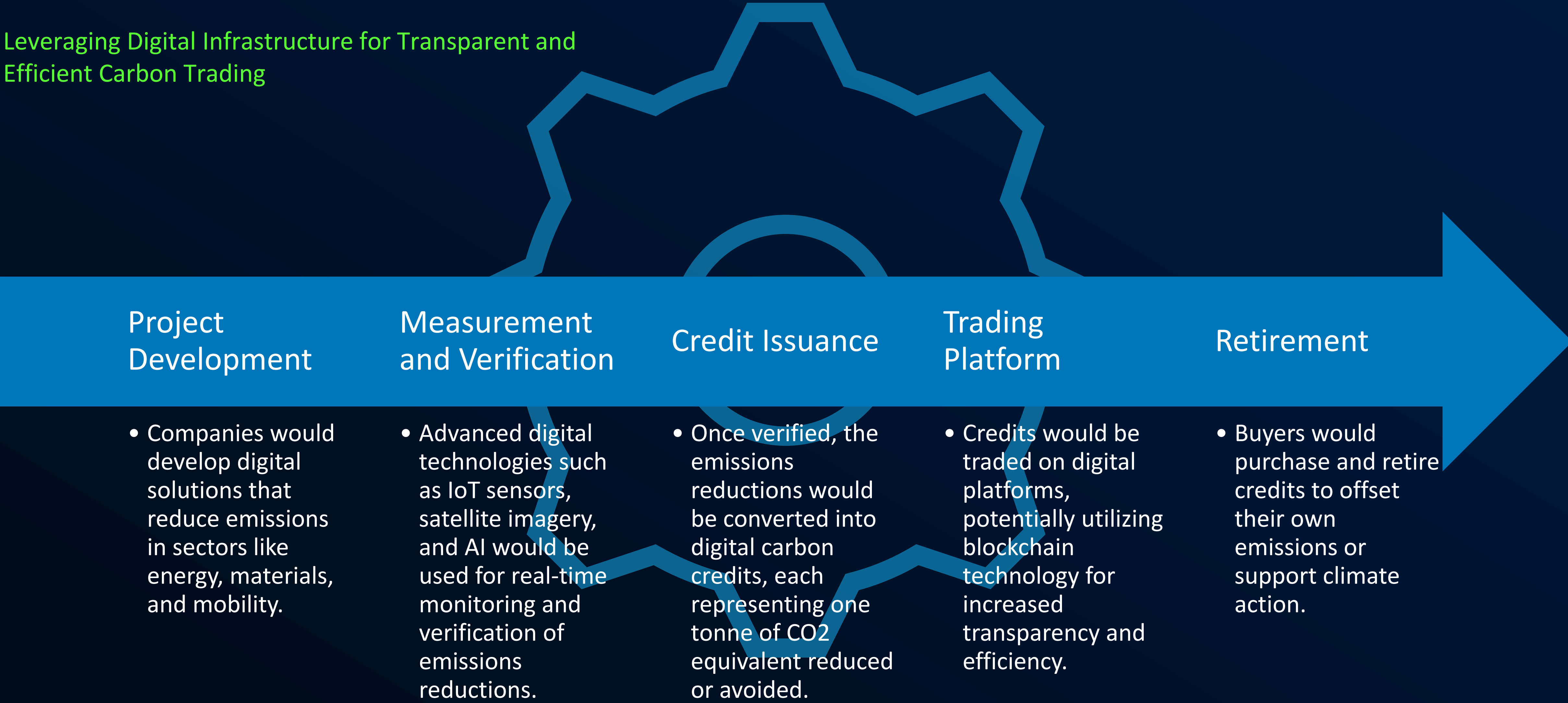
Buyers of Credits

Forward-thinking Entities Embracing Tech-enabled Sustainability



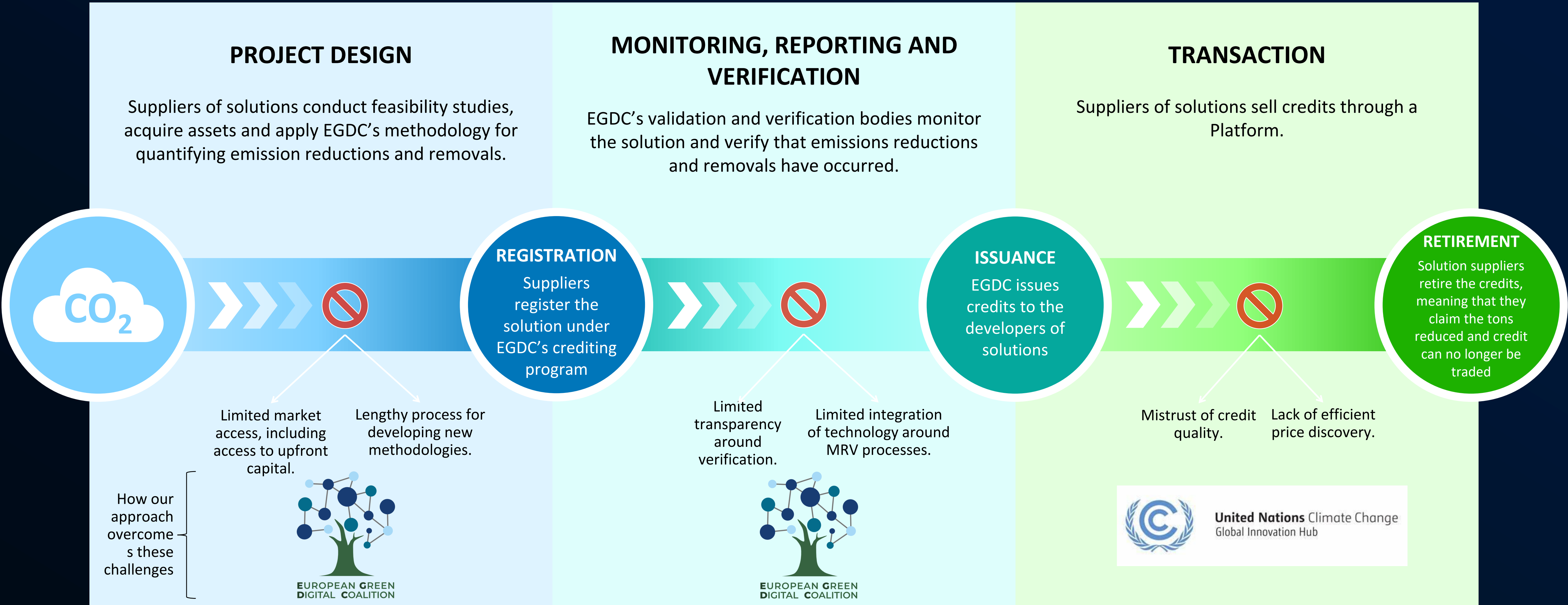
Mechanism Operation

Leveraging Digital Infrastructure for Transparent and Efficient Carbon Trading



Life of a Carbon Credit

The Process of Developing and Bringing Carbon Credits to Market under GeSI and UGIH's VCM (considering potential challenges)



Unique Aspects

Real-time Verification

- Digital solutions enable near real-time verification and issuance of credits, increasing market efficiency.

Enhanced Transparency

- Blockchain and other digital technologies could provide greater transparency in credit generation and transactions.

Scalability

- Digital solutions have the potential to scale rapidly, potentially leading to significant emissions reductions in high-emitting sectors.

Innovation Incentive

- This market would create additional incentives for companies to develop and deploy emissions-reducing digital technologies.



Next Steps



Thank you !