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The EU ETS phase IV reform: implications for system functioning and for the carbon price signal

Outline

The European Commission launched the revision process for phase IV of the EU ETS in 2015, at a moment when the carbon price generated by the system was at a relative low, compared to previous levels and expectations. The final agreement on the revision package, adopted in early 2018, defines the EU ETS rules for the next decade. This paper aims to look at what the current outlook for the EU ETS in phase IV is. It will do so by examining the history and functioning of the EU ETS to date, by outlining the main elements of the phase IV reform, as proposed by the European Commission and as subsequently amended in the course of the legislative process, and their effects on the system. The paper will end by offering an outlook on the future of the EU ETS.

1. The EU ETS

The European Union's Emissions Trading System (EU ETS) is the first and largest cap-and-trade system for reducing GHG emissions,[1] accounting for more than three-quarters of international carbon trading. The EU ETS has inspired the development of similar programmes across the world, at a national, sub-national, and regional level.[2]

The EU ETS has been established and extended over three successive phases:

- Phase I started in 2005 and ended in 2007 and is often referred to as 'the pilot phase', or the 'pre-Kyoto' period;
- Phase II started in 2008 and ended in 2012, coinciding with the first commitment period under the Kyoto Protocol;
- Phase III started in 2013 and will end in 2020.[3]

The upcoming phase IV will start in 2021 and run to 2030. Throughout the different phases, the EU ETS was subject to constant updates, changes, and improvements that shaped it into its current form. The key milestones for the EU ETS to date are summarized below.

[1] IETA: '10 years of Emissions Trading in Europe: towards a new beginning?', May 2015, http://www.ieta.org/resources/EU/EUETS%20Paper%20May_FINAL.pdf.
[2] EU ETS Factsheet: 'The EU Emissions Trading System (EU ETS)', https://ec.europa.eu/clima/sites/clima/files/factsheet_ets_en.pdf.
[3] Ibid.

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The EU ETS covers approximately 11,000 power stations, manufacturing plants and other stationary installations, as well as aviation activities, across 31 countries: the 28 EU Member States and Iceland, Liechtenstein, and Norway. In total, around 45 per cent of total EU GHG emissions are covered by the EU ETS.[4]

More specifically, the EU ETS covers sectors and gases where emissions can be easily measured, reported, and verified with a high level of accuracy. GHG covered are:

- carbon dioxide (CO_2) from power and heat generation, energy-intensive industry sectors including oil refineries, steel works and the production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids, bulk organic chemicals, and commercial aviation;
- nitrous oxide (N_2O) from the production of nitric, adipic, and glyoxylic acids and glyoxal;
- perfluorocarbons (PFCs) from aluminium production.[5]

In 1997, the Kyoto Protocol established, for the first time, legally binding emissions reduction targets for industrialized countries.[6] Once all the EU Member States had signed the Protocol, a period aimed at examining how to fulfil the commitment began. It was up to the EU to find an effective way to establish a system for the implementation of the signed commitments on climate change and the reductions of GHG emissions.

In 2000, the European Commission presented a green paper outlining the idea of establishing a cap-and-trade mechanism as way of delivering the bloc's international climate commitments.[7] This document led to the development and adoption of the EU ETS Directive in 2003.[8]

a. EU ETS phase I

The first implementation phase (also referred to as phase I, 'pilot phase', 'learning by doing' period) of the EU ETS ran from 2005 to 2007. Its purpose was to put the system in place and to let market participants familiarize themselves with the features and functioning of a cap-and-trade programme,[9] ahead of the start of the first Kyoto compliance period, from 2008 to 2012. Phase I covered only CO_2 emissions from power generators and energy-intensive industries. Almost all the allowances were given to emitters for free and the penalty for non-compliance was set at €40/tCO_2.[10]

A key characteristic of phase I was cap setting, which was a responsibility of the Member States, meaning that national authorities decided on the volume of EU ETS allowances (EUAs) allocated to installations. The procedure required each Member State to develop its own National Allocation Plan (NAP), which determined the amount of allowances provided to each installation.[11] NAPs had to be submitted to the European Commission for approval. Absent historic verified emissions data, most Member States distributed allowances on the basis of estimated emissions. After the first compliance

[4] Ibid.
[5] European Commission (Climate Action): 'EU Emissions Trading System (EU ETS)', Last accessed March 2018, https://ec.europa.eu/clima/policies/ets_en.
[6] UNFCCC: 'KP Introduction', Last accessed May 2018, https://unfccc.int/process/the-kyoto-protocol.
[7] European Commission: 'Green Paper on greenhouse gas emissions trading within the European Union', https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52000DC0087&from=EN.
[8] European Commission (Climate Action): 'Phases 1 and 2 (2005–2012)', Last accessed March 2018, https://ec.europa.eu/clima/policies/ets/pre2013_en.
[9] IETA: '10 years of Emissions Trading in Europe: towards a new beginning?', May 2015, http://www.ieta.org/resources/EU/EUETS%20Paper%20May_FINAL.pdf.
[10] European Commission (Climate Action): 'Phases 1 and 2 (2005–2012)', Last accessed March 2018, https://ec.europa.eu/clima/policies/ets/pre2013_en.
[11] IETA: '10 years of Emissions Trading in Europe: towards a new beginning?', May 2015, http://www.ieta.org/resources/EU/EUETS%20Paper%20May_FINAL.pdf.

deadline in April 2006, actual emissions data became available. But the previous lack of data resulted in an over-allocation of allowances for the period.[12]

The impact of this was that prices of EUAs fell dramatically. Early in phase I, prices averaged around €20/tCO_2, with peaks of €30/tCO_2. However, once the first batch of verified emissions data was available in May 2006, it became clear that the allocation was overly generous and prices dropped.[13] Compounding matters, the European Commission then announced that banking of allowances to phase II would not be allowed. Within a week, prices fell from €29/tCO_2 to €13/tCO_2[14] in May 2006.[15] By the end of phase I, spot carbon prices were mere cents and the oversupply of allowances reached 150 million.[16]

b. EU ETS phase II

Phase II started in 2008 and ran until 2012. It coincided with the first commitment period of the Kyoto Protocol, under which EU Member States had to meet binding emissions reduction targets.[17]

With the start of phase II, policy improvements and adaptations to the system were undertaken. Verified data from the trading period of phase I allowed Member States to set their caps based on actual emissions.

Compared the previous phase, the main changes are as follows:

- The EU ETS cap was lowered by 6.5 per cent compared to 2005;
- Three new, non-EU, countries joined the EU ETS: Iceland, Liechtenstein, and Norway;
- More GHGs were covered: nitrous oxide emissions from the production of nitric acid were included by several Member States;
- More sectors were covered: the aviation sector was brought into the EU ETS in 2012, but only for intra-European flights;[18]
- The proportion of free allocation fell to around 90 per cent, with several countries auctioning the remaining 10 per cent;
- The penalty for non-compliance was increased to €100/tCO_2;[19]
- Emission reduction credits generated by the Clean Development Mechanisms (CDM) and Joint Implementation (JI) were accepted for compliance within a limit[20] of around 1.4 billion tonnes of CO_2 equivalent;
- Banking allowances from phase II to phase III was allowed;[21]
- The structure of the NAPs underwent a procedure of simplification and transparency through the setting up of a guidance document by the European Commission.[22]

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[12] A. Maydybura, B. Andrew: 'A Study of the Determinants of Emissions Unit Allowance Price in the European Union Emissions Trading Scheme', Australasian Accounting, Business and Finance Journal, vol. 5 Issue 4, 2012, http://ro.uow.edu.au/cgi/viewcontent.cgi?article=1251&context=aabfj.
[13] Ibid.
[14] Ibid.
[15] Ibid.
[16] IETA: '10 years of Emissions Trading in Europe: towards a new beginning?', May 2015, http://www.ieta.org/resources/EU/EUETS%20Paper%20May_FINAL.pdf.
[17] Ibid.
[18] European Commission (Climate Action): 'Phases 1 and 2 (2005–2012)', Last accessed March 2018, https://ec.europa.eu/clima/policies/ets/pre2013_en.
[19] Ibid.
[20] IETA: '10 years of Emissions Trading in Europe: towards a new beginning?', May 2015, http://www.ieta.org/resources/EU/EUETS%20Paper%20May_FINAL.pdf.
[21] Ibid.
[22] European Commission (Climate Action): 'National Allocation Plans', Last accessed March 2018.

There was the general expectation that, thanks to the availability of verified data and the above detailed policy adjustments, the functioning of the EU ETS would be improved. However, the economic crisis of 2008 had a severe impact on the sectors under the system, leading to reductions in production capacity. This meant lower emissions and, thus, fewer allowances were required, which contributed to the creation of yet another surplus of allowances.[23]

c. EU ETS phase III

Phase III of the EU ETS started in 2013 and runs until 2020. With eight years of operation, it is the longest trading period yet. The EU ETS in phase III is substantially different from that seen in phases I and II, as central policy changes (such as the establishment of the Union Registry) were undertaken in order to raise the resilience and effectiveness of the system. Moreover, since the start of the trading period, Member States have agreed to the establishment of a Market Stability Reserve (MSR).

The sub sections below provide a detailed analysis of the key features and aspects of phase III of the EU ETS.

i Changes to the system

Based on the knowledge and experience gained from the first two trading periods, phase III introduced significant changes to the system. Compared to the first two phases, the main changes to the EU ETS are as follows:

- The establishment of a centralized system via a single Union Registry;
- The establishment of a single EU-wide cap on allowances, with Member States no longer required to prepare NAPs. The cap is set to decrease, without any sunset clause, following a Linear Reduction Factor (LRF) of 1.74 per cent annually;
- The establishment of auctioning as the default system to allocate allowances;
- Member States are given the option to grant transitional free allocation for the modernization of electricity generation;
- The establishment of the carbon leakage list, whereby installations in sectors deemed to be exposed to a significant risk of carbon leakage would receive a higher share of free allowances;[24]
- The establishment of EU-wide harmonized rules and performance benchmarks for the free allocation of allowances;
- The creation of a new fund, the NER300, with the objective of using the EU ETS allowances to fund the development of specific low-carbon technologies;[25,26,27]

The implementation of these new features in phase III is designed to let the system move from the transitional learning years towards a fully functioning EU-wide policy tool.[28]

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https://ec.europa.eu/clima/policies/ets/pre2013/nap_en.

[23] European Commission: REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL, 'The state of the European carbon market in 2012', COM(2012) 652 final, 14 November 2012, https://ec.europa.eu/clima/sites/clima/files/ets/reform/docs/com_2012_652_en.pdf.

[24] European Commission (Climate Action): 'Carbon leakage', Last accessed March 2018' https://ec.europa.eu/clima/policies/ets/allowances/leakage_en.

[25] IETA: '10 years of Emissions Trading in Europe: towards a new beginning?', May 2015' http://www.ieta.org/resources/EU/EUETS%20Paper%20May_FINAL.pdf.

[26] European Commission (Climate Action): 'The EU Emissions Trading System (EU ETS)', Last accessed March 2018, https://ec.europa.eu/clima/policies/ets_en.

[27] European Parliament and Commission: DIRECTIVE 2003/87/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 October 2003, 'establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC', http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02003L0087-20140430&from=EN.

ii. Lack of market balance

At the start of phase III, the formation of a significant surplus of allowances, initially started in phase II as a consequence of the lower demand for allowances in the aftermath of the 2008 economic crisis, became a serious problem. The EU ETS's fixed supply of allowances offered the advantage of simplicity when determining the cap – but it did not provide for any possibility of adjustment to unexpected economic conditions.[29] Other factors, such as imports of international credits and overlapping policies, also contributed to worsen the situation.

In the short term, the surplus risked undermining the orderly function of the carbon market. In the long term, the surplus threatened to affect the ability of the EU ETS to meet emission reduction targets cost effectively and could have reduced industries' drive for innovation and fuel switching.[30]

iii. The impact of overlapping policies

Decreased industrial production in the aftermath of the 2008 economic crisis was not the only determinant of the accumulation of a surplus of unused allowances in the market. The EU ETS does not work in isolation and is not the only union-wide policy that has been implemented to meet the bloc's 2020 climate and energy target. The EU's 2020 climate and energy package set three different goals, to be met by 2020:

- A 20 per cent reduction, below 1990 levels, in GHG emissions;
- A 20 per cent share of renewable energy in the bloc's energy mix;
- A 20 per cent improvement in energy efficiency.

While the EU ETS was meant to be the key policy instrument in decarbonizing the European economy and meeting the first goal, the Renewable Energy Directive (RED) and the Energy Efficiency Directive (EED) were implemented to meet the second and third goal.

The impact of RED and EED policies are thought to have contributed towards a substantial reduction in the demand for ETS allowances up to 2020.[31] This is a consequence of a misalignment between the three policies, especially in the calculation of the mutual impacts, and also because of the overachievements of RED and EED. These factors drove more emission reductions than expected in ETS sectors, resulting in lower emissions and in lower demand for allowances.

An analysis carried out by the International Emissions Trading Association (IETA) in 2015 estimated that between 2008 and 2020 the EED had been responsible for an EUA surplus of approximately 515 $MtCO_2$, while the RED had accounted for a reduction in EUA demand of approximately 210 $MtCO_2$. Further, the EED and RED impact, coupled together with the effect of other policies such as direct regulation or national policies, could rise to over 1 billion tonnes of CO_2 in 2020.[32] The impact of overlapping policies further exacerbated the lack of market balance and undermined the efficiency of the system, affecting the generation of a stable price signal to the market.

iv. Adjustments to the system

To tackle the excessive surplus of allowances, EU regulators implemented two main policy measures:

- Backloading,
- The Market Stability Reserve.

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[28] IETA: '10 years of Emissions Trading in Europe: towards a new beginning?', May 2015, http://www.ieta.org/resources/EU/EUETS%20Paper%20May_FINAL.pdf.
[29] Ibid.
[30] European Commission (Climate Action): 'Market Stability Reserve', Last accessed March 2018, https://ec.europa.eu/clima/policies/ets/reform_en.
[31] IETA: 'Overlapping Policies with the EU ETS', July 2015, http://www.ieta.org/resources/EU/IETA_overlapping_policies_with_the_EU_ETA.pdf.
[32] Ibid.

Backloading was envisaged as a measure aimed at rebalancing the supply and demand of allowances in the short term. The proposal foresaw a postponement of the auctioning of 900 million allowances, reducing 2014 auction volumes by 400 million allowances, 2015 volumes by 300 million, and 2016 volumes by 200 million. This measure was implemented through an amendment to the EU ETS Auctioning Regulation and entered into force in February 2014.[33]

Attention then turned to a long-term solution to improve the market's functioning: the Market Stability Reserve (MSR).[34] The MSR, which will begin operations by January 2019, aims to address the surplus of allowances and improve the system's resilience to shocks by adjusting the volume of allowances to be auctioned.[35]

To ensure predictability, clear rules for placing allowances in the reserve and releasing them were developed to regulate the functioning of the MSR. From 2019, if the total number of allowances in circulation is above 833 million, an amount of allowances corresponding to 12 per cent of the volume in circulation will be withdrawn from the auctioning volume and placed into the reserve. In any given year, when the total number of allowances in circulation is less than 400 million, the European Commission will release the corresponding number of allowances.[36]

An additional measure agreed in the context of the MSR is that the 900 million 'backloaded' allowances will be transferred to the reserve instead of being released back into the market.

d. Market situation in mid-phase III

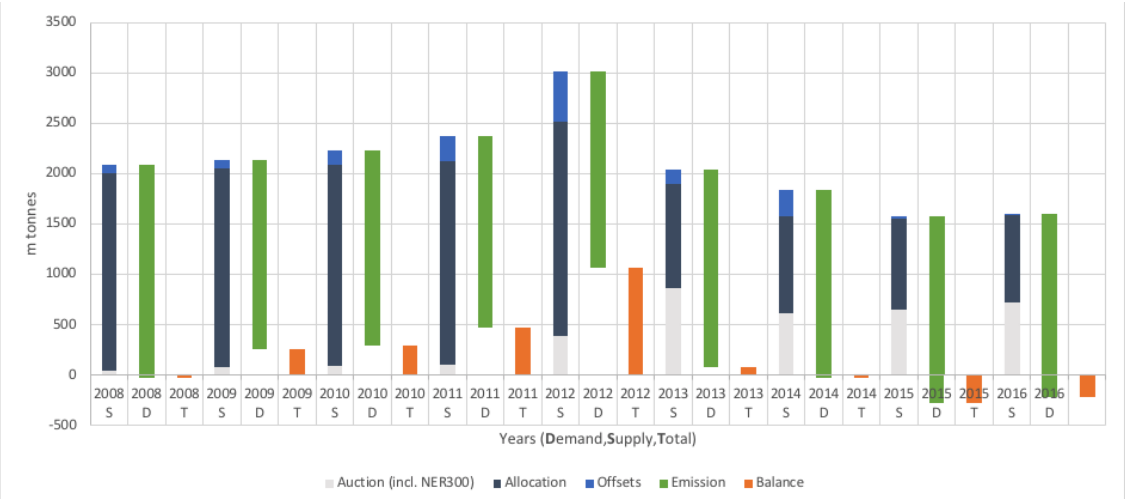
Around the time when the European Commission released the legislative proposal to set the rules for phase IV – July 2015 – the EU ETS was witnessing problems with the market balance. As previously mentioned, one of the most serious issues was the formation of a considerable surplus of allowances in the market. The graph below, provided by carbon market analyst firm ICIS, and based on an elaboration of Commission's data, shows the EU ETS supply–demand balance throughout the different phases.

It is evident that supply started to exceed demand in 2008 and, as a consequence, a net yearly surplus (the orange bar) started to appear. The surplus continued building up until the early years of phase III. The graph also clearly shows the impact of Backloading in 2014, 2015, and 2016, even though, as mentioned earlier, it is only a temporary fix.

The lack of market balance and the overabundance of allowances in the market caused a depression of the EUA prices, which followed an almost constant downward trend from 2008 to 2016, as shown in the graph below, provided by carbon market analyst firm ICIS.

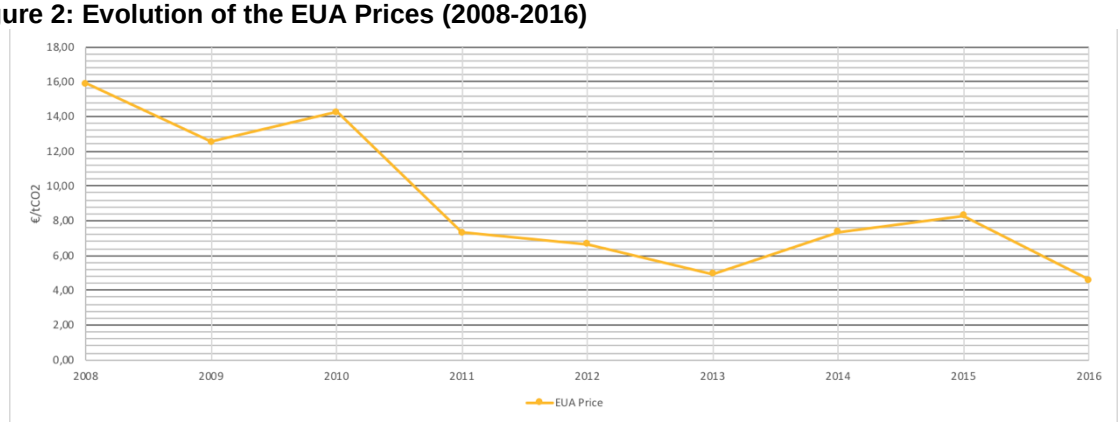
[33] European Parliament: Briefing note, 'Reform of the EU carbon market', October 2014, http://www.europarl.europa.eu/RegData/etudes/BRIE/2014/538951/EPRS_BRI%282014%29538951_REV1_EN.pdf.
[34] European Commission (Climate Action): 'Market Stability Reserve', Last accessed March 2018, https://ec.europa.eu/clima/policies/ets/reform_en.
[35] Ibid.
[36] European Commission: DECISION (EU) 2015/1814 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 6 October 2015, 'concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading scheme and amending Directive 2003/87/EC', http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015D1814&from=EN

Figure 1: Fundamental demand and supply side balance in the EU ETS



Source: Data and elaborations provided by ICIS.

Figure 2: Evolution of the EUA Prices (2008-2016)



Source: Data and elaborations provided by ICIS.

As seen in the previous graph, this chart clearly shows the impact of Backloading on the market balance. By postponing the auctioning of 900 million allowances over three years, Backloading temporarily tightened the market, resulting in a slight price increase from 2013 to 2015.

The market situation depicted by the two graphs is useful in contextualizing the release of the European Commission proposal for phase IV, which happened in July 2015. Restoring the EU ETS market balance was a key concern throughout the negotiations on the policy file.

2. Phase IV reform

The EU's 2030 Climate and Energy Policy Framework, adopted in October 2014, reaffirms Europe's strategy towards decarbonization, and extends the bloc's decarbonization goals beyond 2020.[37] Its key goals are to:

- cut GHG emissions by at least 40 per cent (compared to 1990 levels);
- achieve at least a 27 per cent share for renewable energy;
- improve energy efficiency by at least 27 per cent.[38]

[37] European Commission (Climate Action): '2030 Climate & Energy Framework', Last accessed May 2018, https://ec.europa.eu/clima/policies/strategies/2030_en.

The contribution of the EU ETS in achieving the above-stated GHG reductions by 2030 is to reduce emissions by 43 per cent (compared to 2005) in the sectors covered by the EU ETS.[39]

Phase IV of the EU ETS will run from 2021 until 2030. The aim of phase IV is to increase the pace of emissions cuts, to set up better-targeted carbon leakage rules, and to fund low-carbon innovation and energy sector modernization.[40] To achieve this, and to extend the rules for the system's functioning beyond 2020, the European Commission published a legislative proposal, on 15 July 2015 to review the EU ETS.[41] The main elements of the European Commission's proposal can be found in Annex I.

The publication of the proposal by the European Commission marked the beginning of the legislative process. The proposal was consequently submitted to the co-legislators – the Council of the European Union, representing the governments of EU Member States, and the European Parliament – for review. The co-legislators were responsible for proposing amendments to the Commission's proposal, with the view of forging a final agreement.

It is important to analyse the amendments proposed by the co-legislators, as their work changed the outcome of the revision process significantly, bringing several changes and improvements to the original proposal put forward by the European Commission, as discussed in the following sub-sections.

a. European Parliament position

On the European Parliament's side, the discussion on this policy file was led by the Committee on Environment, Public Health and Food Safety (ENVI Committee), while the Committee on Industry, Research and Energy had shared competences on some specific topics.

On 15 February 2017, after a lengthy process, the European Parliament adopted its position on the European Commission's proposal.[42] The main differences, compared to the Commission's original proposal, are outlined in Annex II. The most significant change was the proposal to double the MSR intake rate from 12 per cent to 24 per cent for the first four years of operations.

b. Council of the European Union position

On 28 February 2017, not long after the European Parliament had adopted its position on the EU ETS phase IV reform, the Council of the European Union also came to an agreement.[43] Council's position did not amend all the key topics, meaning that it did not deem it necessary to change (or counter) the proposals put forward by the Commission and the Parliament. The topics that were not amended by the Council include:

- The linear reduction factor,
- The fund for indirect costs compensation,
- The Just Transition Fund.

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[38] Ibid.
[39] Ibid.
[40] European Commission (Climate Action): 'Revision for phase 4 (2021–2030)', Last accessed March 2018, https://ec.europa.eu/clima/policies/ets/revision_en.
[41] European Commission: PROPOSAL FOR A DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, 'amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments', http://eur-lex.europa.eu/resource.html?uri=cellar:33f82bac-2bc2-11e5-9f85-01aa75ed71a1.0024.02/DOC_1&format=PDF.
[42] European Parliament: 'Amendments adopted by the European Parliament on 15 February 2017 on the proposal for a directive of the European Parliament and of the Council amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments', http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+TA+P8-TA-2017-0035+0+DOC+PDF+V0//EN.
[43] Council of the European Union: PROPOSAL FOR A DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, 'amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments – 'General approach', http://data.consilium.europa.eu/doc/document/ST-6841-2017-INIT/en/pdf.

On the other hand, the Council took a position on a number of topics that sought to modify the Commission's proposal and/or address some amendments proposed by the European Parliament in its position, as outlined in Annex III.

c. Trilogue negotiations

After the co-legislators had adopted their positions on the EU ETS reform for phase IV, the European Commission, the European Parliament, and the Council of the European Union started a legislative process known as 'trilogue negotiations'.

During the trilogue negotiations, the three institutions held regular meetings aimed at finding a final agreement on the EU ETS reform by bridging the differences in their respective positions. The first trilogue meeting took place on 4 April 2017 and a final agreement was found in the early hours of 9 November 2017, at the end of the sixth meeting.[44]

The main elements of the final agreement are outlined below:

- Linear Reduction Factor: agreement to increase the LRF to 2.2 per cent in phase IV.
- Market Stability Reserve: agreement on doubling the intake rate for the first five years of operation. The starting year of the invalidation mechanism proposed by the Council, whereby allowances are cancelled from the MSR, is brought forward from 2024 to 2023.
- Optional cancellation of allowances: endorsement of the Parliament's proposal whereby Member States may cancel a volume of allowances representing the number of allowances equivalent to closures of electricity generation in their territory.
- Changes in activity level: allocation should be adjusted for a production increase or decrease of more than 15 per cent.
- Carbon leakage rules:
    - Conditional lowering of the auctioning share: the auctioning share might be lowered by 3 per cent up to a maximum of 150 million allowances, to avoid the application of the cross sectoral correction factor (CSCF). On the contrary, if the CSCF is not triggered, the allowances will be used for increasing the innovation fund, up to a maximum of 50 million, and the modernization fund, up to a maximum of 75 million.
    - The annual benchmark reduction rate shall be capped between 0.2 per cent and 1.6 per cent.
    - Allocation rate to non-exposed sectors: free allocation to non-exposed sectors should be phased out during the second half of phase IV, implying a linear phase out to zero between 2026 and 2030.
- New Entrants Reserve: the New Entrants Reserve will be populated with 150 million allowances taken from the unused allowances in phase 3, coupled with 200 million from the MSR. If unused by the end of phase IV, up to 200 million will be returned to the MSR.
- Innovation Fund: the Innovation Fund will be populated with a total of 450 million allowances: 325 million from the free allocation share, 75 million from the auction share, 50 million from the MSR, and might possibly be increased by 50 million from unused flexibility allowances.
- Modernization Fund: the Modernization Fund will not support energy facilities using solid fossil fuels, with the only exception being investments in highly efficient co-generation in Bulgaria and

[44] Council of the European Union: Letter to Ms Adina-Vălean, Chair European Parliament Committee of Environment, Public Health and Food Safety re PROPOSAL FOR A DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL, 'amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments', http://www.europarl.europa.eu/RegData/commissions/envi/lcag/2017/11-22/ENVI_LA(2017)011091_EN.pdf.

Romania. The Modernization Fund may be increased by 75 million from the flexible auction share if allowances are unused.

- The Just Transition Fund proposed by the Parliament is merged with the Modernization Fund.[45]

After being agreed at the last Trilogue meeting, the EU ETS reform was discussed and rubberstamped by the co-legislators; it was consequently published in the European Union's Official Journal on 19 March 2018, more than two and a half years after the European Commission first released the initial proposal.[46]

3. Phase IV outlook

The EU ETS phase IV reform is expected to significantly improve the functioning of the system in its next phase. Many of the features of the adopted reform aim to enhance the flexibility of the system to react to changes and to maintain a correct market balance, which has been one of the main shortcomings of the system in previous phases.

In terms of improving the market balance and strengthening the system's price delivery, the most meaningful changes are:

- The increase of the LRF, leading to an additional emissions reduction of approximately 556 million tonnes (equivalent to the annual emissions of the UK) over the course of phase IV,[47]
- The doubling of the MSR intake rate, allowing a quicker absorption of the existing surplus, coupled with the invalidation mechanism, whereby allowance in the MSR are cancelled under some conditions,
- The flexibility to adjust the auctioning level for a production increase or decrease of more than 15 per cent,
- The optional cancellation of allowances, whereby Member States may cancel a volume of allowances representing the number of allowances equivalent to closures of electricity generation in their territory.

The ability to adjust the auctioning level for production increases or decreases, in particular, means that the system will be able to react readily to future economic changes. This provision should protect the ETS from future economic shocks and crises, with the objective of avoiding similar consequences to those seen in the aftermath of the 2008 global recession.

Most importantly, strengthening of the MSR, by doubling the intake rate for the first five years of operation, means that, starting in 2019, the market will be tightened and the supply–demand balance will be restored in a shorter timeframe, by reducing the existing surplus twice as fast. The MSR is also expected be able to absorb any surplus resulting from emissions reduction generated by overlapping policies.

The increase of the linear reduction factor, from 1.74 per cent to 2.2 per cent, is another feature that will help to tighten the market in phase IV, contributing to, as mentioned earlier, additional emissions reduction in the next decade equivalent to the annual emissions of the UK.

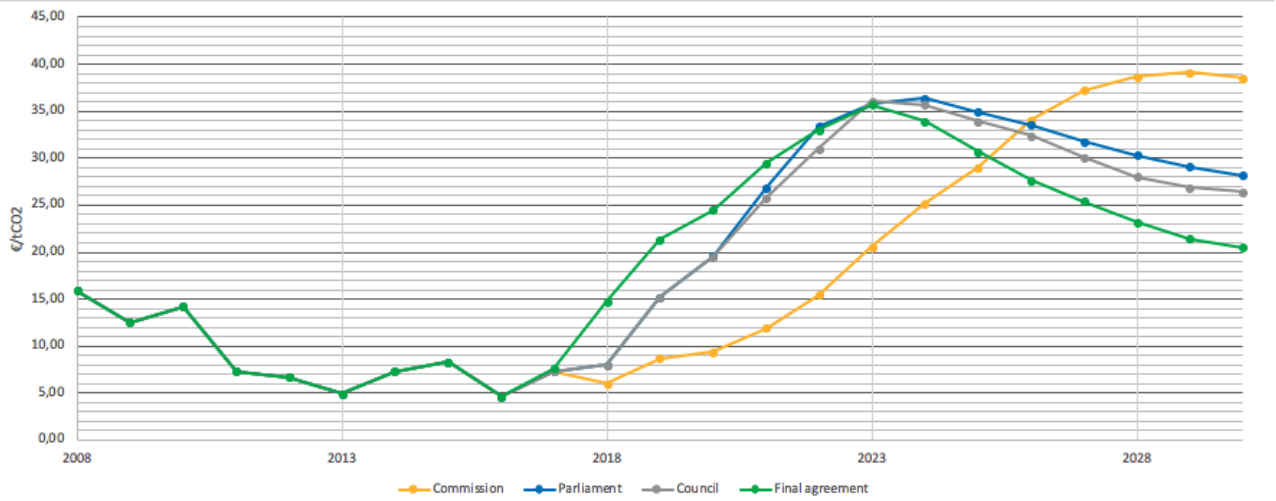
[45] Official Journal of the European Union L 76/3: DIRECTIVE (EU) 2018/410 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 14 March 2018, 'amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments, and Decision (EU) 2015/1814, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L0410&from=EN.

[46] Official Journal of the European Union L76 Volume 61: Legislation, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2018:076:FULL&from=EN.

[47] European Commission: 'Detailed questions and answers on the proposal to revise the EU emissions trading system (EU ETS)', 15 July 2015, https://ec.europa.eu/clima/sites/clima/files/ets/revision/docs/detailed_qa_en.pdf.

As a result of these improvements, the EU ETS is expected to perform better in the coming phase and to deliver a stronger price signal to covered entities. A modelling of the impact of the EU ETS phase IV reform was carried out by carbon market analyst firm ICIS and is shown in the graph below.

Figure 3: Impact of the EU ETS phase IV reform



Source: Data and elaborations provided by ICIS.

The price projection clearly shows the expected improvements in terms of price delivery of the system. The original proposal from the European Commission (yellow line) was already expected to generate a stronger price signal in comparison to historical trends. The subsequent amendments by Parliament and Council (blue and grey line, respectively), reflected in the final agreement (green line), further reinforced the expected impact on market prices.

Under the Commission's proposal, prices were expected to rise above €20/tCO_2 around 2023 and to peak above €35/tCO2 only towards the very end of phase IV. The projections related to the other three proposals (the Council and Parliament positions and the final agreement), instead show a radically different curve. Under all three scenarios, prices already start to increase steeply in the final years of phase III and peak in the early years of phase IV.

Many of the differences characterizing the positions of the three institutions, identified in the previous sections and in the Annexes, play a role in determining the price projection differences visible in the graph. The main determinant of the visible difference between the Commission's proposal and the other three curves is undoubtedly the strengthening of the MSR, included in the Parliament and in the Council positions, as well as in the final agreement.

Doubling the MSR intake rate results in a rapid tightening of the market, as it leads to a reduction of the annual auction volume of around 400 million allowances during the first years of MSR operation. The price impact of the higher intake rate is greater than the LRF increase and of any other measure contained in the phase IV reform package.

The 24 per cent intake rate implies a steeper price increase compared to a 'normal' MSR scenario (with a 12 per cent intake rate), as included in the Commission's proposal. Moreover, the price increase is predicted to actually start in the current phase, given that the MSR starts operating in 2019 – before the start of phase IV. Prices are expected to ramp up way earlier than under the Commission's proposal, considering that compliance entities will start hedging their future demand based on the expectations of a shorter market in the coming years.

These expectations have been confirmed by the price trends witnessed in recent months. Allowance prices started to climb in late 2017, when the outcome of the EU ETS phase IV reform became clear,

and peaked at over 16 €/tCO_2 in May 2018 – a level that had not been seen since phase II.[48] This price increase, witnessed before the phase IV rules come into effect and before the MSR starts operating, is not surprising. Compliance entities and market participants now operate with the expectation of a significantly shorter market in the future and, moreover, the start date of the MSR is less than a year away.

Looking at the 'final agreement' scenario, it is interesting to note that after peaking in 2023–4, prices are expected to decline later in the decade. This trend can be explained by the fact that the significant price increase in 2018–23 is expected to push the abatement pressure forward in time, leading to significant emissions reductions in the first years of phase IV. This early abatement effort, coupled with the reduced MSR intake rate after the first five years, and the inflow of allowances from the unused flexibility provisions and funds, could potentially lead to a longer market in the second half of the 2020s, which explains the downward price trend.

It is important to note that the modelling exercise shown above assumes no further policy change between now and 2030. Changes to the system operated as part of the MSR review and/or a possible revision of the EU's 2030 target would, of course, change the price curves. Further to this, a wide range of different factors will influence the system's functioning.

The MSR will act as a safeguard against the impact of policy overlap by absorbing any surplus of allowances going forward, but it does not address the problem at its root: the existence of an overlap and the consequent creation of a surplus. The harmonization of the interaction between the EU ETS and the other climate and energy policies in phase IV will be crucial in determining whether the system will effectively be the main tool to decarbonize the bloc's economy. Now that the post-2020 rules for the other key policies – EED, RED, and Governance of the Energy Union – are finalized, it remains to be seen how these will interact going forward.

Another possible threat to the system's functioning is the implementation of unilateral measures at the national level, such as floor prices or emission performance standards. A number of national measures were announced, and in some cases implemented, when the persistence of low prices in the ETS was perceived as a problem. Some Member States feared that low prices would not be sufficient to drive the necessary abatement and long-term investments. As such, measures were considered to either deliver a stronger signal in the system (as in the case of price floors) or to reduce emissions in other ways (as in the case of emission performance standards to phase out coal). Such measures, especially when implemented in an uncoordinated way, generate fragmentation in the system, undermining its cost effectiveness, and do not necessarily deliver environmental benefits, due to the so-called 'waterbed effect', whereby emissions rise elsewhere in the system. The phase IV reform addresses these problems to some extent, by allowing Member States to cancel an amount of allowances equivalent to the abatement driven by the implementation of national measures. Moreover, rising prices in the system should mitigate concerns about the effectiveness of the ETS in driving abatement. If the system proves to be able to generate an adequate price signal, there will be less need for additional policies at the national level.

Lastly, the EU ETS will not remain untouched until 2030 and a number of potential game changing milestones are already on the horizon. A discussion on the bloc's 2050 roadmap will start later this year and might bear potential implications for the 2030 target as well. A first review of the MSR is already scheduled for the first years of phase IV and will be a first opportunity to take stock of the system's functioning under the new rules. A new Nationally Determined Contribution to the Paris Agreement will need to be developed well before the end of phase IV, as the current one only sets out goals until 2030. Arrangements will need to be made for the UK's participation in, or departure from, the system post-Brexit.

[48] Markets Insider: 'CO2 European emissions allowances', Last accessed on June 2018, http://markets.businessinsider.com/commodities/co2-emissionsrechte.

These events will be crucial opportunities to assess the system's functioning, operate improvements, and guard against unwanted consequences and inefficiencies. The phase IV reform is a good starting point to enhance the effectiveness of the EU ETS, but it will be crucial to ensure that current and future challenges are adequately addressed.

4. Conclusions

This paper offers an overview of the EU ETS history to date, with a particular focus on problems experienced in phase III, on the revision process for phase IV, and on the expected impact of the latter.

It is evident that the shortcomings experienced in the early years of phase III, related to the economic downturn, the impact of overlapping policies, and the consequent formation of an allowance surplus, has undermined the effectiveness of the system over the past few years.

Many of the elements included in the phase IV reform aim at addressing the shortcomings experienced in the past. The strengthening of the MSR, in particular, is expected to rapidly absorb the existing surplus, tightening the market and reinforcing the price signal, shortly after it starts operating. The improved flexibility on the supply side and a steeper LRF are also expected to play a role in tightening and stabilizing the system going forward.

Reflecting these improvements, modelling simulations of the future EU ETS price show that prices are expected to start growing steadily and rapidly in the last years of phase III, mainly driven by the impact of the MSR. The EU ETS phase IV reform is therefore expected to improve the system and reinforce the price delivery – this should actually be seen in the final years of phase III.

However, as outlined in the last section of the paper, some old challenges might remain a concern in phase IV, and new challenges are on the horizon. These will need to be addressed if the EU ETS is to remain the main tool to drive decarbonization in Europe by providing the long-term price signals that are needed to drive low-carbon investment and innovation.

Annex I: European Commission's proposal for phase IV

This European Commission's proposal included the following changes to the EU ETS:

- ETS cap: Change of the LRF to from 1.74 per cent to 2.2 per cent from 2021 onwards to meet a 43 per cent reduction for ETS sectors by 2030 compared to 2005 levels.
- Share of auctioned allowances and freely allocated allowances: From 2021 onwards, the share of allowances to be auctioned by Member States and/or the modernization fund shall be 57 per cent. This also includes allowances set aside for new entrants but not allocated for free and allowances placed in the MSR that are to be auctioned at a later point in time, as well as the 10 per cent share of total EU allowances that are distributed for solidarity purposes. The remaining 43% of EU allowances will be distributed for free or auctioned through the NER400.
- If the sum of free allowances does not reach the maximum level, the remaining allowances shall be used to prevent/limit a reduction of free allocation in later years, in other words, to limit the impact of the cross sectoral correction factor. However, if the maximum level is reached, free allocation shall be adjusted accordingly in a uniform manner (a cross sectoral correction factor (CSCF) would apply).
- Allowances for new entrants: Around 400 million allowances will be made available until 2030 for new entrants and installations with significant production increases (this would include 250 million allowances that would be placed in the MSR and any allowances that were meant to be distributed for free but were not allocated by 2020). In addition, any allowances not allocated from 2021 onwards (due to the closure of installations or significant changes in production) will also be made available for this new entrants' reserve.
- Benchmark values will be updated twice during 2021–30:
    - The first update will be for the benchmark values used as of 2021 and these values will be kept stable until 2025.
    - The second update will concern the benchmark values applied as of 2026 and these values will in turn be kept stable until 2030.
    - Benchmark values shall be reduced by 1 per cent of the value that was set based on 2007–8 data in respect of each year between 2008 and 2025.
    - However, for all sectors, the real rate of improvement will be verified based on real data. If this reality check indicates that for a sector, technological progress deviates substantially from this flat rate, a lower or higher rate would be applied, ranging from 0.5 per cent to 1.5 per cent.
- Carbon leakage rules:
    - Sectors and subsectors will be deemed to be at risk of carbon leakage if the result obtained by multiplying their 'intensity of trade with third countries' by their 'emission intensity' exceeds 0.2. Such sectors will be allocated allowances free of charge at 100 per cent of the benchmark level.
    - There is a qualitative test for sectors and sub-sectors to also be considered at risk of carbon leakage if the product of multiplying their 'intensity of trade with third countries' by their 'emission intensity' is above 0.18.
    - Other sectors are considered to be more able to pass the costs on, and shall be allocated allowances free of charge at 30 per cent of the benchmark
- Indirect costs compensation: Member States will be 'actively encouraged' to provide partial compensation for indirect costs, from their auction revenues.
- Transitional free allocation: Article 10c details the availability of the transitional free allocation for modernizing electricity production installations, for Member States which had, in 2013, a GDP per capita below 60 per cent of the Union average.

- Modernization Fund: 2 per cent of the total quantity of allowances until 2030 shall be auctioned to establish a fund to improve energy efficiency and modernize the energy system of certain Member States with a GDP per capita below the 60 per cent Union average in 2013. The fund will be governed by an investment board and a management committee.
- Innovation Fund: 400 million allowances will be made available to support innovation in low-carbon technologies and process. These allowances will come from the share of 43 per cent of total EU allowances, rather than the share of 57 per cent of total EU allowances that corresponds to allowances to be auctioned by Member States. An additional 50 million unallocated allowances from the MSR will be made available before 2021, for innovation purposes.

Solidarity mechanism: 10 per cent of total EU allowances to be auctioned will be distributed to Member States for the purposes of solidarity and growth.[49,50]

[49] Markets Insider: 'CO2 European emissions allowances', Last accessed on June 2018, http://markets.businessinsider.com/commodities/co2-emissionsrechte.
[50] European Commission (Climate Action): 'Revision for Phase 4 (2021–2030)', Last accessed on May 2018, https://ec.europa.eu/clima/policies/ets/revision_en.

Annex II: European Parliament's position on the phase IV reform

The main differences compared to the original Commission proposal are outlined below:

- Market Stability Reserve: The MSR intake rate should be doubled from 12 per cent to 24 per cent for the first four years of operations. The MSR review, planned within three years from the start of the operation of the reserve, shall consider doubling the intake rate until the market balance is restored. On 1 January 2021, 800 million allowances should be cancelled from the MSR.
- Linear Reduction Factor (LRF): Endorsement of the proposal to increase the LRF to 2.2 per cent. The LRF should be kept under review with a view to increasing it to 2.4 per cent by 2024 at the earliest.
- Carbon leakage rules:
    - The auctioning share, which the European Commission proposed to fix at 57 per cent, should be decreased by up to 5 percentage points to ensure sufficient free allowances for industries in case the application of the CSCF is triggered. When no adjustment occurs, or when less than 5 percentage points are required for adjustment, the remaining quantity of allowances shall be cancelled, up to a maximum of 200 million.
    - Sectors not on the carbon leakage list shall not be eligible to receive any free allocation.
    - The carbon leakage qualitative test threshold should be lowered from 0.18 to 0.12.
    - District heating should receive free allocation up to 30 per cent of its benchmark level.
    - Electricity generators producing electricity from waste gases should be eligible for free allocation.
    - For the period from 2021 to 2025, the benchmark values should be determined using 2016–17 data. Similarly, for the 2026–30 period the benchmark values should be determined using 2021–2 data, and with the annual reduction rate applying in respect of each year between 2008 and 2028.
    - Introduction of a new benchmark reduction rate of 0.3 per cent (to account for industries that cannot achieve an annual reduction of 0.5 per cent).
- Overlapping Policies:
    - The Commission shall, each year, submit a report on the functioning of the EU ETS to the European Parliament and the Council. The report shall address the interaction of the EU ETS with other Union climate and energy policies, including how those policies impact upon the supply–demand balance of the EU ETS and their compliance with the Union's 2030 and 2050 climate and energy goals.
    - The report shall include a section dedicated to the interaction between the EU ETS and other Union and national climate and energy policies, with attention being paid to the volumes of emissions reductions, the cost effectiveness of such policies, and their impact on demand for EU ETS allowances.
    - If appropriate, the report may be accompanied by proposals aiming at increasing transparency of the carbon market: addressing both its capacity to contribute to the Union's 2030 and 2050 climate and energy goals, and measures to improve its functioning (this would include measures to account for the impact of complementary Union-wide energy and climate policies on the supply–demand balance of the EU ETS).
- Indirect cost compensation: A fund to compensate sectors exposed to carbon leakage due to significant indirect costs should be established and populated with 3 per cent of the total quantity of allowances. Two-thirds of this figure, shall come from the auction share and one-third from the free allocation share. Member States may also adopt measures supporting sectors at risk of carbon leakage due to significant indirect costs. Financial aid should be in line with state aid rules.

- Innovation Fund: Proposal to increase the Innovation Fund from 400 million allowances (the Commission's proposal) to 600 million allowances.
- Modernization Fund: The beneficiary Member States should be responsible for the governance of the Modernization Fund. An advisory board, composed of the beneficiary Member States, three representatives from non-beneficiary Member States, a representative from the Commission, a representative of the EIB, and a representative from the European Bank for Reconstruction and Development, shall be established.
- Just Transition Fund: A Just Transition Fund, supplied with 2 per cent of auction allowances, shall be established as of 1 January 2021. The revenues shall remain at Union level and will support regions which combine a high share of workers in carbon-dependent sectors and a GDP per capita well below the Union average.
- Changes in activity level: For any increase or decrease in production of at least 10 per cent, an installation should be eligible for additional allocation from the new entrants' reserve.
- Optional cancellation of allowances: Member States may cancel a volume of allowances representing the number of allowances equivalent to closures of electricity generation in their territory.
- Transitional free allocation: Member States eligible to grant to their power producers transitional free allocation, may choose to transfer the corresponding number of allowances, or part of their share, to the Modernization Fund.

Annex III: Council of the European Union's position on the phase IV reform

The key elements of the Council position are outlined below:

- Market Stability Reserve: The Council endorsed the Parliament proposal to double the MSR intake rate until 31 December 2023. From 2024 onwards, the number of allowances in the MSR exceeding the total number of allowances auctioned during the previous year should be cancelled, unless decided otherwise in the first MSR review.
- Carbon leakage rules:
    - The Council proposed an optional decrease of the 57 per cent auctioning share by 2 percentage points to ensure sufficient free allowances for industries in case application of the CSCF is triggered before 2030.
    - Sectors at risk of carbon leakage should receive 100 per cent free allocation, while sectors not on the carbon leakage list 30 per cent. Therefore, the binary approached proposed by the Commission should be maintained.
    - For the period from 2021 to 2025, benchmarks values should be determined on the basis of data for the years 2016–17, adjusted by the annual reduction rate in respect of each year between 2008 and 2023. Similarly, for the period from 2026 to 2030, benchmark values should be determined in the same manner, on the basis of data for the years 2021–2 with the annual reduction rate applying in respect for each year between 2008 and 2028.
    - The annual benchmark reduction rate shall be capped between 0.2 per cent and 1.5 per cent.
    - The threshold for a qualitative assessment should be lowered to 0.16.
- Indirect cost compensation: Member States shall seek to use no more than 25 per cent of the auctioning revenues for indirect costs compensation. Where a Member State uses more than 25 per cent for that purpose, it shall publish a report setting out the reasons for exceeding this amount.
- Changes in activity level: Allocation should be adjusted for a production increase or decrease of more than 15 per cent.
- Innovation Fund: The Innovation fund should be populated with 400 million allowances from phase IV's free allocation share, coupled with 50 million unallocated allowances from the MSR, as proposed by the Commission.
- Modernization Fund: The beneficiary Member States should be responsible for the governance of the Modernization Fund.
- Transitional free allocation: Modernization investments with a value of more than €15 million would be selected through a competitive bidding process (investments with a value of less than €15 million would be selected on the basis of 'objective and transparent' criteria). Allowances not allocated for transitional free allocation up to 2020 could be transferred to phase IV, to investments selected through the competitive bidding process.