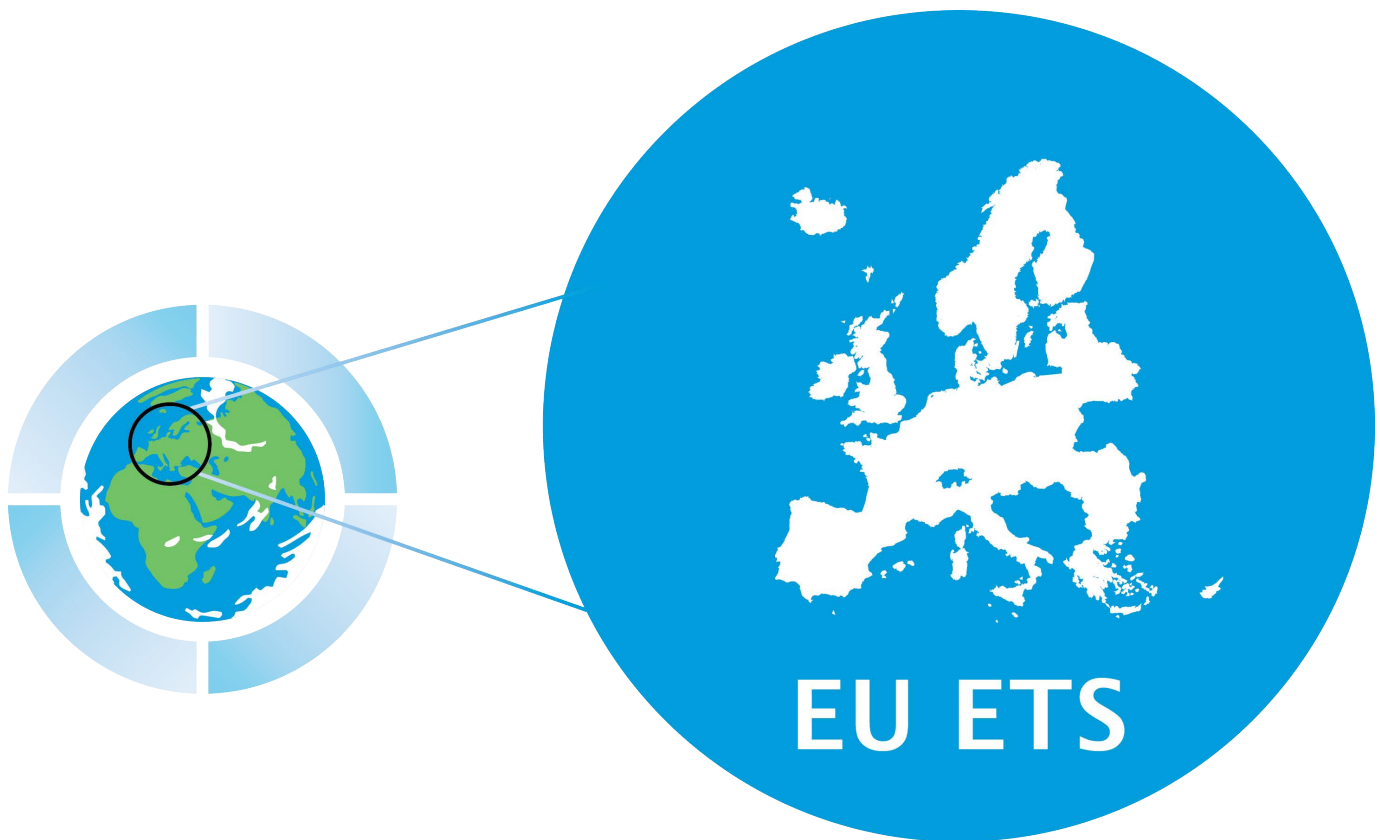




EUROPEAN UNION: AN EMISSIONS TRADING CASE STUDY



European Union

The World's Carbon Markets: A Case Study Guide to Emissions Trading

Last Updated: May 2015

EU ETS Phase III (2015)	
Target	-21% below 1990 by 2020
Cap (tCO ₂ e)	1,964,282,108
Carbon price	€5.88 (2014 average) €6.91 (Q1 2015)
Greenhouse Gasses covered	Carbon dioxide (CO ₂), nitrous oxide (N ₂ O), perfluorocarbons (PFCs)
Number of Entities Covered	>11,500
Sectors Covered	Power and heat generation, industrial processes (oil refineries, coke ovens, iron and steel plants), production of cement, glass, lime, bricks, ceramics, pulp, paper and board, commercial aviation, CCS networks, production of petrochemicals, ammonia, non-ferrous metals, gypsum and, aluminum, nitric, adipic and glyoxylic acid.
Threshold	Sector specific
% Total emissions covered	45%
Compliance tools & Flexibility mechanisms	Free allowance allocation, offsets, banking, Market Stability reserve (2019)

Table 1: Programme Overview

Brief History & Recent Developments

Date	Event
2003	EU ETS directive adopted
2004	EU linking directive with Kyoto Protocol adopted
2005	EU ETS Phase I (2005-2007) launched on 1 st January
2007	Bulgaria and Romania join EU ETS
2008	Beginning of Phase II (2008-2012)
2008	Norway, Iceland and Liechtenstein join EU ETS
2009	Adoption of the 2020 EU energy and climate package (Effort sharing directive) with a revised directive for the Phase III of the EU ETS (2013-2020)
2010	EU ETS Aviation directive
2011	EU Commission release communication: "Towards a 2050 low-carbon economy roadmap"
2012	International aviation included in ETS
2013	Beginning of Phase III (2012-2013)
2014	Market Stability Reserve and Backloading measures implemented

Table 2: Key dates

Source: European Commission, DG CLIMA, 2015. Available at: ec.europa.eu

The EU Emissions Trading System (ETS) was the first multi-national installation-level cap-and-trade programme. The ETS covers 45% of carbon dioxide (CO₂) emissions in the EU, as well as emissions of other greenhouse gases (GHGs). The 31 countries covered by the EU ETS – being the EU28 plus Iceland, Liechtenstein and Norway – account for 20% of global gross domestic product (GDP) and 11% of the world's energy-related CO₂ emissions.¹

The EU ETS was established by the Directive of the European Parliament and the European Council in October 2003.² In 2004, the Directive was amended to link the EU ETS with the international carbon market,³ and the ETS came into force in 2005. A Directive in 2008 amended the EU ETS Directive to cover CO₂ emissions from [aviation](#) beginning in 2012,⁴ although this was later amended to apply only to flights within the European Economic Area or within outermost regions. Amendments in 2009 established annual emissions reductions for a post-2012 Phase of the EU ETS without a sunset clause, implying that the EU-wide system is set to continue beyond 2020.⁵ While the declining emissions cap continues by default beyond 2020 with 1.74% increased up to 2.2% after 2020. The European Commission envisages the emission reductions required to meet the EU's stated emissions reduction objective of 80-95% below 1990 levels by 2050 as part of an effort by developed countries as a group to reduce their emissions by a similar degree, can be reached by the current trajectory of the ETS.

On 22 January 2014, the European Commission published its non-legislative Communication on the *2030 Climate and Energy Framework*.⁶ It proposed two binding targets, which were adopted by Member States in October 2014:

- *A domestic GHG reduction target of at least 40% by 2030* compared to 1990 levels. No use of international credits after 2020 is foreseen, unless the global climate agreement reached at the end of 2015 justifies the EU increasing its GHG reduction target for 2030 beyond 40%, which could be met by using international credits (a scenario of a 45% emission reduction target is assessed). For the EU ETS sectors, this target means achieving an emissions reduction target of -43% below 2005 levels by 2030.
- *An indicative renewable energy target of at least 27%* for the EU as a whole (with no binding energy efficiency targets for Member States, although this was reviewed at a later date and the European Commission proposed

a 30% energy efficiency target but EU Heads of States then endorsed an indicative target of 27% to be reviewed in 2020 having in mind a 30% target).

At the beginning of Phase III (January 2013), the allowance surplus within the EU ETS stood at 2.1 billion allowances.⁷ Due to a lack of reliable emissions data that could be used to establish an accurate emission baseline, allowance surplus has been an issue since Phase I. In Phase II, the allowance surplus was a result of the economic crisis and other climate policies. According to the European Commission, without action, a structural surplus will continue during the majority of Phase III and will likely undermine the overall effectiveness of the EU ETS. In order to address this issue the European Commission has undertaken two main initiatives:

1. **Market Stability Reserve (long term):** In January 2014, the European Commission published an EU ETS structural reform legislative proposal for the creation of a [Market Stability Reserve \(MSR\)](#).⁸ The objective of the reserve is to adjust the supply of allowances according to changes in demand. This proposal was followed by a public consultation (which ended in March 2015) on *the revision of the EU ETS Directive for Phase IV (after 2020)*. An additional legislative proposal to amend the ETS Directive is expected later in 2015, once the MSR is adopted, and will incorporate the elements from the politically-agreed 2030 climate & energy framework into the ETS Directive.⁹
2. **Backloading (short term):** In February 2014, the European Parliament and European Member States adopted a European Commission proposal on [Backloading](#) - a measure to postpone the auctioning of 900 million allowances from 2014-16 until 2019-20 initially. Due to the adopted MSR, back loaded allowances are to be placed directly within the Market Stability Reserve at the end of the third trading period.¹⁰

Summary of Key Policy Features

CAP & TARGET:

Kyoto Protocol (KP) Emission Reduction Commitment

The EU15's emission reduction objective under the first commitment period of the Kyoto Protocol was to reduce economy-wide GHG emissions to 8% below 1990 levels (on average) over 2008-12. As part of the EU's strategy to reach this target, firms covered by the EU ETS were required to reduce their net emissions by 6.5% below 2005 levels.¹¹ In Phase II, which coincided with the Kyoto period, the cap was 2,083 million tonnes of carbon dioxide equivalent per year (tCO_{2e}).¹² However, excluding the countries and installations which joined in Phase II, the comparable ETS-wide cap would have been 1,909 million tCO_{2e}/year, 8% below the Phase I cap of 2,181 million tCO_{2e}/year.¹³

While the EU15,^a are considered a single regional bubble, under its first Kyoto Protocol commitment period, the burden sharing agreement assigned each member state a portion of the region's commitment.¹⁴

EU Emissions Reduction Commitment

The EU aims to reduce economy-wide **GHG emissions 20% below 1990 levels** (or 13% below 2005 levels) by 2020. To reach this goal, the EU target is divided into two sub-targets:

- EU ETS sectors: Sectors covered by the EU ETS have a reduction target of 21% below 2005 levels by 2020. This translates to a maximum of 1,777 million tCO_{2e} emitted by covered entities in 2020.¹⁵ Around 45% of GHG emissions in the EU are covered by the ETS.
- Non-EU ETS sectors: For the majority of sectors not included under the EU ETS, the emission reduction target is 10% below 2005 levels by 2020. This target is determined by the Effort Sharing Decision (ESD),¹⁶ which was adopted in April 2009. The ESD sets GHG emission reduction targets for each Member State for sectors not covered by the EU ETS (transport, heating of buildings, small-scale industry, agriculture and waste). Currently, these sectors cover 55% of total GHG emissions emitted by EU Member States. However, the ESD does not cover or set emission reduction targets for land use, land-use change and forestry (LULUCF)

^a Referring to the 15 EU Member States as of 1997

activities. A public consultation on the ESD was launched in March 2015. The INDC indicates EUs interest in including LULUCF in the 2030 effort.

The **long term objective** is to reduce the EU’s emissions to 80-95% below 1990 levels by 2050, which includes both sectors covered by the EU ETS and non-traded sectors.¹⁷

EU emissions cap

The 2015 cap for power stations and other fixed installations among the 28 EU Member States is set at 1,964 million tCO_{2e}.¹⁸ During Phase III, a linear reduction factor decreases the overall cap annually by 1.74% of the average total quantity of allowances that were issued from 2008-12. Beginning in Phase IV, according to the 2030 climate and energy policy framework, the linear reduction factor will be 2.2%. During Phases I and II, Member States determined the total quantity of allowances that would be issued (their emissions cap), subject to Commission approval, and the breakdown of allowances that would be distributed to covered installations within the country. Phase III brought substantial changes in the allocation rules: a single EU-wide cap for free allowances has been established and allocation takes place according to harmonized rules.

Year	Cap (tCO _{2e})
2013	2,039,152,882
2014	2,001,717,495
2015	1,964,282,108
2016	1,926,846,721
2017	1,889,411,334
2018	1,851,975,947
2019	1,814,540,560
2020	1,777,105,173

Table 3: EU ETS cap for covered sectors except aviation for the period 2013 -20

Source: European Commission, 2015. Available at: eur-lex.europa.eu

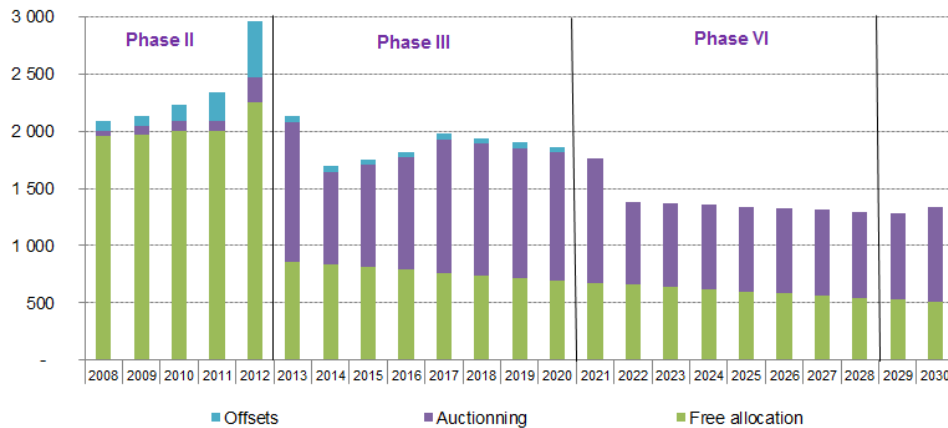


Figure 1: EU ETS emissions cap and allocation by 2030

Source: CDC Climat Research, 2015. Based on the European Commission’s 2030 proposals

SCOPE & COVERAGE: The EU ETS covers around 50% of EU CO₂ emissions and **45% of total EU GHG emissions**.¹⁹ The ETS limits the GHG emissions of over **11,500 installations**,²⁰ owned by **5,000 companies** in **31 countries**.^b The **point of obligation** is at the point of emissions.²¹ The EU ETS covers CO₂ and, since 2013, nitrous oxide (N₂O) and perfluorocarbons (PFC) for specific cases.

Sector	Phase included	GHG Coverage	Coverage Thresholds
Power stations and other combustion	I	CO ₂	20 MW
Refining of mineral oil	I	CO ₂	-
Coke	I	CO ₂	-
Cement clinker	I	CO ₂	550t/day (rotary kilns)
Ceramic products by firing	I	CO ₂	75t/day
Glass	I	CO ₂	20t/day
Iron or steel	I	CO ₂	2.5t/h
Lime or calcination of dolomite or magnesite	I	CO ₂	50t/day
Metal ore roasting	I	CO ₂	-
Pulp	I	CO ₂	-
Paper or cardboard	I	CO ₂	20t/day
Black carbon	III	CO ₂	20t/day
Bulk organic chemicals by cracking, reforming, partial or full oxidation	III	CO ₂	100t/day
Drying or calcination of gypsum	III	CO ₂	20 MW
GHG from Capture, transport and geological storage	III	CO ₂	-
Hydrogen, synthesis gas by reforming or partial oxidation	III	CO ₂	25t/day
Mineral wool insulation material	III	CO ₂	20t/day
Nitric acid	III	CO ₂ , N ₂ O	-
Production of adipic acid	III	CO ₂ , N ₂ O	-
Production of glyoxal and	III	CO ₂ , N ₂ O	-
Production or processing of ferrous metals and of non-ferrous metals	III	CO ₂	20MW
Production or processing of primary	III	CO ₂ , PFC	
Production or processing of secondary aluminium	III	CO ₂	20 MW
Soda ash and sodium bicarbonate	III	CO ₂	-

Table 4: EU ETS sectors and threshold coverage

Source: European Commission, 2003. Available at: eur-lex.europa.eu

^b The 28 EU nations, Iceland, Liechtenstein and Norway.

EU ETS implementation has been divided into **four Phases** thus far:

- **Phase I** (2005-07) was a “*learning-by-doing*” period;
- **Phase II** (2008-12): The scope of the EU ETS increased with the inclusion of the aviation sector and Iceland, Liechtenstein and Norway in 2012;²²
- **Phase III** (2013-20): The scope expanded to include 17 industrial activities, N₂O and PFCs. Croatia also joined the EU ETS, and the European Commission is negotiating a link between the EU ETS and the Swiss ETS.
- **Phase IV** (2021-28): Rules are still under development.

Aviation within the EU ETS

The inclusion of international aviation emissions under the EU ETS has been a highly contentious issue over the years. The 2008 amended EU ETS Directive stated that all emissions from flights to, from and within the EU would be covered from January 2012.²³ These provisions were amended in 2013 to facilitate international negotiations on aviation within the International Civil Aviation Organization (ICAO), a 191-nation body that operates under the aegis of the United Nations. Specifically, in April 2013 the EU enacted “*Stop the clock*” provisions which postponed the deadline for the aviation industry to surrender 2012 allowances by one year. In October 2013, ICAO formally agreed to develop a global market-based mechanism by 2016 and to cap emissions from international flights from 2020.²⁴ Pending the possible adoption of international rules, in April 2014, European member states and the European Parliament amended the EU ETS Directive for the period of 2013-16.²⁵ Coverage for the aviation sector is currently limited to flight emissions within the European Economic Area (being the 28 EU member states plus, Iceland, Liechtenstein and Norway) for the period from 2013 to 2016.²⁶

AUCTION OVERVIEW: Since 2013, with the beginning of Phase III, auctioning has been the default method used to allocate allowances. Most of the power sector is required to purchase allowances at auctions (taking into account the sector’s ability to pass on costs).^c According to the European Commission, “*given the significant weight of power generation in the EU ETS, and even with partial free allocation in eight Member States, more than 40% of the 2013 annual allowances were auctioned*”.²⁷ An exception is maintained for 8 Member States²⁸ who joined the EU after 2004 - Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Lithuania, Poland and Romania (Latvia and Malta were also eligible to use this derogation but chose not to). Derogation under Article 10c of the EU ETS Directive allows these states to provide a decreasing number of free allowances to existing power plants for a transitional period until 2019 (although as part of the negotiations for the EU’s 2030 climate and energy framework, this exemption may be extended to 2030).

Industrial sectors that are not eligible for carbon leakage protection are required to purchase 20% of allowances; this is expected to increase to up to 70% by 2020.²⁹ By contrast, in Phase II, only 3% of annual allowances were auctioned.³⁰ In Phase III, more than 7.9 billion allowances will be auctioned according to Member States’ based on emissions historical emission baselines:³¹

- 88% are distributed based on a Member States’ share of verified emissions from EU ETS installations in 2005 or by an average of the 2005-07 period, (whichever one is the highest);
- 10% of allowances will be distributed to the least wealthy EU Member States as an additional source of revenue to help them invest in reducing the carbon intensity of their economies and adapting to climate change, and;
- the remaining 2% are offered as a “*Kyoto bonus*” to nine EU Member States (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Slovakia) which, by 2005, had reduced their GHG emissions by at least 20% of the base year levels in their Kyoto targets.

^c With exception of 7 Member States who are entitled to grant free allocation to the power sector for a transitory period and on the basis of real investments in carbon reductions.

One impact of this distribution breakdown will be that countries with lower income will receive a greater amount of free allowances relative to high-income Member States. Auctions are conducted by national governments, but buyers are located worldwide. The EU ETS Directive has established a common platform to auction emission allowances on behalf of the Member States: the *European Energy Exchange* (EEX) based in Germany. Member States can also develop their own auction platforms such as the UK, (which has contracted ICE Futures Europe in London), Germany (which has appointed EEX), and Poland (which has contracted EEX to auction on their behalf).

In order to ensure greater efficiency of the EU ETS in Phase III, the auction calendar was modified to reflect [backloading](#),³² which reduced the volume of allowances auctioned by 400 million in 2014, by 300 million in 2015, and 200 million in 2016. The backloaded allowances will be placed into the Market Stability Reserve in 2019-20.³³

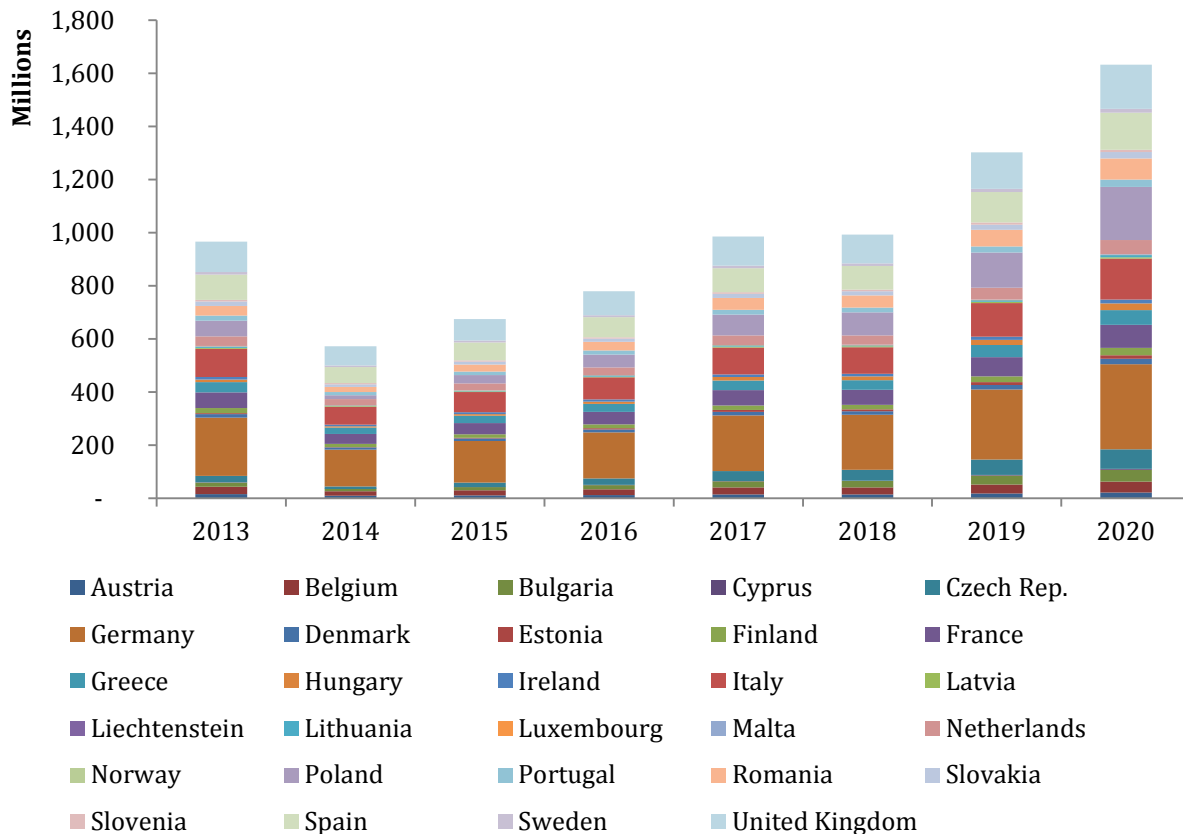
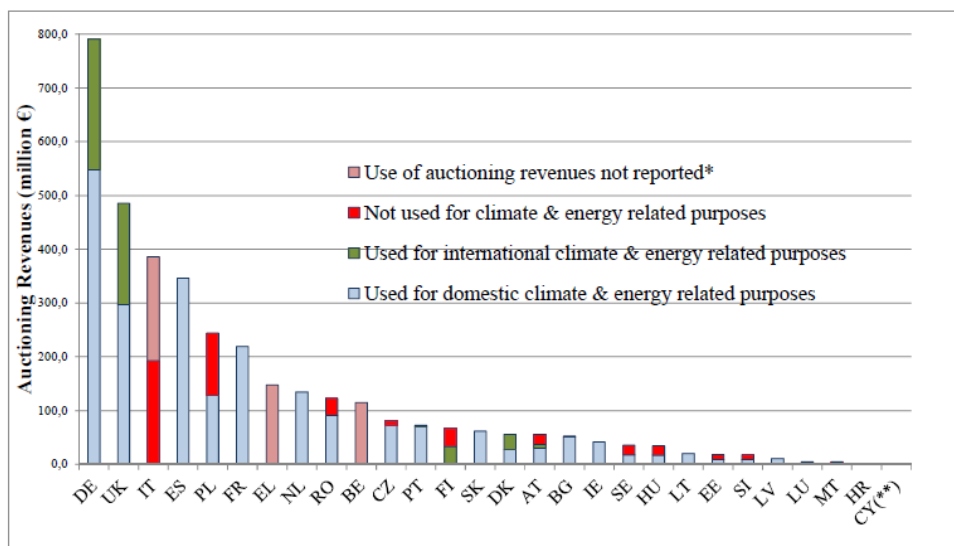


Figure 2: Overview of EU ETS auction volumes in Phase III, with backloading

Source: CDC Climat Research, 2015.

Auction proceeds³⁴

According to the EU ETS Directive, at least half of **auction revenues** should fund complementary GHG reduction measures in the EU and developing countries. Such measures can include renewable energy investment and energy efficiency, adaptation, minimising the economic impact on low to middle income households from higher electricity rates, reducing deforestation, and carbon capture and storage (CCS) projects. There is a divergence within member states on the extent to which auction revenues are used for climate protection – some will reinvest their full auction revenues in complementary GHG reduction measures, while others will return the auctioning revenues directly to their Treasury. In 2013, the EU ETS’s total auctioning revenue amounted to €3.6 billion.³⁵ From this, around €3 billion was used for climate and energy related purposes such as energy efficiency, renewables, research and sustainable transport.³⁶



* IT, EL: split between domestic and international use not reported. BE: no information on the use of auctioning revenues provided.

** No reporting provided.

Figure 3: Use of 2013 EU ETS auction revenue

Source: European Commission, 2014. Available at: eur-lex.europa.eu

The sale of 300 million Phase III allowances prior to the start of the trading period was to seed a fund dedicated to low-carbon technologies such as CCS and renewable energy projects, the NER 300.³⁷ Auctioning revenues were distributed to projects that were selected through two rounds of proposals, covering 200 and 100 million allowances respectively. The NER 300 programme also seeks to leverage a considerable amount of private investment and/or national co-funding.

According to the European Commission, the first call for proposals in April 2013 led to a total of €1.1 billion of funding awarded to 20 renewable energy projects.³⁸ This amount is estimated to have leveraged additional funding of over €2 billion from private sources. The projects awarded funding are expected to be operational by December 2016 at the latest. The second round of funding in July 2014 granted a total of €1 billion in funding to 18 renewable energy projects and one CCS project. This amount is estimated to have leveraged over €860 million of additional funding from private sources. The projects awarded funding must reach their final investment decisions by July 2016 and enter into operation by July 2018 at the latest.³⁹

Auctioning rules for the aviation sector⁴⁰

15% of allowances issued for the aviation sector are auctioned. Member states are able to auction a number of these allowances in proportion to their share of verified aviation emissions compared to other member states. Aviation auctions differ from general auctions for covered stationary sources in that, from 2013 to 2016, the amount of aviation allowances for auctions is positioned to progressively decrease. Beyond 2016, the EU legislation on aviation could be amended taking into account the potential decision of the ICAO.⁴¹

ALLOWANCE DISTRIBUTION: During Phase I and Phase II, allowances were largely allocated for free. Each member state developed and made public their National Allocation Plan (NAP) specifying the number of allowances allocated to each installation per year and the amount of offsets they were permitted to use to satisfy their compliance obligation. All NAPs were submitted to and evaluated by the European Commission.⁴² Member states were entitled to auction a maximum of 5% of their cap during the pilot phase and up to 10% in Phase II; however, this option was rarely exercised.⁴³

While auctioning is the primary method of allocation in Phase III, there is still an element of free allocation. By 28 February of each year, member states are to communicate the quantity of allowances to be allocated to each installation in their territory in their *National implementation measures* (NIM) submission to the European Commission. The European Commission and the European Free Trade Association Surveillance Authority then verify each NIM to ensure it is compliant with the relevant legal provisions and approve or reject the NIMs accordingly. Since 2013, free allowances⁴⁴ have been allocated according to EU harmonised rules on the basis of benchmarks (carbon intensity target) and historical production levels. A benchmark does not represent an emission limit or even an emission reduction target, but merely a value used to calculate free allocation per installation. The benchmarks have been developed per product, to the extent feasible, based on a value reflecting the average GHG emissions performance of the 10% best performing installations in the EU producing that product.

In Phase III, 5% of allowances are placed in the new entrants' reserve (not eligible for new entrants in electricity production).⁴⁵ At the end of Phase III, any remaining allowances are likely to be placed into the MSR, according to the provisional agreement reached at the time of writing.⁴⁶

Avoid the risk of carbon leakage⁴⁷

Under certain conditions, firms in sectors that are 'at risk' of carbon leakage may receive free allowance allocations based on industry best-practice benchmarking – measured as the best 10% of performers in the sector - but the total free allocation to benchmarked industries decreases linearly with the overall cap. As of 2013, firms outside of the power sector receive 80% of their benchmark for free, but this form of free allocation will decrease to 30% by 2020 and further thereafter. Until 2020, emissions-intensive trade exposed (EITE) firms will receive up to 100% of their benchmark via free distribution.⁴⁸

The European Commission is required to review the list of sectors vulnerable to carbon leakage every five years. The first list was adopted in 2009 but applied at the start of Phase III in 2013. The second list (adopted in October 2014)⁴⁹ used the same criteria as the previous list and will be applicable from 2015 to 2019. A sector or sub-sector is deemed to be exposed to a significant risk of carbon leakage if:⁵⁰

- The extent to which the sum of direct and indirect additional costs induced by the implementation of the Directive would lead to an increase of production cost, calculated as a proportion of the Gross Value Added, of at least 5%; and
- The trade intensity (imports and exports) of the sector with countries outside the EU is above 10%.

A sector or sub-sector is also deemed to be at risk of carbon leakage if just one of the following requirements is met:

- The sum of direct and indirect additional costs is at least 30%; **or**
- The non-EU trade intensity is above 30%.

$$\text{Carbon cost} = \frac{\text{Direct} + \text{indirect carbon cost}}{\text{Gross value Added}} > 30 \%$$

$$\text{Trade Intensity} = \frac{\text{Imports} + \text{Exports}}{\text{Production} + \text{Imports} - \text{Exports}} > 30 \%$$

$$\text{Trade Intensity} > 10 \% \quad \& \quad \text{Carbon cost} > 5 \%$$

Criteria	N° Sectors	Allocated Free Allowances (million tonnes)
Carbon Cost (CC) > 30%	4	210
Trade Intensity (TI) > 30%	133	148
CC > 5% et TI > 10 %	20	496
Listed Total	146	712
Industry Total	236	755

Table 5: List of carbon leakage sectors and criteria between 2015 and 2020

Source: CDC Climat Research, 2015. Available at: eur-lex.europa.eu

Aviation sector specificities⁵¹

The EU Aviation ETS also features a new entrants reserve called the *Special Reserve*.⁵² Starting in 2013, every year 3% of the total aviation allowances (around 6.3 million tCO₂) are added to the reserve. ⁵³The role of the reserve is to distribute free allowances to aircraft operators who began operations after 2010 or for those for whose tonne-kilometre data has increased by more than 18% (on average) annually between 2010 and 2014. In both cases, aviation activities cannot, wholly or in part, be a continuation of activities performed by another aircraft operator.⁵⁴ To apply for free allocation from the *Special Reserve*, aircraft operators are required to submit their 2014 verified tonne-kilometre data to the European Commission. A final decision on such requests will be adopted in 2016, and allowances will be issued from 2017 onwards. The deadline to apply for allowances from the *Special Reserve* is 30 June 2015. Allowances that are not allocated from this reserve will be cancelled.

FLEXIBILITY PROVISIONS: The EU ETS Directive gives covered entities some options to comply with their obligations. These provisions are related to offsetting emissions, banking, and linking to foreign ETS's.

The use of offset credits⁵⁵

Offset usage for the period 2008-20 is constrained to 50% of the required aggregated abatement relative to 2005. Emitters are allowed to use credits from the flexibility mechanisms established by the Kyoto Protocol, the Clean Development Mechanism (CDM) and Joint Implementation (JI).

In **Phase II**, the rules relating to the usage of certified emission reductions (CERs) and emission reduction units (ERUs) for covered entities were defined by each member state and calculated as a percentage of the allocation of each installation.⁵⁶ Each country individually specified the percentage of offsets allowed (international offsets as a percentage of total allowances); the range varied from 0% (Estonia) to 20% (Spain, Germany, and Lithuania).⁵⁷ In total, CERs and ERUs were permitted to comprise up to 13.4% of the total EU cap, equating to 1.4 billion allowances.⁵⁸ Amendments to the EU ETS Directive in 2011 excluded the possibility of using CERs for compliance from projects registered after 2012 unless the project was in a least developed country (LDC) and was registered after 2012. Since 2013, CERs and ERUs from industrial gas projects are ineligible,⁵⁹ while credits from hydroelectric projects exceeding 20MW of installed capacity are subject to terms and conditions.⁶⁰

Unused Phase II offset caps were transferred to Phase III (2013-20). The exact amount eligible for use per operator in Phase III depends on whether or not the operators are new entrants.

Operators	Limited use from 2008-20 (%)
Stationary Installations	
Already covered in Phase II	11
New entrants in Phase III	4.5
Aircraft	< 1.5

Table 6: Limited use of offsets during EU ETS: Phase III

Source: EU Commission, 2013. Available at: eur-lex.europa.eu

The total amount of available credits from ERUs and CERs exceeds 1,600 million tCO₂e, which equates to approximately 50% of the projected abatement required by the EU ETS from 2008-20.⁶¹

From 2020, as per the 2030 Climate and Energy Policy Framework, there will be a shift towards achieving emission reductions domestically rather than relying on international credits to achieve reduction goals.

Banking & Borrowing

Unlimited **banking** of allowances was allowed in Phases II and III. **Borrowing** is not technically allowed, but since the compliance period submission deadlines follow the issuance of the following year's allowances, there is effectively year-ahead borrowing within trading periods (but not between the last year of one period and the first year of the next).⁶²

Linking provisions

The EU considers **linkage of its carbon market** with programmes in other countries as an essential step in building a global carbon market.⁶³ Norway, Iceland and Liechtenstein joined the EU ETS in 2008 and the European Commission is currently negotiating a link with the Swiss ETS. A planned link with Australia was put on hold following the repeal of Australia's emissions trading system in July 2014.

COST CONTAINMENT & VOLATILITY MANAGEMENT: Banking between Phases II and III, and Phase III's longer eight-year trading period, are intended to bolster investment certainty. In addition, the decline in the EU ETS linear cap will continue beyond 2020 in order to provide a stable, long-term policy signal for investors.⁶⁴ However, a build-up of allowances in the system during Phase II risks undermining the long-term objectives of the EU ETS, and prompted the EU to pursue two options to reform the market using Backloading as a short-term fix and a market stability reserve as a long-term structural solution.

Backloading

Backloading, which was adopted in February 2014, allows the withholding of 400 million allowances from auctioning in 2014, 300 million in 2015 and 200 million in 2016. The allowances are currently due to be placed into the Market Stability Reserve in 2019.⁶⁵ Backloading was implemented via an amendment to the EU ETS Auctioning Regulation.⁶⁶

Market Stability Reserve

To manage the current and growing supply-demand imbalance, the European Commission has proposed to establish a *Market Stability Reserve (MSR)*.⁶⁷

The MSR functions by triggering adjustments to annual auction volumes in situations where the total number of allowances in circulation is outside a certain predefined range:

- When the surplus exceeds 833 million allowances, 12% of the allowances in circulation will be placed in the MSR instead of being auctioned;

- When the surplus is less than 400 million allowances, 100 million allowances would be released from the MSR via future auctions.

The MSR legislative proposal, put forward in January 2014 at the same time as the EU’s 2030 Climate and Energy policy framework, requires approval by the member states and the European Parliament before becoming law. At the beginning of May 2015, the representatives of member states, the European Parliament and the European Commission agreed in principle to a compromise on the MSR proposal.⁶⁸ This agreement will see the MSR start in 2019 and backloaded allowances and unallocated allowances (from unused NER units and reduced free allocation due to closures) will be placed into the MSR. The scope of the MSR currently excludes until 2025 the “solidarity allowances”, which are the 10% of distributed allowances to lower income member states. This agreement has been adopted by the Committee of Permanent Representatives (COREPER) on 13 May 2015. It will be also approved by the European Parliament’s Environment Committee (ENVI) on 26 May and will eventually be approved by all MEPs in a plenary session early July. Because of the COREPER adoption, the European ministers will then adopt the text in the European Council meeting.

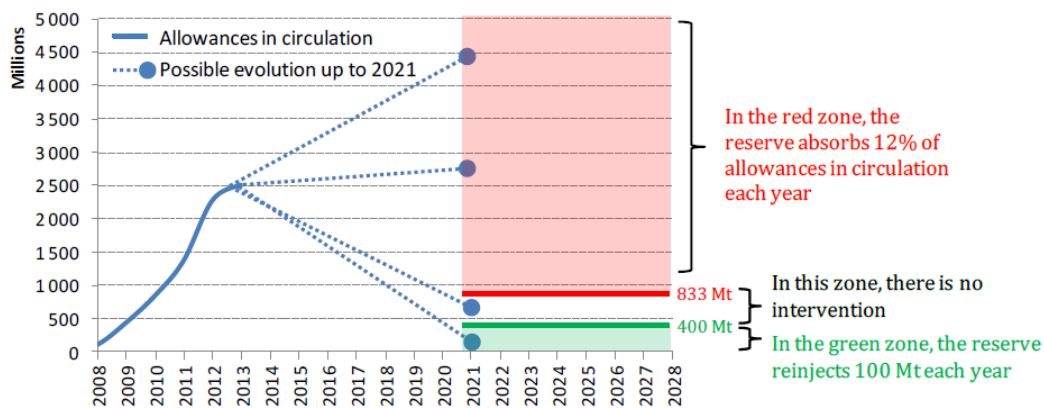


Figure 4: The implementation of the EU ETS market stability reserve

Source: Climate Economics Chair, 2015. Available at: chaireconomieduclimat.org

MARKET REGULATION & OVERSIGHT: Capped firms are required to report their emissions annually and have these emissions independently verified. Firms whose emissions are not independently verified are not permitted to sell allowances.⁶⁹

EU registry

Following the 2009 revision of the EU ETS Directive, EU ETS operations were centralised within The *Union Registry*,⁷⁰ operated by the European Commission. The Registry is linked to the Kyoto National Registry and covers all 31 EU ETS countries (replacing national registries). The Registry records all NIMs, allowance transactions, annual verified emissions from installations and annual reconciliations of allowances with verified emissions.

Electronic security has strengthened over the course of the EU ETS in response to instances of emissions allowance fraud in 2010 and 2011. In January 2011, approximately \$65 million (€50 million) worth of EU allowances were stolen from some member states’ carbon registries.^d In early 2011, the European Commission took immediate action by temporarily suspending all national registries until minimum security requirements were fully achieved. Actions taken included; preventative measures against fraud, immediate measures in case of fraud and measures to avoid disruption to the market if a fraud occurs.

^d While the sums stolen were not trivial, their scale in light of the annual value of the EU emissions allowance system was small—approximately 0.06%. For comparison, annual credit card fraud in the United States is 50% higher as a fraction of total value, estimated at 0.09% of annual transactions. EU governments lost substantially greater revenues from large-scale fraudulent value-added tax transactions on sales of emissions allowances, but these resulted from a lack of harmonized EU tax structure, not from the design of the ETS itself.

*Monitoring, Reporting and Verification*⁷¹

All emitters are required to develop and submit a monitoring plan detailing their emissions throughout the year. For industrial installations, the monitoring plan is one of the elements required to receive free allowances. For aircraft operators, the monitoring plan is required to include a report on emissions and tonne-kilometre data.

Stationary installations have to submit their annual monitoring plan for the previous year's emissions for verification before 31 March of the current year. Once verified, operators are required to surrender the equivalent number of allowances by 30 April of the current year.

Reporting and verification requirements differ for aircraft operators. Their annual monitoring plan includes CO₂ emissions emitted two years prior to the report (2013) and must be submitted by 31 March of the current year (2015). However, similar to stationary operators, aircraft operators have to surrender a corresponding amount of allowances by 30 April of the current year.

Enforcement & non-compliance measures

In the event a covered entity does not surrender enough emissions units, they are subject to a penalty. This penalty has increased over time: in Phase I, the penalty was €40/tCO_{2e}, in Phase II €100/tCO_{2e} and in Phase III, this penalty increased with the EU consumer price index.⁷² Companies that fail to comply with their respective caps also have their names published. Member States have established additional penalties at the national level.⁷³

In October 2011, in the *Market Financial Instruments Directive II* (MiFID II)⁷⁴ which proposed revisions to the financial requirements for trading in the market, the European Commission added EUAs and international credits by creating a separate category for marketable securities, derivatives and financial contracts. This inclusion in the revised MiFID II means EUAs are now classified as financial instruments. The European Parliament adopted these rules in October 2014, and the reviewed Markets in Financial Instruments Directive and Regulation will be applicable as of January 2017. For the time being, the implementing rules and standards are being prepared by the European Securities and Markets Authority, which will have important consequences in terms of the obligations for participants in the EU ETS.

COMPLEMENTARY & SUPPLEMENTARY MEASURES: Individual member states and the EU have implemented a range of complementary domestic climate policies in addition to the EU ETS, including 20% targets in 2020 for energy efficiency and renewable energy ("20-20-20" targets). Emissions from *non-ETS sectors*, which comprise approximately 60% of the EU's GHG emissions, will decrease to 10% below 2005 levels by 2020.⁷⁵

European Energy Strategy: Three main objectives drive the EU's energy policies: security of energy supply, providing a supportive and competitive environment for energy providers, and ensuring the sustainability of the EU's energy consumption. These goals have been set to tackle the EU's dependence on energy imports (accounting for half of EU energy consumption).⁷⁶ To reach these objectives, the EU developed its 2020 Energy Strategy⁷⁷ which contributes to achieving the 20-20-20 targets as well as the proposed 2030 Energy Strategy to help reach the proposed 2030 targets.

European Energy Efficiency Strategy: To achieve the 2020 and 2030 Energy Efficiency targets, the EU has adopted several pieces of legislation: the *Energy Efficiency Directive* (2009),⁷⁸ the *Energy Performance of Building Directive*⁷⁹ in 2010, the *Energy Labelling Directive*⁸⁰ in (2010) and the *Ecodesign Directive*⁸¹ in (2009). Energy efficiency measures include:

- an annual reduction of 1.5% in national energy sales;
- each EU member state is responsible for renovating 3% of central government buildings;
- establishing mandatory energy efficiency certificates for sale and rental of buildings;
- minimum energy efficiency standards and labelling for various products;
- preparation of National Energy Efficiency Action Plans (NEEAP) every three years by EU Member States;
- setting energy audits for large companies at least every four years; and,
- protecting consumers rights by improving transparency in bills and information.

European Renewable energy strategy: To reach the 2020 and (proposed) 2030 renewable energy target, in 2009, the EU implemented the *EU Renewable Energy Directive*.⁸² In addition, to reach the 2020 renewable energy target, EU member states have committed to achieve their own national renewable energy targets which range from 10% Malta to 49% Sweden of the national energy mix.⁸³ Member states are also required to generate at least 10% of their transport fuels from biofuels by 2020^e. Additionally, all EU countries are required to adopt National Renewable Energy Action Plans (NREAPs), which must include monitoring measures to assess implementation and the level of effort put forward. NREAPs include implemented and planned measures, sectoral targets for electricity, heating, cooling, and transport, as well as a breakdown of renewable energy technology and the policy measures to achieve the targets including cooperation between local, regional and national authorities.

RESULTS:

Environmental Effectiveness

According to the EU Environmental Agency, CO₂e emissions declined by approximately 19% between 2005 and 2013, which was close to achieving the 21% emissions reduction target by 2020.⁸⁴ In **Phase I**, the EU ETS reduced **emissions** by an estimated 2-5%,⁸⁵ and allowance prices were volatile. At the outset of Phase I, in January 2005, allowances were €8/tCO₂e. By early 2006, the price exceeded €30/tCO₂e but fell back following the publication of the 2005 verified emissions data in April 2006, which showed a surplus in the market. Prices never recovered, and ended in 2007 at €0.01. According to Aldy and Stavins (2012), “*This volatility was attributed to the absence of transparent, precise emissions data at the beginning of the program, a surplus of allowances, energy price volatility, and a program feature that prevents banking of allowances from the first phase to the second.*”⁸⁶

Phase II saw a more stringent cap and higher prices between 2008 and 2010, followed by a huge price drop reflecting the growing imbalance between the supply and demand of allowances. Every year in Phase II, except in 2008, total emissions were below the number of allocated allowances. The additional use of CERs and ERUs contributed to accumulating surplus of allowances over the years 2009 to 2012 – which stood at almost 2 billion by the end of Phase II. During this trading period, EUA prices reached €25-30, but decreased to around €7 by the end of the period. Meanwhile, CER prices were trading at less than €1 by the end of 2012.



Figure 5: EUA spot price development from 2008 to 2015

Source: CDC Climat Research, 2015

^e On 28 April 2015, the EU Parliament approved the draft agreement on the use of biofuel within the transport sector. The new agreement caps the contribution of biofuels produced from “food crops” at 7% and improves the use of wastes and residues to produce biofuel.

In 2013, the price of EUAs stabilised at around €5, while CER prices remained very low, at levels around €0.40. As a result, operators continued to surrender significant amounts of CERs and ERUs. From 31 March 2015, international credits from the first Kyoto Protocol commitment period (CP1 credits) can no longer be exchanged within the EU ETS.⁸⁷

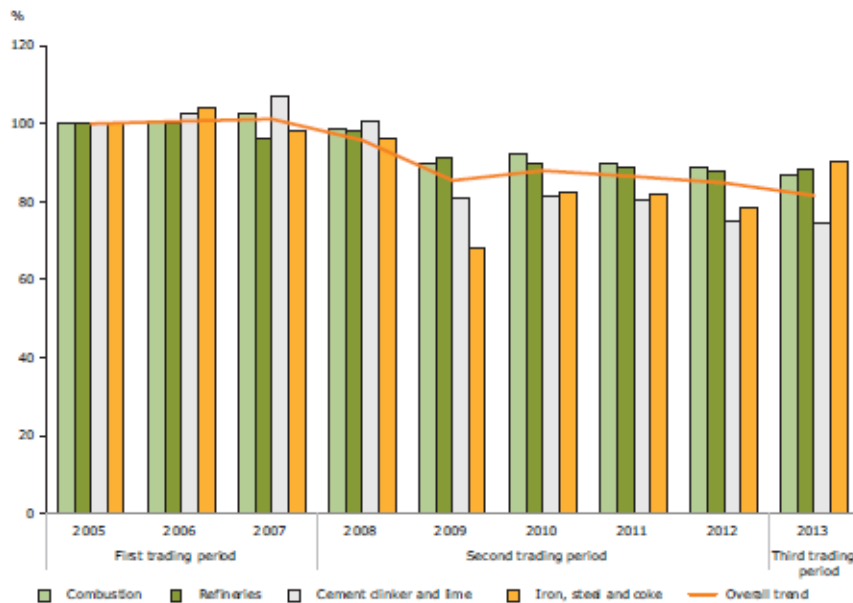


Figure 6: CO₂ emissions trends by EU ETS sectors from 2005 to 2013^f

Source: European Environment Agency, 2014. Available at: eea.europa.eu

In 2014, the verified GHG emissions from stationary installations amounted to 1,812 million tCO₂e (a 4.5% decrease below the 2013 level).⁸⁸ The cumulative surplus of emission allowances decreased slightly from a 2.1 billion in 2013 to 2.07 billion in 2014.⁸⁹ This reduction correlates with the implementation of the Backloading measure which has removed 400 million allowances that were available for auction previously.

Economic Effectiveness

According to CDC Climat Research (2013),⁹⁰ compared to a “business-as-usual” scenario, around 1.2 billion tCO₂ of emissions were avoided between 2005 and 2011: around 30% of the reduction was the result of a fall in manufacturing output, while approximately 60% of the reduction was caused by the development of renewable energy and the improvement in energy intensity.⁹¹ Research suggests that the carbon price (also weakened by the economic crisis, the deployment of renewable energy and the new Energy Efficiency Directive) does not seem to have been the main driver for domestic CO₂ emission reductions.

However, the research points at how the EU carbon price has been useful in promoting cost-effective emission abatements. The price of carbon has led to a reduction of 1,048 million tCO₂ between 2008 and 2012 through the use of carbon credits from CDM and JI mechanisms projects. Lower credit prices have enabled installations to reduce their compliance costs. These savings are estimated between €4 billion and €20 billion over 2008-12.⁹² Kyoto credits have always been less expensive than EUAs, initially as a result of asymmetric information, and later due to the fact that the use of Kyoto credits for compliance was limited at the European level.

^f The emission trend takes into account a scope correction (EEA, 2014). The sectoral disaggregation takes the following into account: for Bulgaria and Romania, it was assumed that the sectoral disaggregation in 2005 and 2006 was equal to the one in 2007; for Norway and Liechtenstein, it was assumed that the sectoral disaggregation in 2005 to 2007 matched the one of 2008. It was further assumed that the change in scope from all other countries can be assigned to the sector of combustion installations.

Secondly, although the research suggests that EU allowances do not seem to have been the main driver of domestic reductions, it has allowed reductions in emissions at a lower cost than those obtained by the deployment of renewable energies such as CO₂ emissions reductions from wind or solar⁹³. If achieving environmental objectives has been successful, cost-effectiveness has yet to be fully assessed. These early results suggest the importance of better aligning the objectives of the EU ETS and renewable energy in the next 2030 Climate and Energy package.

What Distinguishes this Policy?

UNIQUE ASPECTS

1. The EU ETS is the **largest emissions trading system in the world**. Its coverage of GHG emissions, scale, and market value far exceed other carbon markets currently in operation.
2. The EU ETS was the first **multi-national** installation-level cap-and-trade system that **set up a market for CO₂ and other GHGs**.

The EU ETS was the first, and is the main emission trading system, in the world to allow the use of international carbon credits (CERs and ERUs) for their compliance operators.

CHALLENGES

1. **Intra-EU negotiations and the political support for reforming the EU ETS:** Discussions have started on the post-2020 framework, with the European Commission's proposals for a 2030 framework for energy and climate policies, but it could take years before legislative changes are implemented. One of the big challenges that the EU is faced with is the need to achieve a political compromise among 28 member states with different and sometimes opposite interests or needs in terms of climate mitigation ambition, competitiveness and financing funds.
2. **The need for a coherent energy and climate policy package for the EU ETS:** Due mainly to the effectiveness of renewable energy policies and energy efficiency policies in terms of GHG emission abatements in the scope of the EU ETS and to the economic downturn, **EUA prices** have been significantly lower than expected since 2008, and are likely to remain so until 2020. Low-carbon investments need to be supported by a carbon price that reflects scarcity of emissions in the market. The introduction of other energy and climate policies that overlap with the EU ETS could undermine its effectiveness and should be considered with caution in the 2030 framework.
3. **Giving flexibility in the supply in the short and mid-term with an inflexible emissions reduction cap in the long-run:** A predicted growing surplus of allowances by 2020 and beyond appears likely to limit the potential for the necessary emission reductions to be on track for the indicative 2050 low-carbon trajectory. As a consequence, the European Commission proposed the implementation in 2019 of the Market Stability Reserve to guarantee a more balanced market, with a carbon price more strongly driven by mid- and long-term emission reductions. Beyond the political difficulty of reaching an agreement between member states, the main challenge will be to appreciate the effectiveness of this structural reform, and whether the behaviour of EU ETS operators will be focused on developing low-carbon investments.

LESSONS

1. **Long-term policy certainty** is fundamental. A long-term planning horizon creates certainty, allowing companies to make investments for the future.

⁹³ Marcantonini and Ellerman (2013) demonstrated that between 2006 and 2010 in Germany CO₂ abatement cost of wind are in average of the order of 44 euro per tonne of CO₂, while CO₂ abatement cost of solar are in average very high, of the order of 537 of euro per tonne of CO₂. With the basis of the EU carbon price average of 10 euros during 2006 – 2010, the cost of CO₂ abatement from wind and solar is from 4 to more than 50 times more than CO₂ abatement driven by the EU carbon price.

2. **Harmonised monitoring, reporting and verification, and allowance distribution mechanisms** are essential for the cost- and time-efficient continuation of the ETS.
3. **Allowing flexibility mechanisms** can help to manage compliance costs. Banking and borrowing provisions reduce possible problems that can arise from over-allocation, such as severe price fluctuations. Project-based mechanisms enable the carbon price to be extended to other sectors of the economy and reduces compliance costs for participants.
4. **Grandfathering of allowances** may have political benefits but can create opportunities for gaming and can lead to sectoral distortions among member states. Full auctioning of allowances, a single EU-wide cap and harmonisation of transitional free allocation provisions at the EU level (based on benchmarks) may correct these distortions.
5. **Maintaining the resilience of the ETS to external shocks or strong policy interactions with regulatory clarity to respond to extraordinary circumstances** is needed to avoid short-term impacts on the carbon price. In Phase III, the EU ETS has been vulnerable to demand shocks caused by interactions with other climate and energy policies and the economic downturn. Without a long-term target, these demand shocks can lead to a marginalised EU ETS.

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