DISCUSSION PAPER

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Managing liquidity in the future EU ETS framework

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The key issue

The European Chemical Industry supports the EU ambition to become climate neutral by 2050. Considering the challenges in the transition towards 2050, the chemical sector, with its long investment cycles, needs a supporting and coherent regulatory framework to secure the investments necessary to deploy and scale up disruptive technologies. An important element to this coherent regulatory framework is the EU ETS.

The Fit for 55 package amended the ETS Directive, in view of meeting the 2030 climate target. This being said, the ETS framework doesn't stop at 2030. When looking beyond 2030, the recently amended ETS Directive delivers consequences and challenges that need to be urgently addressed.

With the current linear reduction factor and without recognition of removals, as per the 2023 revision of the ETS Directive, there will be no new allowances in the system around 2039-2040. That means that all sectors under ETS 1, including industry, would be required to reach absolute zero emissions by that time. And well before, the ETS market functioning will be challenged by a lack of liquidity. This poses two fundamental questions.

Firstly, an absolute-zero system does not match the ambition to achieve *net*-zero, which implies matching emissions and removals. The Commission's impact assessments for both the 2030 and 2040 climate targets indicate industry emissions will need to be strongly reduced, but also that some hard-to-abate emissions from industry are likely to remain, even by 2050[1].

Secondly, the accelerated timeframe does not match the modelling of future emissions. The nature of the industry's long investment cycles, the lead times for infrastructure investments in Europe and the replacement rates of fossil energy carriers with low-carbon carriers over the past decade pose issues of concern.

Failing to address this mismatch between regulatory framework and technical feasibility risks jeopardising the present and the future of the European industry, leading to carbon leakage. In particular, investments in low-carbon solutions to meet the 2030 target are also at risk of being delayed or cancelled, if they do not match with reaching absolute zero emissions by 2039.

It is worth reiterating that the transition to 2050 can be successful – and a source of inspiration for other regions in the world – only if matched with investments in emissions reduction and a competitive and thriving industry in Europe. Enabling conditions for access to economically viable renewable and low-carbon energy sources and feedstock substitution need to be implemented alongside demand-pull

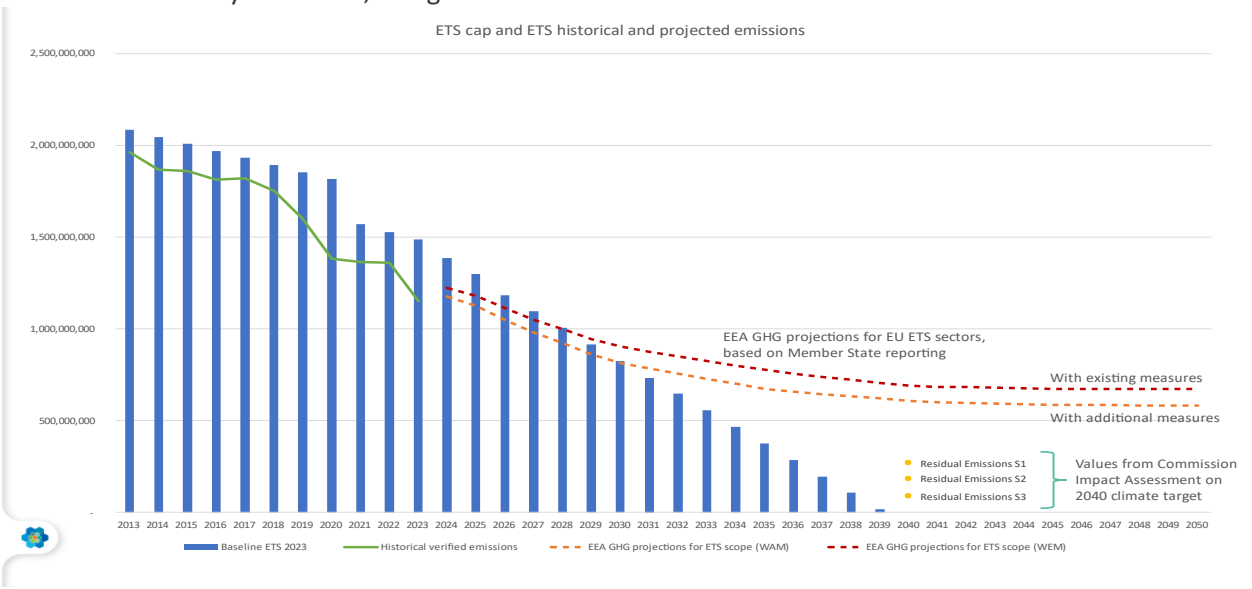
[1] Commission Staff Working Document (2024) 63 final: Impact Assessment Report accompanying the document Communication from the Commission – Securing our future – Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society, available online
Similar observations were made in the Communication from the Commission COM (2018) 773: A Clean Planet for All – A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy, in particular figure 6, page 23. Available on EurLex

measures to create a European competitive market. And importantly, European producers can bear additional costs only with adequate carbon leakage protection. This requires a framework that provides for adequate and robust carbon leakage protection with sufficient resources allocated to it.

With a view to providing suggestions towards a more predictable EU climate policy framework that drives the economy to achieving climate neutrality by 2050, while avoiding deindustrialisation, this discussion paper looks at policy options for managing liquidity challenges in the future of the ETS. It aims to provide some initial policy ideas to make this work, but does not aim to address all other concerns referred to above. It also assumes that ETS remains the overarching policy approach for decarbonising the sectors in its current scope, delivering a long-term signal to drive investments towards climate neutrality. Whereas not explicitly addressed in each option, it should be taken into account that the different policy options would have different costs, as well as a different distribution of these costs.

Outset and main assumptions

It is clear that some emissions from industry are expected to remain in 2040 and 2050, even in the most optimistic emission reduction scenarios, as confirmed by the Commission's impact assessment for the 2040 climate target. As various pathways are discussed in the impact assessment, this discussion paper will refer to the figures of S1 (267 Mt), S2 (181 Mt), and S3 (89 Mt) as possible outcomes of industry's residual emissions in 2040. In addition, this paper looks at the greenhouse gas projections data from the European Environmental Agency, based on projections reported by EU Member States. These projections come with different scenarios. The scenarios shown in the graph below are projections with existing measures (WEM) and with additional measures (WAM)[2]. It is important to note that the used assumptions on residual emissions are merely indicative, using available information.



[2] European Environment Agency (EEA), 2023. EEA greenhouse gas projections – data viewer. Available online.
The data shown is filtered to match the ETS scope to the extent possible: energy industries, manufacturing industries and construction, domestic navigation, industrial processes, waste.

In this context, it has to be noted that the European Commission's impact assessment for the 2040 climate target raises many questions as regards the likelihood and necessary enablers to achieve the proposed scenarios. The impact assessment makes important assumptions, including, but not limited to:

- Increasing yearly investment in the energy system for industry by more than six-fold: from €7 billion per year (2011-2020) to €46 billion per year in the period 2031-2040 (S2);
- Undescribed solutions enabling electrification of industrial processes despite electricity prices remaining uncompetitively high, in the range of €130 per MWh by 2040;
- Development of hydrogen to 21-35 Mt (S1-S3) by 2040, and development of e-fuels to 15-37 Mt;
- Capturing 86-344 $MtCO_2$ per year (S1-S3) by 2040, mainly from industrial processes. Current worldwide capture capacity is 50 $MtCO_2$, of which 5% is operated in Europe.

So far, these assumptions have yet to be materialised. Therefore, these figures need to be understood with the right sense of caution. From the graph above, it is also clear that there is a large gap between the projected ETS emissions from the EEA for 2040 and 2050 and the projected industry emissions in the suggested 2040 climate target by the Commission.

The issue of a rapidly decreasing cap is important. Given the high level of economic and technological uncertainty, industry requires a sufficient amount of allowances to be available in the system, for liquidity and predictability reasons. As a principle, the EU's climate policy should make it possible for companies to operate in Europe while complying with the legal requirements. Regarding this required amount in the system, there is significant uncertainty to be taken into account, as the residual emissions in the future from installations subject to the ETS, as well as from the rest of the economy, remain unclear.

From a conceptual perspective, the available policy options for a more functioning and more liquid ETS fall in two broad categories:

1. Options addressing the structural element, providing the possibility of exchanging emission allowances also in a very deep decarbonisation scenario, such as through integrating removals and/or offsets.
2. Options addressing the time element, such as reducing the LRF and changing the ETS scope

The policy options discussed in this paper are non-mutually exclusive, and they should thus also be considered together. A sustainable ETS framework beyond 2030 will need a combination of these available policy options, coupled with additional policies to address the risk of carbon leakage, to create demand for low-carbon products, and to finance the transition.

The next sections of this paper will discuss various policy options that relate to these two fundamental ways forward for the ETS.

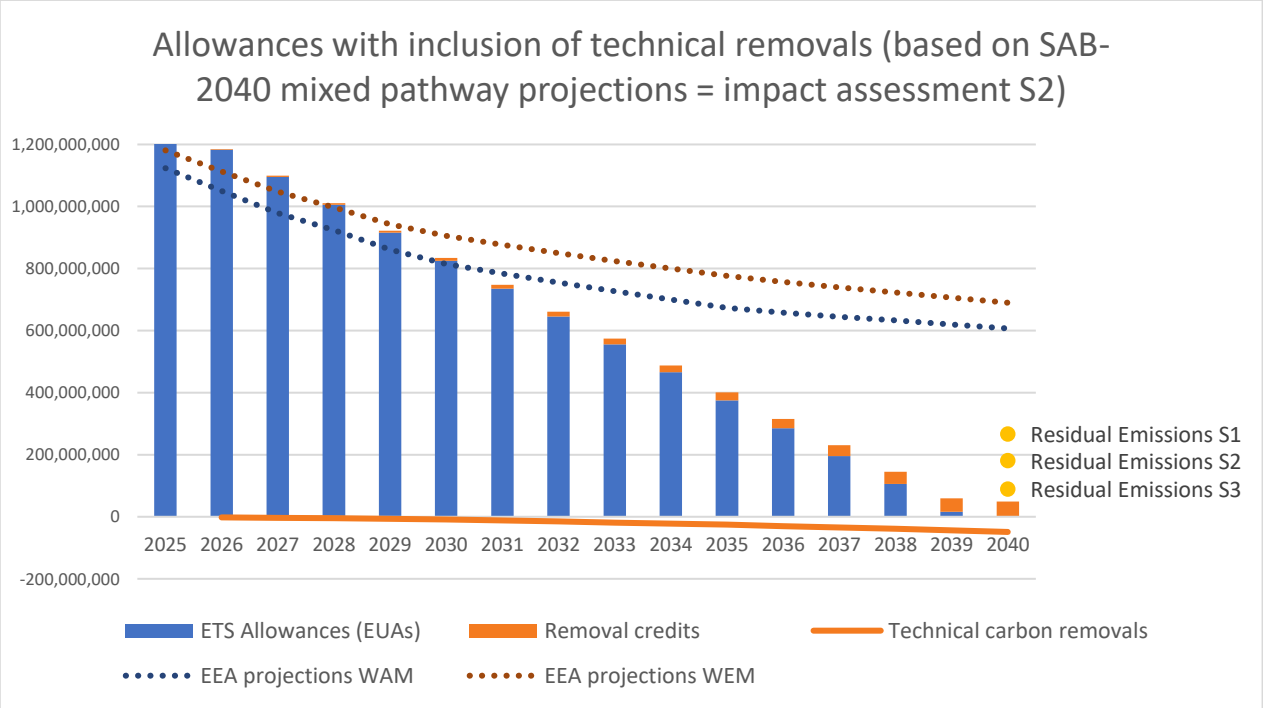
Structural solutions

Integrating technical removals

One policy option for the future of the ETS would be the integration of technical removals. The 2023 revision of the ETS Directive inserted a paragraph in Article 30, requesting the Commission to report by 31 July 2026 on:

> *how negative emissions resulting from greenhouse gases that are removed from the atmosphere and safely and permanently stored could be accounted for and how those negative emissions could be covered by emissions trading, if appropriate, including a clear scope and strict criteria for such coverage, and safeguards to ensure that such removals do not offset necessary emission reductions in accordance with Union climate targets laid down in Regulation (EU) 2021/1119*
> Directive (EU) 2023/959, Article 1 (28) (d), inserting paragraph (5) (a) under Article 30 of Directive 2003/87/EC

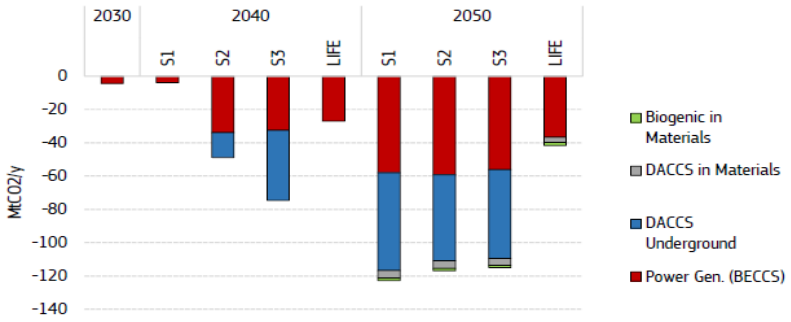
And where appropriate, the Commission is asked to come forward with a legislative proposal. The data from the graph below are taken from the ETS system and the European Scientific Board Advisory Body's 2040 report, which provides estimates of the size of potential future carbon removals (MIX scenario). This is similar to scenario 2 of the Commission's impact assessment for the 2040 target. For modelling purposes, the LRF is maintained at 4.4% beyond 2030.



In this example, the lowest point will be reached in 2040, with zero 'normal' EUAs and 49 million carbon removal credits in the system. With this, there is a gap of credits in the system ranging between 218 Mt (S1) and 40 Mt (S3) for the 2040 impact assessment assumptions. The gap with the EEA projected emissions is 558 Mt in the WAM scenario. By 2050, there would be 147 million tonnes of expected technical carbon removals, provided all projections from the impact assessment indeed materialise. However, a mismatch

of timelines remains to be expected, suggesting the need to consider this option in combination with other policy options.

Figure 2: Carbon removals by source and use



Source: PRIMES.

On the left: modelling of BECCS and DACCS in the 2040 Impact Assessment (p. 10 of Part 3)

The Commission impact assessment's S3 assumes a significantly accelerated deployment of BECCS and DACCS. Together, they would deliver industrial removals of up to 75 Mt by 2040 in S3, compared to 49 Mt in S2. With this figure, a gap with residual industrial emissions would still remain, ranging between 192 Mt (S1) and 14 Mt (S3), provided that these quantities will be achieved and that these certificates are integrated into the ETS. Compared to the EEA's WAM scenario, the gap would be 532 Mt.

Further to this, it is important to note that there are significant uncertainties, for example related to the development and deployment at scale of technical removals, as well as the associated learning curves. It would require BECCS and DACCS to quickly climb the last part of the ladder of the technology readiness levels (TRLs)[3]. In addition, DACCS is highly energy-intensive and would need to compete with other activities that require energy.

In summary, it appears that the inclusion of technical removals can provide only a small addition to the ETS market, just slightly increasing its liquidity in the coming decades. The timings of projected carbon removals by the Commission are not aligned with the current cap going down to zero and their inclusion alone does not seem to be adequate to soften the expected crunches in the ETS.

Land-based removals

Next to technical removals, one could consider providing the ETS with access to credits stemming from land-based removals. The EU has more experience with land-based removals than with technical removals, given the LULUCF Regulation. Land-based removals are more challenging, from the perspective of monitoring, reporting and verification (particularly in the long-run) and due to the element of additionality, resulting in a baseline and crediting mechanism. Nature-based solutions can come at a relatively low

[3] Commission Staff Working Document (2024) 63 final: Impact Assessment Report accompanying the document Communication from the Commission – Securing our future – Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society, page 78 of part 1. available online

abatement cost, in comparison to industrial mitigation activities, and are relatively abundant, but are limited due to their non-permanent character.

For removals, Member States currently use the LULUCF removals in their reporting, but they are not recognised under the ETS. Recently, the EU has made a step forward with the Carbon Removals Certification Framework (CRCF) to increase the reliability of its monitoring, reporting and verification, and certification – even if these rules do not tend to be interoperable with the ETS. As such, a system would have to be put in place to allow the use of removal certificates for compliance within ETS.

With the possible inclusion of land-based removal credits, which tend to expire after a certain period of time according to the CRCF, industry would need clarity and predictability. Solutions would need to be found to make sure that when an operator acquires a removal for ETS compliance, this credit would not be cancelled at a later stage. Returning liability for the emissions that were duly compensated for would increase the uncertainty of the compliance mechanism.

Integrating international credits

Given the high uncertainties, as well as the limited space and renewable energy capacity available in Europe, the inclusion of international credits could be a policy option to consider. As it is imperative that a solution for liquidity in the ETS is required for the period after 2030, the EU could consider opening up to allowing environmentally robust carbon credits generated outside the EU into the EU ETS. This would provide a boost to the international carbon market and increase the attractiveness of deploying removal or mitigation activities where they are most efficient.

Article 6 of the Paris Agreement allows for the exchange of internationally transferred mitigation outcomes and establishes a mechanism to contribute to the mitigation of greenhouse gas emissions and support sustainable development. As such, parties to the Paris Agreement would be able to trade mitigation outcomes to help achieve their nationally determined contributions. The UNFCCC is in the process of elaborating methodologies and assessments to set the right framework for operationalising the Article 6 mechanism.

It is important that this framework is soon finalised to ensure a common understanding in the international community about the rules for these credits. This would create certainty and trust in the international exchange of certificates, while effectively reducing emissions worldwide. The environmental integrity and trust in the system is of paramount importance.

Next to efforts at the UN level, the EU could explore the possibilities of striking bilateral agreements. This can boost international cooperation on carbon removals and climate mitigation. In addition, the Climate Law[4] would potentially require adaptation to ensure international credits are recognised.

[4] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law')

So far, there are no clear projections of high-permanence, strongly verified creditable activity deployment around the world. Here, the amount of available credits would also depend on the exact scope of the Article 6 methodology and the types of certificates that would be accepted by the EU.

To address the environmental integrity of such a system, the EU could consider developing an intermediary body for these credits. This organisation would be tasked with safeguarding the trust in the system. In particular, its tasks could include:

- Checking the quality and verifications of credits available on the market
- Acquiring environmentally robust certificates
- Where needed, inject the acquired certificates into the ETS system as exchangeable EUAs

Time-bound solutions

Adjusting the Linear Reduction Factor

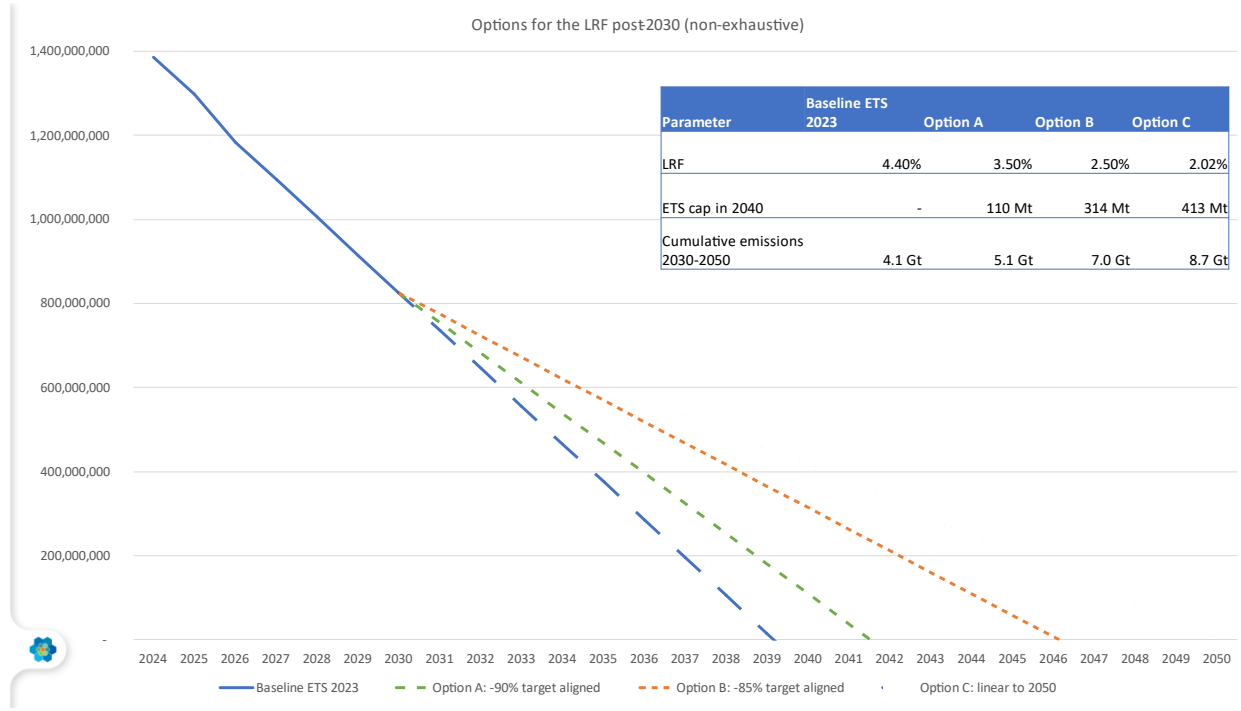
Conceptually, an option the EU could consider is adjusting the linear reduction factor for the periods 2031-2040 and 2041-2050. For the purpose of this discussion paper, three alternative options have been selected:

A. An LRF of 3.5%, that would align with a -90% target trajectory for 2040[5]
B. An LRF of 2.5%, that would align with a -85% target trajectory for 2040[6]
C. An LRF of 2.02%, that would set a linear trajectory to zero in 2050.

In the figure below, they are put next to the current situation (baseline ETS 2023) that foresees an LRF of 4.3% as of 2024, and an LRF of 4.4% as of 2028. The table summarises the key outcomes of these three options, next to the baseline.

[5] This LRF is based on a linear trajectory from 2031 to 2040. The point in 2040 is calculated as 10% of UNFCCC-reported EU emissions in 1990. Subsequently, this level of emissions is divided between ETS sectors and non-ETS sectors, forecasting the various sectors' reduction trajectories. Here, one must note substantial uncertainty, as less ambition in one sector may require more ambition in another sector. For this option, the emissions space available to the ETS in 2040 would be in the range of 105 to 120 $MtCO_2$. Inspiration was taken from the presentation of ICIS at this IETA event.

[6] Cf. footnote 8. For this option, the emissions space available to the ETS in 2040 would be in the range of 310 and 330 $MtCO_2$.



Parameter	Baseline ETS 2023	Option A	Option B	Option C
LRF	4.40%	3.50%	2.50%	2.02%
ETS cap in 2040	-	110 Mt	314 Mt	413 Mt
Cumulative emissions 2030-2050	4.1 Gt	5.1 Gt	7.0 Gt	8.7 Gt

The graph and table above suggest that the alternatives would make a quantifiable difference for the industry's transition in terms of timeline. At the same time, the possibility to adjust the LRF may depend on the overall EU ambition, the acceptance of international credits, as well as the ambition in non-ETS sectors. As such, this will require political deliberation. In addition, the future configuration of the ETS should preserve the global competitiveness of operators in Europe and the incentive for economic operators to invest in low-carbon solutions. This should also be seen in the overall EU ambition towards climate-neutrality.

This policy option gives rise to substantial discussion, as there are various different viewpoints. On the one hand, there is the expectation that the current LRF will give rise to substantial deindustrialisation, as enabling conditions and investments may not materialise in time, and currently anticipated carbon leakage risk mitigation measures are insufficient. As such, a more lenient LRF is seen as imperative to the transition towards climate neutrality and to maintaining industrial competitiveness. On the other hand, there is a viewpoint that shares the concerns on timelines of enabling conditions, but does not prefer lowering the ambition in the reduction of the ETS cap. As such, it would rather be seen as a last-resort option, in case the enabling conditions and investments indeed would not materialise fast enough. Given this discussion, the order of magnitude of a required LRF change may depend on the delivery of enabling conditions for the industry to transition towards climate neutrality.

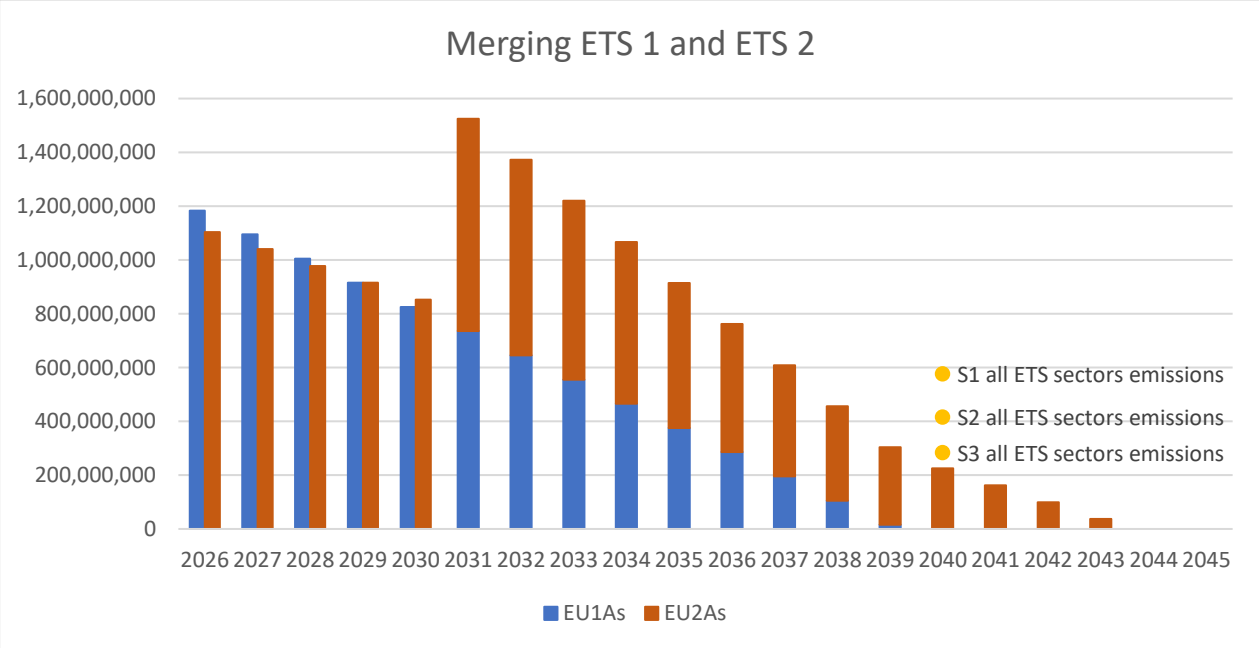
Next to this, it should be noted that there are various options to achieve a more lenient LRF. One of these would be changing the LRF and thereby increasing the allowed cumulative emissions from ETS-covered activities or the future years. Another option for increasing the system's flexibility would be to reintroduce the allowances that were taken into the Market Stability Reserve. Since the start of this Reserve, it has reduced auctions by around 2.9 billion allowances. Yet another option would be to compensate the additional allowances in the ETS by government-acquired carbon removals or emission offsets. With this, the option of adjusting the LRF would be combined by introducing removals and offsets within the EU's climate policy compliance mechanism.

Clearly, as with any option, adjusting the LRF has advantages and disadvantages. Yet, in a discussion paper on the future of the ETS that also takes into account the current speed of reductions, this policy option requires consideration and discussion.

Merging ETS 1 and ETS 2

The 2023 revision of the ETS Directive created a separate emission trading system for buildings, road transport and additional sectors, the so-called ETS 2. In this system, the fuel suppliers to those sectors will be the obligated parties. According to the new Article 30i, the Commission is asked to "assess the feasibility of integrating the sectors covered by Annex III to this Directive into the EU ETS covering the sectors listed in Annex I to this Directive." This assessment is expected before 31 October 2031.

The ETS 2 will commence with monitoring emissions in the years 2024-2026, after which pricing will start as of 2027. The LRF is set at 5.1% for the years 2024-2027, and at 5.38% (from the mid-point of 2024-2026) for the period of 2028 onwards. This means that the cap of ETS 2 would reach zero by 2044, based on the current rules.



In the above graph, the two systems are considered separately up to 2030 and are combined as of 2031. This would mean that ETS 1 sectors would have access to the allowances of ETS 2 for their compliance and vice-versa. Effectively, this policy option would delay the ETS cap reaching zero by 3 years, but does not address any of the fundamental issues. At the same time, this option gives rise to concerns over price development.

In the context of the covered sectors, it should also be considered that each sector has a different abatement cost profile. Authors from the Potsdam Institute (PIK) and E3 Modelling[7] have shown the major uncertainties over the future price development in the ETS 2. Among previous studies, the projected EUA price for ETS 2 ranges from €51 to €380 in 2030. The PIK and E3 Modelling study implies that the marginal abatement costs in 2030 are at least €261 per tonne. It also finds that energy efficiency policies taken next to the ETS 2 instrument have a significant effect on the price development – more stringent energy efficiency policies lead to lower ETS 2 prices. Next to this, price projections for 2040 and 2050 show a rapid increase to levels above €400.

In general, the different price elasticity and cost pass-through could lead to ETS 2 sectors having a higher ability to pay for allowances, strongly raising the price for ETS 1 sectors. As a result of this, his could lead to industries being outcompeted for the allowances that they need to cover their remaining emissions, making the system much costlier for operators to comply with legislation, as they face an inability to pass through this cost due to expose to trade.

As it is important to avoid carbon leakage, significant caution needs to be taken into account when assessing this option. It would be important to take this possible impact into account in the Commission's upcoming assessment.

Conclusion

In this discussion paper, two main issues were brought to the fore:

1. Projected emissions are higher than the ETS cap if the current framework is continued beyond 2030, even in the most optimistic scenarios; and
2. The projected emissions in the Impact Assessment for the 2040 climate target strongly deviate from current emission projections from the EEA, and enabling conditions for their achievement are not yet in place.

To address these issues, the following options were analysed and discussed, indicating pros and cons:

- Integrating technical removals
- Integrating land-based removals
- Integrating international credits
- Adjusting the LRF

What is clear from the above analysis is that these options should not be considered in isolation. A successful path forward will most likely involve a combination of several of the suggested policy options.

[7] Günther, Claudia and Pahle, Michael and Govorukha, Kristina and Osorio, Sebastian and Fotiou, Theofano, Carbon prices on the rise? Shedding light on the emerging EU ETS2 (April 26, 2024). Available at SSRN: https://ssrn.com/abstract=4808605 or http://dx.doi.org/10.2139/ssrn.4808605

The EU's consideration of the future of the ETS should start with providing certainty on the rules for the industry's emission trajectory towards 2040 and 2050, that takes into account the deployment of enabling conditions and the globalised economy.

Next to this, carbon removals form an element to the future of the EU's climate action. Both technical and land-based removals require attention in terms of accelerated development and deployment. The ETS should recognise removals and may be able to provide a financial push-factor for removals, as the removals can provide (part of) the much-needed liquidity in the Emissions Trading System. For a sensible integration of removals into the ETS, it is of paramount importance to have a reliable and robust system of greenhouse gas emission accounting. Industry needs a predictable and supportive framework and should have certainty when acquiring carbon removal credits to compensate for their residual emissions.

As highlighted in the Antwerp Declaration, Europe needs a business case, urgently. Key to the business case is clarity, predictability, and confidence in Europe and its industrial policy. That includes providing clarity and predictability on the future of the ETS, enabling the European economy to constructively work together towards achieving net-zero by 2050, whilst remaining globally competitive.