adelphi

Emissions Trading

Basic Principles and Experiences in Europe and Germany

About the programme

Capacity Building on Emissions Trading Systems by Germany

The German Federal Ministry for the Environment (BMU) began this Capacity Building Programme on Emissions Trading (CB ETS) in 2011. Its aim is to disseminate knowledge, practical experience, and best practices about emissions trading at an international level, and to support countries in setting up their national ETS. Since December 2021, the CB ETS programme is run by the Federal Ministry for Economic Affairs and Climate Action (BMWK). The programme is now in its fourth phase that will run until 2025.

The programme focusses on the conceptualization, organisation, and implementation of capacity building activities for countries worldwide that are interested in establishing or are in the process of developing an ETS. Capacity building activities can take various forms:

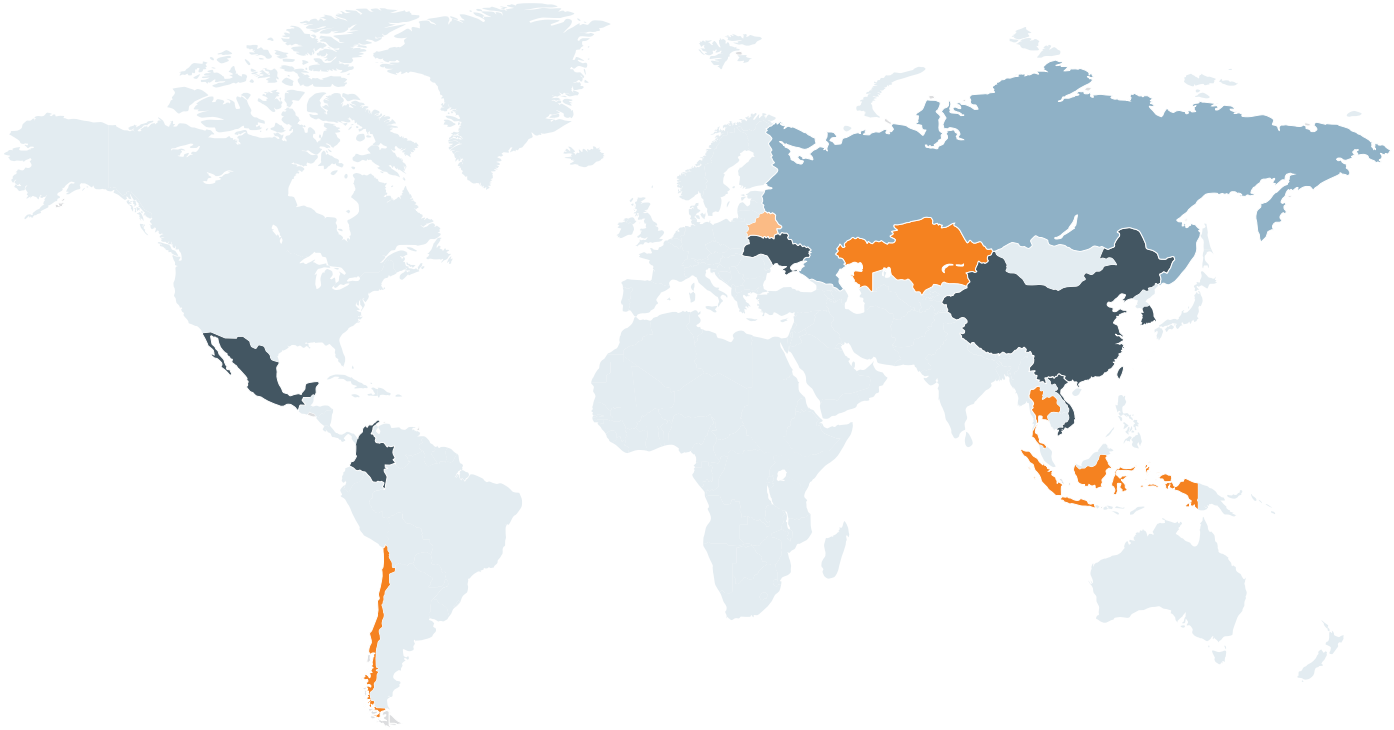
- **In-country ETS workshops and training courses** (virtual and in-person);
- **ETS study trips** to Germany (virtual and in-person); and
- **In-country expert consultations** (virtual and in-person).

The programme activities target both policy makers and private sector representatives.

It is implemented by carbon pricing experts from the German institutions adelphi, FutureCamp, Ecologic Institute, and Öko-Institut e.V., under the guidance of the Federal Ministry of Economic Affairs and Climate Action (BMWK) and in close cooperation with the German Emissions Trading Authority (DEHSt).

Since its inception in 2011, 24 training activities were implemented, with more than 650 participants from 15 countries around the world, including China, Indonesia, Kazakhstan, Mexico, and Ukraine.

More about the programme: ets-training.de



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Introduction

Climate change must be addressed within the next decades to avoid even more catastrophic impacts on people and the planet. Many governments and companies are now setting ambitious emission reduction targets and committing to net-zero by mid-century to address the challenge – and they urgently need to implement adequate policy frameworks to keep those targets within reach.

There is a wide range of instruments at governments' disposal to mitigate emissions: market-based instruments (tradable permit systems or environmental taxes), regulatory instruments (efficiency and technology standards), and information-based policy instruments (labelling, information campaigns). The primary advantage of market-based instruments lies in their capacity to achieve emissions reductions in a more cost-effective way.

The EU's primary climate policy tool is the European Union Emissions Trading System (EU ETS) – a market-based instrument that has been in operation since 2005 and covers the EU's major economic sectors, including industry, energy utilities and domestic aviation. It caps the total amount of emissions allowed and allocates emissions allowances to market participants, which are thereafter required to hold allowances for each ton of produced emissions. As the cap declines over time, the cost-effective benefits of the ETS stem from the ability of regulated firms to trade allowances amongst themselves, enabling a degree of flexibility regarding where the necessary emissions reductions take place within the group of regulated firms.

Over the years, the EU ETS has gradually evolved to match the EU's increasing climate ambition and improve the system's effectiveness and resilience to external shocks. For example, the EU ETS moved from granting free allowances to auctioning large portions of them, discontinued the use of offsets, and built in a structural market stability mechanism to address exogenous effects (such as economic downturns or effects of complementary climate policies).

More countries are putting a price on carbon as a central element of their climate policies, and many of them are choosing ETSs. As of January 2023, twenty-eight ETSs were in force worldwide, covering 17 % of global GHG emissions, including the UK, Germany, China, South Korea, New Zealand, Mexico, Kazakhstan, and a selection of states and provinces of the US and Canada. Another eight systems are expected to be in operation in the next few years, including in Colombia, Indonesia, and Vietnam. Those jurisdictions that are planning to design and implement an ETS can greatly benefit from lessons learned and best practices collected by front-running jurisdictions.

This paper highlights lessons learned from the implementation of the EU ETS. It is organized in a Q&A format, answering the most frequently asked questions during trainings and workshops conducted under the project "Emissions Trading Capacity Building to Support Bilateral Cooperation".

Chapter 1 — Cap Setting

Setting the cap is one of the most important decisions when establishing an ETS. The nature and stringency of the cap directly impacts the environmental effectiveness of the system and is the principal factor determining the economic value of an emissions allowance. A cap and its reduction factor can be altered over time to enable increased accuracy and adjusted ambition as the quality of input data improves and the acceptance of higher carbon prices grows. Cap setting can evolve over time, both in accuracy and ambition, as the quality of data improves, and acceptance of higher carbon prices grows.

1 What have been the relevant considerations for setting the cap in the EU ETS?

The process of setting the cap of the EU ETS started with the evaluation of the relative GHG abatement potential of all sectors (those that were to be included in the ETS and the non-ETS sectors), as well as the interaction with other climate and energy policies. In a second step, the contribution of the ETS to EU-wide GHG reduction targets was determined. Based on these two factors, the cap trajectory was set.

a. Understanding the impacts of complementary policies is important. These are measures which have overlapping objectives with the ETS (e.g., improving energy efficiency). The EU drew on economic modelling to assess the possible effects of complementary policies such as the Renewable Energy Directive and the Energy Efficiency Directive.

b. After the cap is set, the impact of other policies should still be frequently evaluated, and the cap adjusted accordingly. Otherwise, the cap may end up not adequately accounting for emissions reductions that result from other policies, which can ultimately generate a surplus of allowances.

2 How has the cap under the EU ETS evolved?

The EU ETS cap has evolved over time maintaining a "learning by doing" approach, becoming more ambitious and more resilient to unforeseen events and external shocks.

a. **Phase I (2005 – 07):** Member States were responsible for setting the cap in a bottom-up process, whereby National Allocation Plans (NAPs) established the number of allowances provided to each installation. These plans required the approval of the European Commission and, due to the lack of historical verified emissions data, were based on estimated emissions.

b. **Phase II (2008 – 12):** The annual caps were strengthened and aligned with the EU's emissions reduction targets under the Kyoto Protocol. The NAPs were simplified and made more transparent. Caps were set based on verified, facility level historical emissions data.

c. **Phase III (2013 – 2020):** A top-down, single EU-wide cap on allowances was introduced that decreased annually by a Linear Reduction Factor (LRF) of 1.74 %. This LRF was set in line with the EU-wide emissions reduction targets for 2020. A separate cap for emissions from flights within the European Economic Area for the years 2012 and 2013 to 20 was established.

d. **Phase IV (2021 – 2030):** the LRF has been raised from 1.74 % to 2.2 % and will be raised further to 4.3 % per year from 2024 to 2027 and to 4.4 % from 2028 to 2030. It applies to emissions from both stationary sources and the aviation sector.

3 What were the key lessons learned as the EU ETS was evolving?

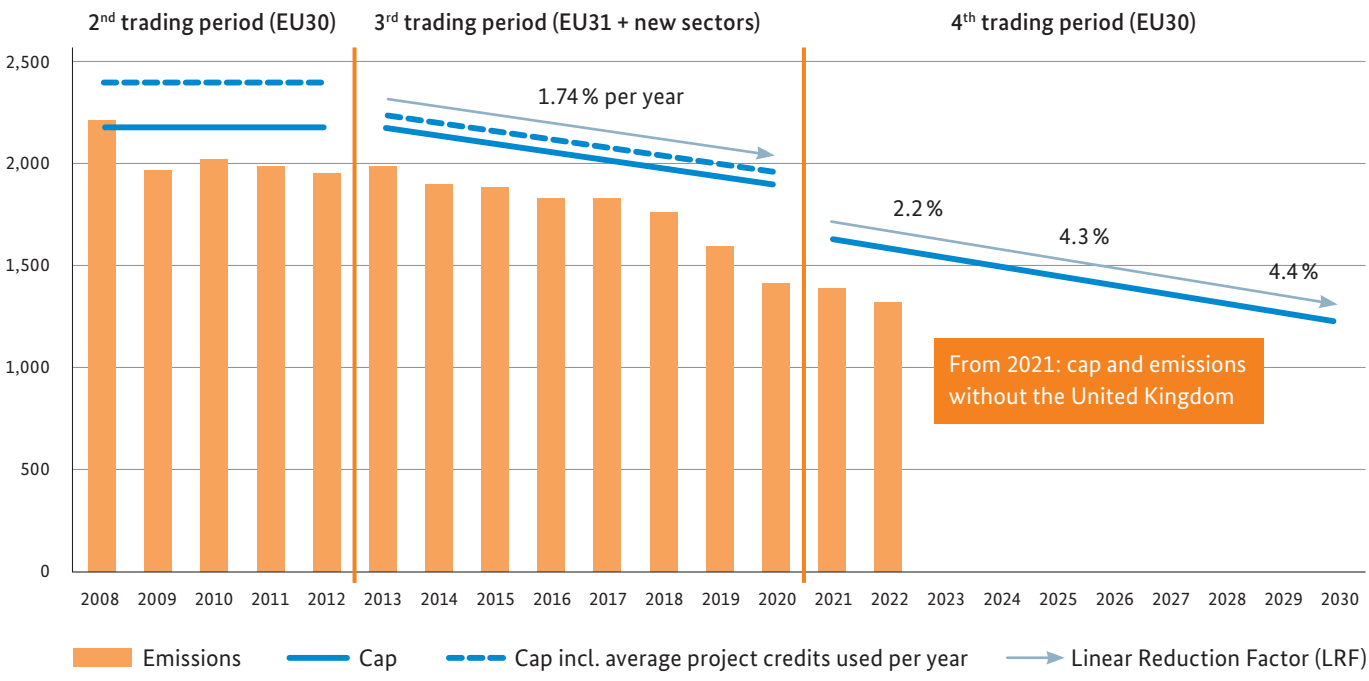
There are several key lessons learned from the EU's experience with cap setting.

a. Caps should be set using robust data. The lack of accurate, facility-level data at the outset of the EU ETS resulted in the Phase I cap being higher than actual emissions. This promptly led to a crash in the allowance price. To ensure such situations do not permanently undermine the effectiveness of a scheme, banking of allowances from a prior phase can be disallowed. Banking refers to the possibility of carrying over unused allowances from one phase to the next.

b. Build in mechanisms to adapt to changing conditions. In the case of the EU ETS, the lack of adjustment mechanisms meant the system was not able to respond dynamically to the emissions impact of the 2007 – 2008 financial crisis, which, together with unrestricted use of offset credits, caused a severe oversupply of allowances. The desire to make the system more responsive to such developments led to the introduction of the Market Stability Reserve (MSR) in 2019.

c. A cap period of eight or more years may be too long for the execution of timely cap adjustments. The new ETS Directive that applies since the start of Phase IV in 2021 includes a review clause for adjusting the linear reduction factor in line with the global stocktake of the UNFCCC.

Figure 1: Cap and verified emissions in the EU ETS



Source: German Environmental Agency based on European Commission (2022)

Chapter 2 — Scope and Coverage

Determining the scope and coverage of an ETS involves, firstly, defining which gases to include, the sectors to cover, and the thresholds for participation. In a second step, it is important to determine the point of regulation and to specify the actors in an economy that fall under the scope of the ETS. This has a direct impact on the number of participants in the market and on the emission reduction potential of the ETS. It is reasonable to start with a limited scope and gradually expand the coverage.

1 *What sectors and gases are covered by the EU ETS and why? What happens in the sectors not covered by the EU ETS?*

The EU ETS focuses on specific sectors and gases, while other sectors outside the cap are covered by the Effort Sharing Regulation. The scope of the EU ETS has gradually expanded to cover new sectors as well as new gases.

a. **Phase I:** The EU ETS only covered CO_2 emissions from the largest-emitting sectors (power generation and energy-intensive industries).

b. **Phase II:** Some Member States expanded coverage to also include N_2O emissions from the production of nitric acid. Given the sector's rapidly growing GHG emissions, intra-European flights were covered under the EU ETS from January 2012.

c. **Phase III:** The sectoral scope was expanded to include aluminium, carbon capture and storage, petrochemicals, and other chemicals. N_2O emissions from all nitric, adipic, and glyoxylic acid production, and PFC emissions from aluminium production were covered.

d. **Phase IV:** As part of the "Fit for 55" policy package, gradual inclusion of maritime sector emissions until 2026 is envisaged, as well as the inclusion of non-CO_2 emissions such as methane from 2026 onwards. By the end of 2026, the Commission will also assess whether to introduce emissions from municipal waste incineration into the EU ETS from 2028.

Emissions from sectors not covered by the EU ETS I are regulated under the **Effort Sharing Regulation (ESR),** which sets binding reduction targets for each Member State based on its GDP per capita. This accounts for the differences in financial capabilities of EU Member States and ensures fair burden sharing between them. As part of the Fit-for-55 package, an EU ETS II will be introduced to cover CO_2 emissions in the housing and road transport sectors to support the achievement of sectoral emission reduction targets under the ESR.

2 How was the point of regulation considered in the EU ETS and at which level are compliance obligations applied?

The EU ETS is designed as a downstream system and covers emissions at the installation level.

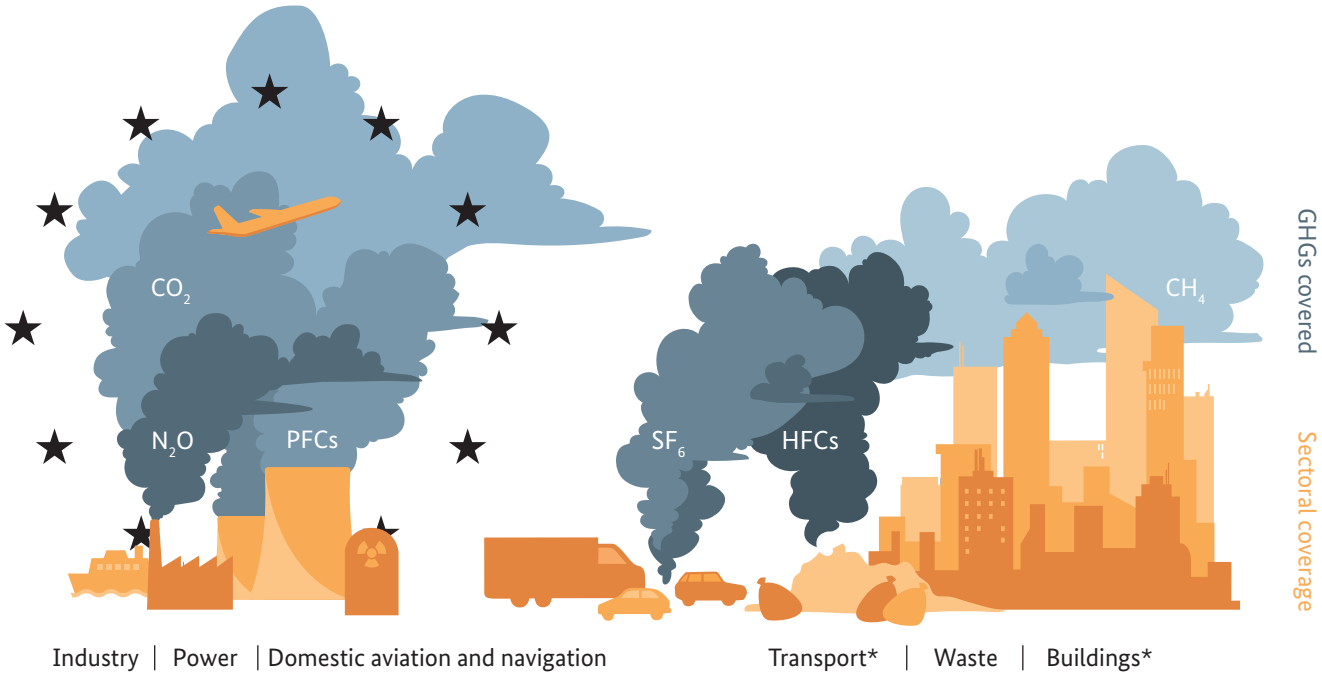
a. The Integrated Pollution Prevention and Control Directive previously provided a comprehensive set of regulations for downstream emissions of pollutants like nitrogen oxide, sulphur dioxide, mercury, and particulate matter from large combustion plants. This regime established a set of common rules for permitting and controlling large emitters at the installation level, on which the EU ETS could build.

b. A downstream approach leads to a higher number of participants and a larger number of abatement options, which in turn generates positive effects for market liquidity and a more stable and well-functioning market.

c. Covering emissions at the installation level was also consistent with the desire to place the liability at the point where technical mitigation could be achieved.

The EU ETS for housing and road transport (EU ETS II) is designed as an upstream system, with the compliance obligation being placed on suppliers of fossil fuels that are used in the buildings and road transport sectors. An upstream system was chosen in this case, because there are a large number of small emitters in the covered sectors and due to reasons of technical feasibility and administrative efficiency.

Figure 2: Scope and Coverage



Scope of EU ETS 1

* to be covered by the EU ETS 2 from 2027

Chapter 3 — Allocation of Allowances and Competitiveness

Allocation refers to the distribution of allowances to market participants once the cap is set and the scope, coverage, and point of regulation of an ETS has been defined. The allocation regime of an ETS shapes the market dynamics of the system and has implications for market participants that are exposed to international competition. There are two basic mechanisms for allowance distribution: allowances can be allocated for free based on historical emissions or benchmarks, or they can be sold, often by auction.

1 How are/have allowances been allocated under the EU ETS?

The allocation regime of the EU ETS was subject to several changes and adaptations from Phase I to Phase IV, with the share of auctioned allowances increasing significantly, particularly from the onset of Phase III in 2013. Those changes were due to experiences made with different allocation methods, different competitiveness environments in covered sectors, and improved understanding and acceptance of the ETS.

a. **Phase I:** 95 % of allowances were freely allocated, with 5 % auctioned. Allocation rules turned out to be too complex and not sufficiently transparent. Free allocation for electricity producers within a liberalized power market led to windfall profits.

b. **Phase II:** Around 90 % of allowances were freely allocated, with the rest auctioned. An extension of benchmarking allocation replaced grandparenting; and auctioning was phased in in some Member States to reduce windfall profits of electricity producers.

c. **Phase III:** Auctioning became the default allocation method, accounting for 57 % of the cap. The power sector bought all allowances required to cover their electricity production emissions, as it was not strongly exposed to international competition. Freely allocated allowances were determined through benchmarks.

d. **Phase IV:** Unchanged from Phase III, the share of auctioning will remain at 57 % until 2030. Sectoral benchmarks for free allocation are being regularly updated to avoid windfall profits. Between 2026 and 2034, free allocation will be phased out for the sectors included in the first phase of the carbon border adjustment mechanism (CBAM), with the final phase-out date for the rest of the industry not yet fixed. For aviation, free allocation will be phased out by 2026.

2 *What was the rationale for the different allocation methods in the EU ETS?*

Different allocation methods are used to balance different policy objectives and to help overcome the initial hurdles of introducing a carbon price, including political opposition.

a. **Auctioning** provides full incentives for abatement and allows for price discovery and revenue generation. It was, however, not possible to use it from the start of the EU ETS due to strong opposition from affected industries over concerns of losses of international competitiveness. In contrast to free allocation, auctioning does not provide protection against carbon leakage (see next question).

b. **Use of historical emissions (grandparenting)** in the early stages was meant to protect the competitiveness of affected EU industries and to avoid negative impacts from cost pass-through. In addition to the low allowance price level in Phase I, this helped to mitigate negative distributional and competitiveness effects, but it did not lead to meaningful emission reductions.

c. **Benchmarking** – currently the main method in the EU for distributing free allowances – incentivizes switching to lower-carbon technologies, by providing a fixed number of free allowances per ton of product. Producers with a high emissions level need to buy additional allowances on the market to cover their excess emissions, and low-emission producers can sell their surplus allowances. High-emitters are thus incentivized to invest in emission reduction measures, including low-carbon technologies, to decrease their carbon costs.

3 How has free allocation addressed competitiveness concerns in the EU ETS?

The EU ETS has thus far relied on the free allocation of allowances as its main tool to tackle carbon leakage. This refers to the risk of increased emissions outside the EU, from covered EU entities shifting their production and investments to other jurisdictions with lower or no carbon price or losing market share to competitors that do not pay an equivalent carbon price.

To determine which sectors are eligible for free allocation, the EU calculates the sectoral risk of carbon leakage by applying two criteria: sectoral carbon intensity and sectoral exposure to international competition as a function of trade intensity. In Phase IV, the two criteria were combined into a "carbon leakage indicator", by multiplying sector values for both criteria. For sectors and sub-sectors that narrowly missed eligibility using this indicator, an additional eligibility procedure was available based on qualitative or disaggregated quantitative assessment.

a. In sectors that are found to be at risk of carbon leakage, installations benefit from a more generous free allocation. They receive 100 % of the benchmark allocation for free, whereas installations in other sectors only receive a share of the benchmark-based allocation, which fell from 80 % to 30 % in 2020. This will eventually fall to zero by 2030.

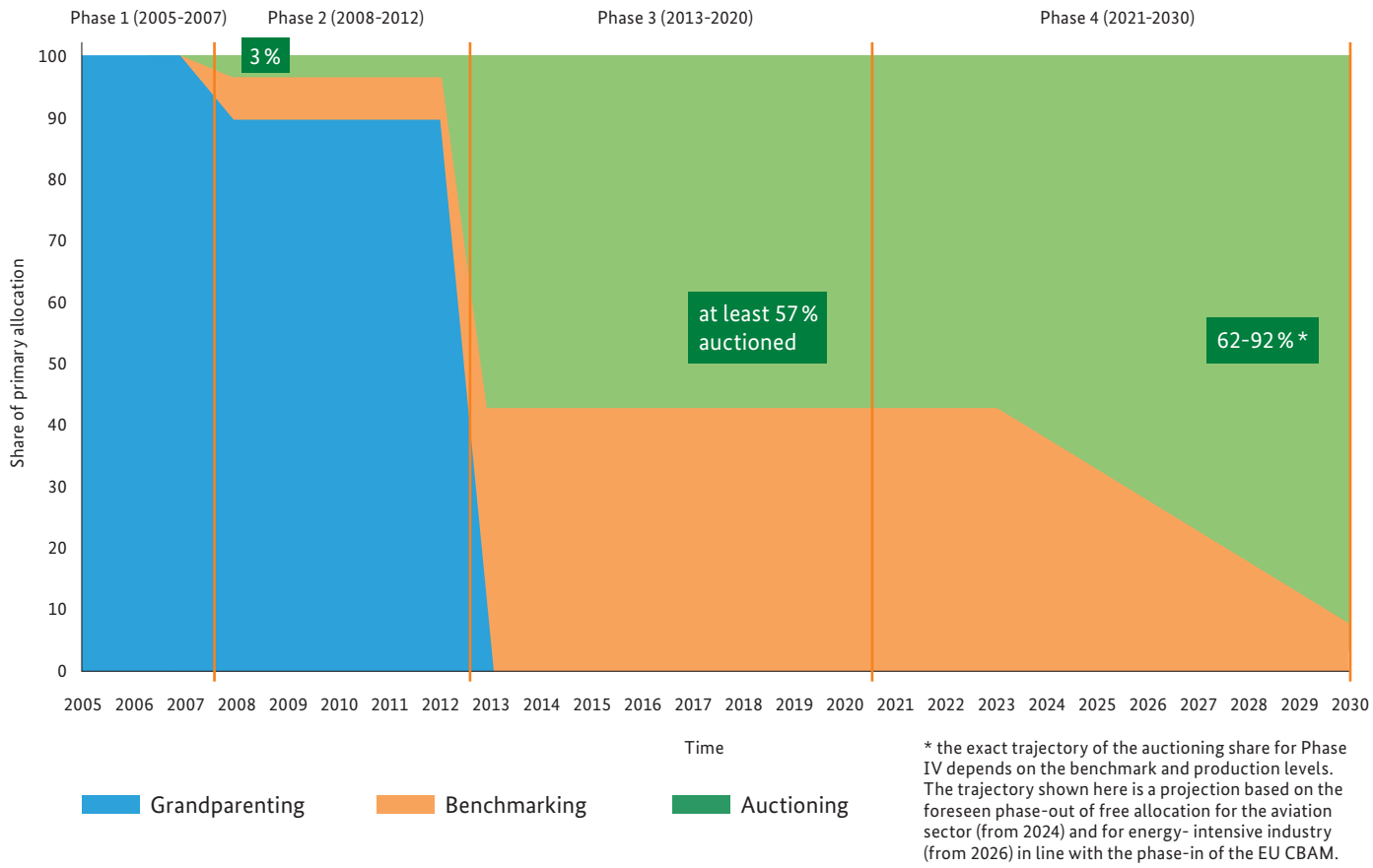
b. Benchmark values for free allocation will be updated twice in Phase IV to reflect technological progress in different sectors. An annual reduction rate (0.2 % to 1.6 % for allocations for 2021 – 25 and 0.3 % to 2.5 % for 2026 – 30) will be determined for each benchmark. Also, a revised carbon leakage list applies for the period 2021 – 2030, with a reduced number of sectors classified as at risk of carbon leakage compared to Phase III.

c. As a further safeguard against carbon leakage, the EU ETS has introduced more dynamic elements in its allocation after 2020, i.e., making it more responsive to changes in production levels by introducing a threshold of 15 % for the recalculation of free allowances. This applies to annual free allocation adjustments to reflect relevant increases and decreases in production.

d. The EU ETS also contains provisions on compensation from Member States to their national firms for indirect costs from increased electricity prices induced by the EU ETS.

e. From 2026 onwards, the free allocation of allowances to sectors at risk of carbon leakage is to be gradually phased out with the introduction of the CBAM to address carbon leakage.

Figure 3: Evolution of primary allocation methods in the EU ETS



* the exact trajectory of the auctioning share for Phase IV depends on the benchmark and production levels. The trajectory shown here is a projection based on the foreseen phase-out of free allocation for the aviation sector (from 2024) and for energy- intensive industry (from 2026) in line with the phase-in of the EU CBAM.

Source: own illustration based on data from the European Commission

Chapter 4 — MRVA

The system for Monitoring, Reporting, Verification and Accreditation (MRVA system) is the central framework that defines procedures and obligations of operators, verifiers, and competent authorities in an ETS. First and foremost, this pertains to emissions monitoring and reporting. It may also include tasks for the accounting of activity data in the case of free allocation to covered installations based on such data.

1 What are the main conceptual and institutional building blocks of the EU MRVA system?

Today's sophisticated MRVA system in the EU ETS reflects precious lessons learned and refinements from three past implementation phases. It assures the integrity and transparency that are essential for a well-functioning compliance and trading market.

a. The implementation follows central principles, notably that monitoring and reporting must be complete, consistent, comparable, transparent, and accurate. To assure that these standards are met, there is a comprehensive set of dedicated rules.

b. The setting integrates complementary responsibilities. The reporting obligation and general accountability lies with the operators. The independent third-party verification is assigned to accredited verification bodies. Their accreditation is carried out by accreditation bodies. The overall governance, official approval, and supervision are the responsibility of the competent authorities.

c. The ETS rules formulate a comprehensive set of provisions and processes that effectively assure an implementation of adequate requirements for the broad spectrum of covered activities (e.g., combustion of fuels, refining of mineral oil, production of cement clinker etc.) under the ETS. They have been refined and improved over time.

2 What are the characteristics of the annual MRV compliance cycle in the EU ETS?

The established framework covers the tasks through a defined annual MRV compliance cycle. It contains specific obligations to comply with and includes flexibility for adjusted application in real life.

a. Dedicated steps for involved parties define a comprehensive routine process that assures seamless, rigorous implementation of requirements: In general, monitoring plans have to be prepared by the operator and approved by the competent authority before application. Operators submit an annual emissions report based on their monitoring plan, which thereafter needs to be verified by an independent accredited verifier before submission to the competent authority. Operators are obliged to surrender emission allowances corresponding to the volume of emissions they have reported.

b. Operators may benefit from helpful flexibilities. They may generally choose amongst available monitoring approaches (calculation or measurement-based approach) and apply combinations thereof where it best fits their circumstances. Under certain conditions, small emitters may even opt-out of the ETS.

3 How does the established tier system grant flexibilities in the rigorous ETS system?

The tier system is a central MRV feature in the EU ETS. Tiers define levels of requirements for the monitoring operators to follow. The following selected aspects illustrate how this is executed:

a. The highest tiers apply to large emitters and large source streams/emissions sources: they must meet the highest requirements on accuracy (with defined uncertainty thresholds to be met).

b. Lower tiers apply to smaller emitters and source streams/emission sources of lower relevance in an installation, so-called small or de-minimis source streams. Here requirements are lowered (e.g., standard factors can be applied).

c. The tier system allows for flexibility where proportionate. Such a deviation from the applicable tier requirement (i.e., applying a lower tier than required) is possible if operators can prove that costs for meeting the required tier are disproportionate (vis-à-vis the benefit) or even technically not feasible.

4 How do IT applications support the processes?

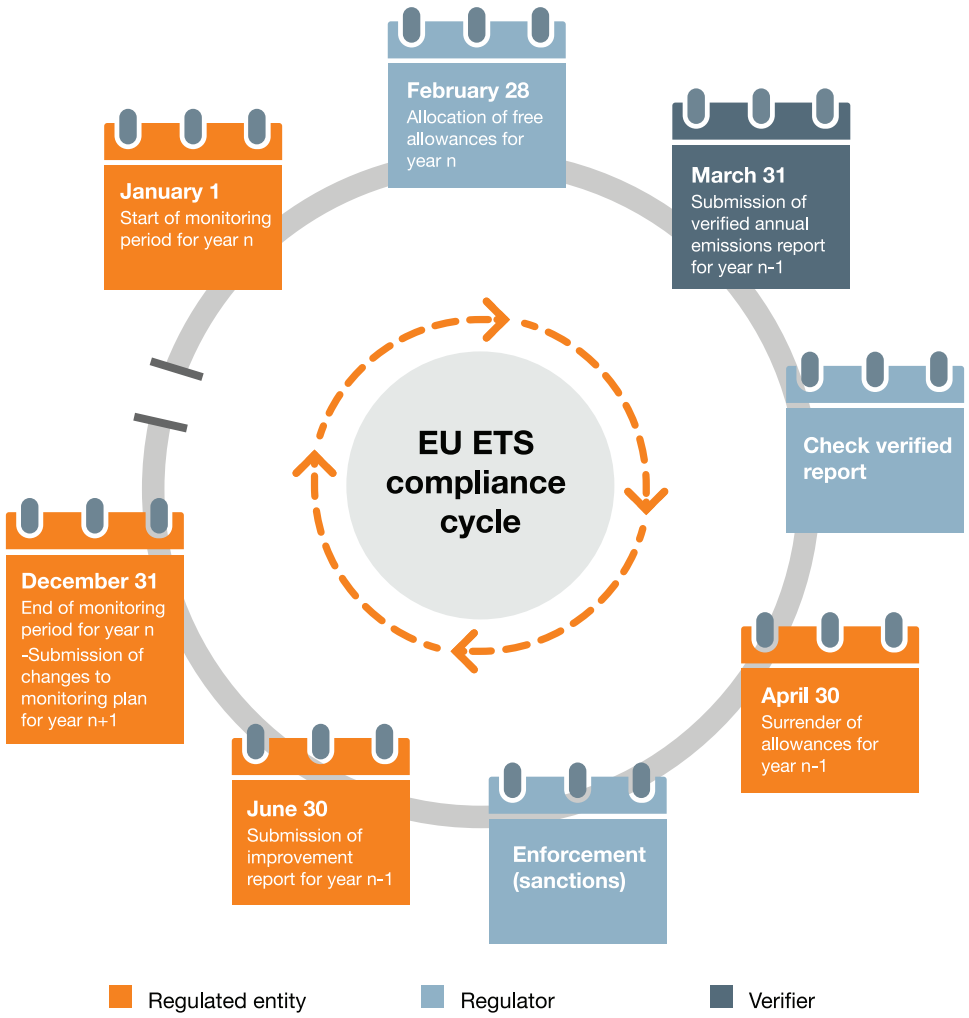
Secure electronic forms and IT applications effectively support reporting processes.

a. The IT infrastructure facilitates data collection. For example, the compilation of the emissions reports is based on (approved) imported monitoring plans.

b. The online templates automatically flag inconsistencies. Embedded hints on the requested data as well as validity/consistency checks in the forms further support operators when preparing the data.

c. The system allows for an integrated verification process. The integration of verifier statements into the emissions report transparently documents the verifiers' acceptance of data before the report is submitted to the competent authority.

Figure 4: MRV in the EU ETS



Source: ETS Handbook (2021), p. 167

Chapter 5 — Market Participants and Trading, Market oversight

Market liquidity and market access for key players are essential components for a well-functioning ETS. This goes well beyond what compliance entities as market participants alone can provide. Another critical function of the market is to send a clear price signal to participants of the ETS, encouraging emissions abatement where it is most cost-efficient. Considering external shocks that may cause high volatility in the market, the use of price stabilization instruments is advisable. Regulators must also consider issues regarding the technical infrastructure for carbon trading and apply market oversight to address risks that may hamper the integrity of the market at large.

1 Which products and market players support a liquid market?

To ensure the effectiveness of an ETS, it is important to implement a functioning market with sufficient liquidity to buy and sell emission allowances.

a. In a developing market, brokers and intermediary traders may play a very important role, facilitating a marketplace for bids and offers. They can also help define appropriate trading products (e.g., forwards, swaps, options). With growing liquidity and standardized products, exchange trading becomes increasingly attractive and relevant.

b. All participants should have easy access to the market. This may be directly or via brokers, service providers or banks. Banks function as enablers of trading by other ETS participants. Energy utilities and financial institutions are the most active market players and make use of all venues and products that are available in the EU ETS. All of this helps improve liquidity in the market.

c. The availability of a wider range of products beyond spot trades is important. Especially futures/forwards can help accommodate operators' needs for hedging against price risks.

2 Why and how should a regulator help stabilize market prices?

ETS market prices are driven by different internal and external factors. If prices are too low, emissions abatement will not be triggered. If volatility is too high, the companies might experience a lack of planning security, but the regulator can help stabilize prices through institutional provisions.

a. The main drivers for declining prices in the EU ETS were over-allocation and financial and economic crises (e.g., 2008, 2011). Market stability instruments can help soften large price movements.

b. The EU ETS Market Stability Reserve (MSR) was adopted in 2017 (see chapter 6). Prices rose immediately (even though the MSR came into force in 2019) and thereby "corrected" the low price level that had been caused by a combination of over-allocation and economic crises (of 2008 and 2011). In 2020, the MSR proved to be efficient in stabilizing the market during the COVID-19 crisis, with prices recovering very soon after a dip due to lower industrial production.

c. Other volume control instruments include allocation reserves and offset quotas. Alternatives are price control instruments, such as price floors or price caps.

3 What is the character and functionality of emissions trading registries?

Emissions allowances are immaterial goods. Therefore, they can be held as records in a database only. Therefore, emissions trading registries must be set up.

a. Registries are like online banking systems. They can be reached via an internet interface. ETS participants have accounts in the registry and hold allowances, which can be transferred between these accounts.

b. Registries are usually in the hands of a public administration or a bank. The registry contains assets of the participants.

c. Due to the significant value of allowances, a registry has, like any other banking system, high security demands. Similar measures to those used in online banking systems, such as two-factor authentication, should be applied.

d. Surveillance and control tasks are also performed in the registry to protect the integrity of the system. Measures considered in managing the registry include "Know Your Customer" (KYC) checks, as well as mechanisms to prevent criminal activities, such as transaction analyses to detect misconduct such as money laundering or sales tax fraud.

e. The registry documents the ownership of allowances. After a trade, the allowances are transferred between accounts in the registry, but the trading itself does not happen in the registry.

4 How can market oversight mechanisms support the integrity of trading?

As the commodity value of carbon credits rises, the risk of fraudulent activity increases. To ensure market integrity, adequate market oversight must be established.

a. The function of market oversight is to prevent and sanction market misconduct, particularly considering insider dealing, market manipulation, or the risk that the market is used as a vehicle for other illegal activities like money laundering or VAT fraud.

b. Special provisions in the EU ETS address fraudulent actions that have happened in the past, including establishing a reverse charge mechanism to prevent VAT fraud.

c. There must also be caution against overregulation: While stringent provisions for market oversight are important, they must also acknowledge the need to assure appropriate market access to all ETS market participants, for example, by the design of appropriate risk-based exemption rules.

» *From our experience, it is vital to allow entities under an ETS to manage risks and ensure easy access to the market for small and medium-sized entities. The involvement of service providers and financial institutions can enhance liquidity and support the effectiveness of market mechanisms. The question of price regulation poses a challenge as it involves a trade-off between a clear market-driven price signal and a reliable price trajectory. Ultimately, this decision rests on political considerations, and various options exist for both approaches.*

Dr. Roland Geres & Dominik Glock, FutureCamp Climate

Chapter 6 — Market Stability Measures

In more developed systems, it makes sense to introduce market stability measures to improve the management of allowance supply in response to exogenous impacts. For example, an economic downturn would lead to a sharp decrease in demand for allowances in line with lower production, potentially resulting in allowance prices being too low to stimulate emissions reductions. Stability measures for an ETS may work by regulating the number of allowances available in a market either at a specific price or quantity level.

1 Why was it necessary to implement a mechanism to manage supply & demand?

In the EU ETS, the global economic crisis of 2008, high imports of international carbon credits that had not been reflected in the pre-determined cap, and the large uptake of renewables within the EU, drove down emissions and thus decreased the demand for emissions allowances (EUAs). These factors contributed to a large overallocation of EUAs, resulting in allowances prices falling to a relatively low level.

a. This experience highlights a trade-off between providing policy certainty regarding the emissions cap and the ability to respond to exogenous demand shocks.

b. It further highlights the need to properly define flexibility mechanisms by using offsets (see chapter 7).

2 How does the MSR operate?

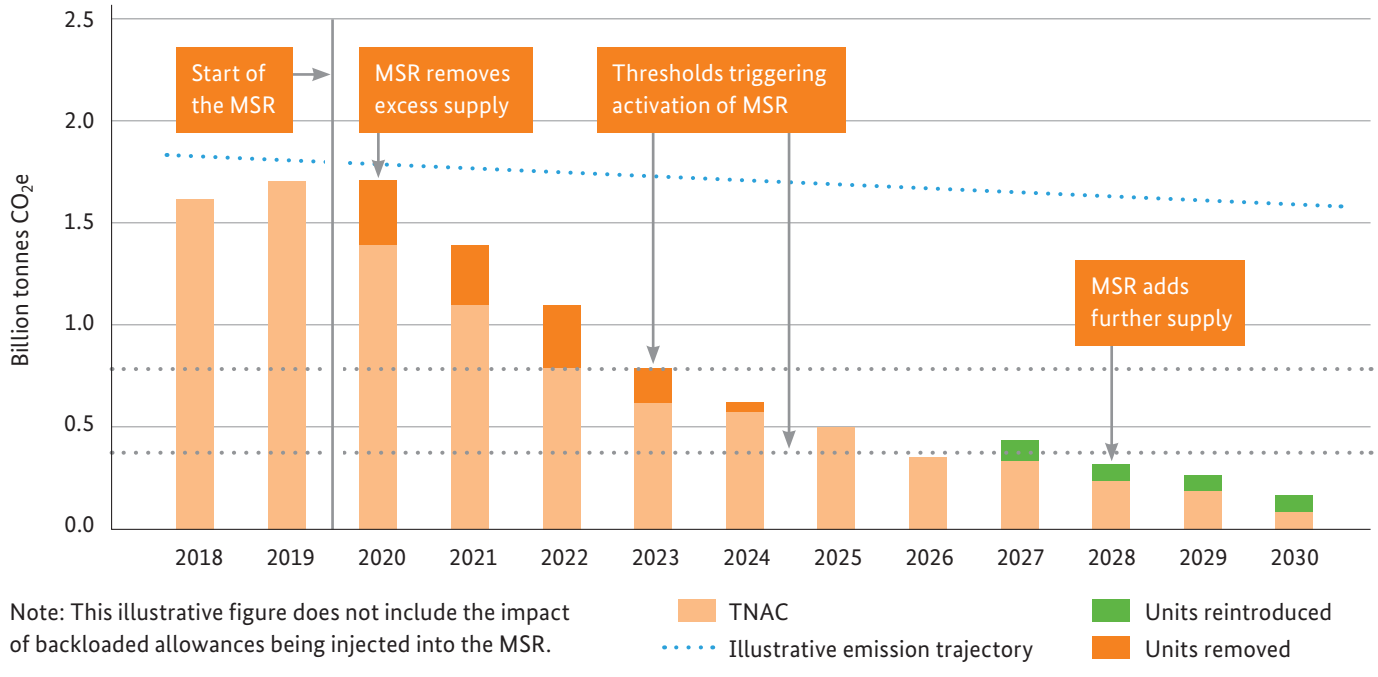
In response to the unnatural price fluctuations, the EU ETS introduced two measures to manage allowance supply. As a short-term measure, changes were made to the auction schedule for Phase III ("backloading": deferment of auction volumes). As a structural measure, a Market Stability Reserve (MSR) was established.

a. The MSR is an automatic adjustment mechanism that alters auction volumes when the Total Number of Allowances in Circulation (TNAC) – a measure of allowance supply – is above or below predefined triggers. The MSR aims to maintain a certain supply-demand balance while ensuring the liquidity of the market. It was designed to address a surplus of allowances and to improve the system's resilience to major shocks by adjusting the supply of auctioned allowances. It also helps to keep the allowance price signal within the necessary range to achieve the long-term decarbonization target of the ETS.

b. The TNAC is announced every year in May, and a decision is made on whether allowances should be released from or moved to the reserve. As part of the negotiations on the structural reform of the EU ETS for Phase IV, it was agreed that the number of allowances that can be held in the reserve will be restricted to 400 million, with any surplus being permanently cancelled.

Figure 5: Market Stability Measures

Illustrative example of MSR's impact on the supply of allowances



Note: This illustrative figure does not include the impact of backloaded allowances being injected into the MSR.

Source: adapted from Vivid Economics (2020)

Chapter 7 — Offsets

Offsets are emissions reduction or removal projects implemented outside of an ETS coverage or a compliance regime that are undertaken to compensate for emissions producing activities. Assuring the additionality of the mitigation effects resulting from an offset project is essential, which means that the project would not have occurred without the incentives of the mechanism. As global warming is not bound by geographic borders, it does not matter from a climate perspective where the emissions reductions or removals occur. In theory, emissions reductions or removals would therefore occur in the most cost-effective manner, reducing the burden on ETS participants.

1 *What are the direct effects on an ETS by the use of offsets for compliance?*

An inflow of offset units can have notable effects on the price signal of an ETS, and the EU experience highlights that allowing the use of offsets in an ETS must be properly planned.

a. The incorporation of offsets in an ETS can lower the compliance burden of regulated entities, as finances can be used in a more efficient way to reduce emissions.

b. At the same time there is a necessity for stringent safeguards, such as import quotas limiting excessive imports of certificates. Otherwise, the critical demand/supply balance in an ETS market may be compromised.

c. The usage of offsets can bring benefits to sectors and activities outside the ETS and thus lead to increased ambition and knowledge creation. These benefits may facilitate the inclusion of those activities into the ETS over time. This was the case with the roll-out of ground-breaking N_2O mitigation technology. The offsetting activities helped to identify benchmarks that were later used in the ETS.

2 *What are the co-benefits of using offsets within an ETS?*

Offsets create benefits for the sectors and regions in which they are implemented. This is of interest for buyers and host countries alike, as it may become a vehicle for both international cooperation on climate finance and broader technology cooperation.

a. Domestic projects can incentivize private sector engagement by helping to identify financial needs and innovation. They can thus provide funding for innovative mitigation action or leverage it where it is lacking.

b. New technologies developed through innovative offset projects can also function as a buy-in for relevant stakeholders. They can help operators prepare for and comply with the ETS once they are covered under it.

c. On the international level the Clean Development Mechanism (CDM – the predecessor of the Art. 6 Mechanism under the Paris Agreement) and other voluntary offset standards helped roll out new technologies worldwide, thus supporting international cooperation on climate mitigation. In this instance, host countries' benefits are closely linked to the design components, with additionality and ambitious baselines being the most important factors in this regard.

3 *What are the most relevant reference points when looking at an ETS in combination with an offset regime?*

Since 2021, offsets are no longer eligible for compliance under the EU ETS (Europe wants to implement its mitigation targets domestically). Nevertheless, the long European history with this flexibility instrument is highly valuable and an excellent starting point for legislative planning around the ETS/offset nexus in other prospective jurisdictions.

a. The experiences drawn from the integration of the Kyoto mechanisms in the EU ETS brought many insights into the integrity and quality of offsets. These lessons informed current international offset rules and modalities.

b. Countries that are interested to link their new domestic ETS with a domestic offset instrument can draw valuable insights from the use of Joint-Implementation (JI) with its many domestic projects in the EU ETS. However, the design and use of (domestic) offsets must accommodate the new architecture that is emerging under the Paris Agreement.

c. The long-term nature of targets under the Paris Agreement have made the treaty the decisive framework for offset instruments: The rules and modalities of the new market mechanism under Article 6 made significant progress in the Conferences of the Parties in Glasgow (COP 26) and Sharm el-Sheikh (COP 27). Many countries are starting the implementation process, and experts expect Article 6 units to be in circulation from 2024 onwards. The rules, modalities and procedure of the new mechanism are based on the experiences and lessons learned from the established offset standards.

» *Allowing offsets in an ETS brings both risks and opportunities. Offsets can provide early abatement incentives to sectors not yet covered by a carbon price. However, offset use in an ETS should be limited to ensure that the system drives sufficient mitigation in the covered – usually most polluting – sectors. Finally, offsets should be subject to robust international standards to ensure that emission reductions achieved are real and additional.*

Dr. Constanze Haug, adelphi

Chapter 8 — International Cooperation of Carbon Markets

One advantage of emissions trading systems is that they can be linked internationally. This brings economic and environmental benefits, including increased market liquidity and more flexibility for market participants to reduce emissions where it is most cost- effective. To link ETSs while maintaining environmental integrity, key design elements of the respective systems require a degree of compatibility.

1 What are prospects for carbon markets worldwide?

National and regional ETSs are emerging worldwide, including in developing countries. Linking these ETSs could gradually lead to the establishment of a global carbon market, which would theoretically offer the most cost-effective solution to the global challenge of climate change.

a. Article 6 of Paris Agreement allows parties to use cooperative approaches that involve the transfer of mitigation outcomes to help achieve their emissions reduction targets.

b. International linking of ETSs could be another example of such cooperative approaches.

c. The economic benefits of ETS linking include the more cost- effective reduction of emissions, increased market liquidity, better insulation against external shocks, and reduced carbon leakage risks. The environmental benefits from lower compliance costs may also allow for the setting of more ambitious targets.

2 What specific considerations would be relevant for a jurisdiction when exploring the potential to link with other carbon markets?

Within linked ETSs, allowances in one system can be used for compliance in another one, which has several economic, environmental, and political implications.

a. Linking ETSs requires a degree of compatibility of different design elements and considerable political effort. Power dynamics should be taken into consideration: when one system is considerably larger than the other, the smaller one might have to conform to the rules of its counterpart (i.e., loosing autonomy in rule setting).

b. Linking can also be politically difficult when there is a significant difference in abatement costs between the jurisdictions. This would lead to large financial inflows into the system with lower abatement costs and insufficient emissions reductions in the other.

c. Generally, jurisdictions need to find compromises to align design elements to guarantee comparable levels of environmental integrity for emissions units to ensure a successful linkage.

3 What is the experience of the EU ETS with international cooperation and linking?

The EU Member States were the first to implement an international ETS for GHGs, and the EU ETS remains the largest ETS to date. It was also a pioneer in developing international linkages. In Phase I of the EU ETS, the Norwegian ETS included a one-way linkage with the EU ETS where Norwegian installations could purchase EU allowances for compliance, but not the other way around. That link was replaced in 2009, when the EU ETS expanded its geographical coverage to include Norway, along with Iceland and Liechtenstein. Thereafter, in 2010, the EU started negotiations with Switzerland to link their systems, with the linkage becoming fully operational in 2020.

» *International linking of emissions trading systems can bring about economic benefits, including enhanced market liquidity and increased flexibility for market participants to pursue cost-effective emissions reductions and thus enable to raise ambition. However, to maintain environmental integrity, it is essential to ensure compatibility of the key design elements of the respective systems. The EU experience shows that settling technical issues for ETS linking can take many years and require a good amount of high-level commitment. Linked ETSs forms also one type of voluntary international cooperation under Article 6.2 of the Paris Agreement.*

Philipp Voss, Federal Ministry for Economic Affairs and Climate Action (BMWK)

Chapter 9 — Stakeholder Engagement

An ETS can only work effectively if all participants share the same understanding and fulfil their roles based on trust in the system. It is therefore important to build lasting support for an ETS by systematically engaging all relevant stakeholders from the beginning. This is a continual task, as the maturing and further development of an ETS should happen in consultation with the relevant stakeholders.

1 Why is it important to engage relevant stakeholders in the development of an ETS?

Engaging stakeholders in all stages of an ETS will help build lasting public and political support for the system. It fosters shared understanding, builds trust, enhances transparency, and supports the overall capability in a system.

a. Relevant stakeholders should participate already in the design process, helping to develop a mutual understanding of the system from the start and creating joint ownership.

b. Continual knowledge-sharing and exchange may enhance the performance of the ETS as it makes detailed information from multiple, well-informed stakeholders accessible.

c. Communicating relevant information in a transparent and timely manner helps build credibility and trust vis-à-vis the ETS.

2 Who are the relevant stakeholders that should be engaged?

When designing an engagement process, it is good to start with the identification and mapping of the most relevant stakeholders.

a. In general, relevant stakeholders are those directly or indirectly affected by the system.

b. This includes national, regional, and local government agencies, industry, academia, as well as the broader public.

c. Furthermore, groups or institutions that hold a particular expertise or represent relevant interest groups (multipliers) should be included. Among these are environmental advocacy groups, scientific and technical experts, and trade associations and unions.

3 What can an effective engagement strategy look like?

An engagement strategy may include different forms of engagement, but it should be tailored to the particular stakeholders that are involved and adapted to the respective stage of ETS development.

a. A clear and consistent communication strategy is needed.

b. An ETS requires capacity building for stakeholders to support their familiarization with the objectives, design features, and potential impacts of an ETS.

c. A stakeholder group like the “Working Group on Emissions Trading” (AGE) in Germany can serve as an important and effective forum to engage stakeholders.

» *Emissions trading is a learning experience for everyone involved - not only for the regulated companies, but also for the regulator. Stakeholder engagement provides the framework to enable this learning process, to bring together different viewpoints and backgrounds, to improve the emissions trading system over time. It is also key to foster the political acceptance of the instrument and buy-in from key stakeholders. For stakeholder engagement to be credible and successful, it needs to start early in the process, take place regularly, and it must be inclusive, engaging all relevant stakeholders in a transparent way.*

Benjamin Görlach, Ecologic Institute

Chapter 10 — Legal Framework

As a regulatory instrument, an ETS must be based on a solid legal framework. The legal basis and key design features of the system should be set out in statutory legislation, while technical norms and evolving regulatory details can be addressed through sub-statutory regulations and guidelines. Public (government) institutions should provide the necessary administrative infrastructure and ensure the necessary market oversight.

1 Why do regulatory frameworks for ETS implementation vary, and what are the main building blocks they address?

A range of norms with varying degrees of formality and technical input are required for a well-functioning ETS. This comprises the legal mandate and the general objective down to technical norms and guidance.

a. Regulating an ETS and its design features via norms is critical, as this affects the legally vested interests of compliance entities, other stakeholders, and the market at large.

b. Certain basic components are common to all ETSs. These include: a legal mandate, the nature and stringency of the target (legally binding in nature), the scope and coverage of the system, data collection and management, allocation and issuance of units, price management and flexibility, compliance and enforcement, as well as market oversight and regulation.

c. Concepts, principles, and legal and institutional contexts of legal frameworks of ETSs differ widely across jurisdictions. This reflects the differences in the political and judicial systems of countries in which ETSs are operated

2 Based on EU experience, what type of norms proved helpful for the governance of the ETS?

As the EU case shows, in legal frameworks there is a general rationale for policy makers to select different levels of the normative hierarchy depending on the subject matter of regulation.

a. The central foundations and key obligations (especially for compliance and enforcement) should be laid out in formal, statutory legislation. In the early years of the EU ETS, the use of Directives and guidelines granted Member States some leeway to define tailor-made implementation provisions. By use of directly applicable Regulations, the transnational EU ETS was further harmonized over time.

b. Technical and continually evolving details are better addressed through sub-statutory regulations, decrees, and guidelines. This keeps the system more flexible while establishing the required legal certainty.

3 What are the main functions an emissions trading authority must fulfil?

The governing authority should provide the necessary administrative infrastructure and guarantee the necessary oversight of the ETS, but some sub-tasks and functions may also be outsourced.

a. Key responsibilities of the central emissions trading authority include identification and regular updating of the ETS participant registry, organisation of the reporting cycle, development and operation of a registry, allocation of allowances, enforcement and sanctions, and market oversight.

b. An electronic administrative procedure, including an electronic registry and infrastructure for MRV documents and data, is key to enable the effective exchange of data and reports between the regulator and participants, and to ensure accurate accounting.

c. Third-party entities (from the private sector) may be assigned to conduct tasks such as the verification of emission reports.

» *As the authority that implements emissions trading in Germany with its diverse tasks, we implement the legal framework in our daily enforcement work and thus bring it to life. We support the BMWK significantly in its legislative work and advise them from an enforcement perspective based on our experience and our steadily growing expertise. We thus contribute to the further development of emissions trading both at national and international level and to the attainment of the Federal Government's climate protection goals.*

Dr. Jürgen Landgrebe, German Emissions Trading Authority (DEHSt), Director

Further information on emissions trading in Germany:

German Federal Ministry for Economic Affairs and Climate Action (BMWK):
https://www.bmwk.de/Redaktion/EN/Artikel/Energy/emissions-trading.html

German Emissions Trading Authority (DEHSt):
https://www.dehst.de/EN/home/home_node.html

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