



Can the EU ETS weather the impact of Covid-19?

Milan Elkerbout and Lars Zetterberg

Abstract

The Covid-19 crisis has caused an economic downturn that may reverberate throughout the European carbon market. This makes a review of the EU ETS supply mechanisms imperative.

In the previous economic crisis, the carbon price in the EU ETS dropped to very low levels as supply-demand imbalances increased. Today, the Market Stability Reserve (MSR) operates to prevent significant allowances surpluses from accumulating.

We estimate whether the MSR will be able to address additional surpluses under different emissions scenarios, following recent years of already rapid emissions reductions. Our analysis shows that the MSR's original withdrawal rate of 12% will not prevent supply-demand imbalances from increasing under any scenario, and that even the temporarily doubled rate may be insufficient.

The MSR review foreseen in the legislation offers an opportunity to revisit the design of the MSR. Besides calibrating the MSR parameters there is also the option of introducing alternatives such as a carbon price floor, as suggested recently by France and Germany. A carbon price floor would offer the benefit of a more stable carbon price to guide investments, but it may require significant political capital to agree on an appropriate level.

Any change to the ETS' supply management systems should also consider the impact on automatic allowance invalidation. Even with a growing allowance surplus, the number of allowances removed permanently from the market may exceed 3-4 billion. Hybrid solutions between the quantity control of the MSR and the price impact of price floors could also be considered.



Milan Elkerbout is a Mistra Fellow at IVL Swedish Environmental Research Institute and a Research Fellow at CEPS. Lars Zetterberg is the programme director for Mistra Carbon Exit at IVL Swedish Environmental Research Institute. The authors thank the Mistra Foundation for their support, and Dallas Burtraw and Christian Egenhofer for their valuable comments.

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The economic downturn induced by the Covid-19 crisis has also affected the European carbon market. The experience of the EU Emissions Trading System (ETS)¹ during the previous economic crisis has made many stakeholders wary of what could happen this time: will the surplus of allowances grow again and will carbon prices fall, thus reducing the incentive to abate greenhouse gas emissions?

To date, carbon prices in the EU ETS have decreased from their pre-crisis levels of around €25, but after a swift drop to €15 have stabilised at roughly €20 per tonne of CO₂. In the aftermath of the 2008 financial crisis, a surplus of allowances exceeding two billion had accumulated, while the ETS price had dropped to as low as €3 per tonne.² This compares to annual emissions of just over 1.5 billion tonnes in the EU ETS in 2019.

While a (smaller) part of this surplus was the result of an additional external supply through the inflow of international Kyoto credits, the real issue was the rigidity of the supply coupled with declining demand for allowances as economic activity slowed down.

This resulted in a number of structural reforms, which addressed the supply-demand imbalances and the EU ETS design more generally, and have supported a recovery in the ETS price (and its credibility as a climate policy instrument) since 2015. The Market Stability Reserve (MSR) makes automatic adjustments to the volume of allowances to be auctioned each year,³ and the Phase 4 rules that were agreed in 2018 will lead to (lower) free allocation volumes that better track economic output levels from 2021 onwards.

The carbon market disruption in 2020 with the Covid-19 crisis is therefore significantly different from the previous crisis in 2008. Nonetheless, it will test the market in a similar way and will provide an opportunity for examining whether the MSR will be able to deal with the surplus that may arise from a sustained economic depression, or whether alternatives such as a carbon price floor merit reconsideration. A carbon price floor has been implemented nationally in the UK. France has been a long-time supporter and Germany seems to be warming to the idea.⁴ A price floor is also a common market design element in North American carbon markets such as the California and Quebec ETS.

The ETS surplus increases when emissions stay below the cap. However, the cap as it is currently set largely reflects the policy consensus of 2014. When the European Council adopted the 2030 climate and energy framework, it included a reference to the trajectory of the ETS cap up to 2030 (the 'linear reduction factor' of 2.2%) which was later adopted as part of the ETS revision. Since then, several pivotal climate policy developments have occurred, notably

¹ The EU ETS covers the greenhouse gas emissions of over 12,000 stationary installations in the power sector and energy-intensive industries, as well as flights within the European Economic Area.

² <https://www.theguardian.com/environment/2013/jan/24/eu-carbon-price-crash-record-low>.

³ Between 54 and 57% of all allowances will be auctioned in Phase 4, depending on free allocation volumes.

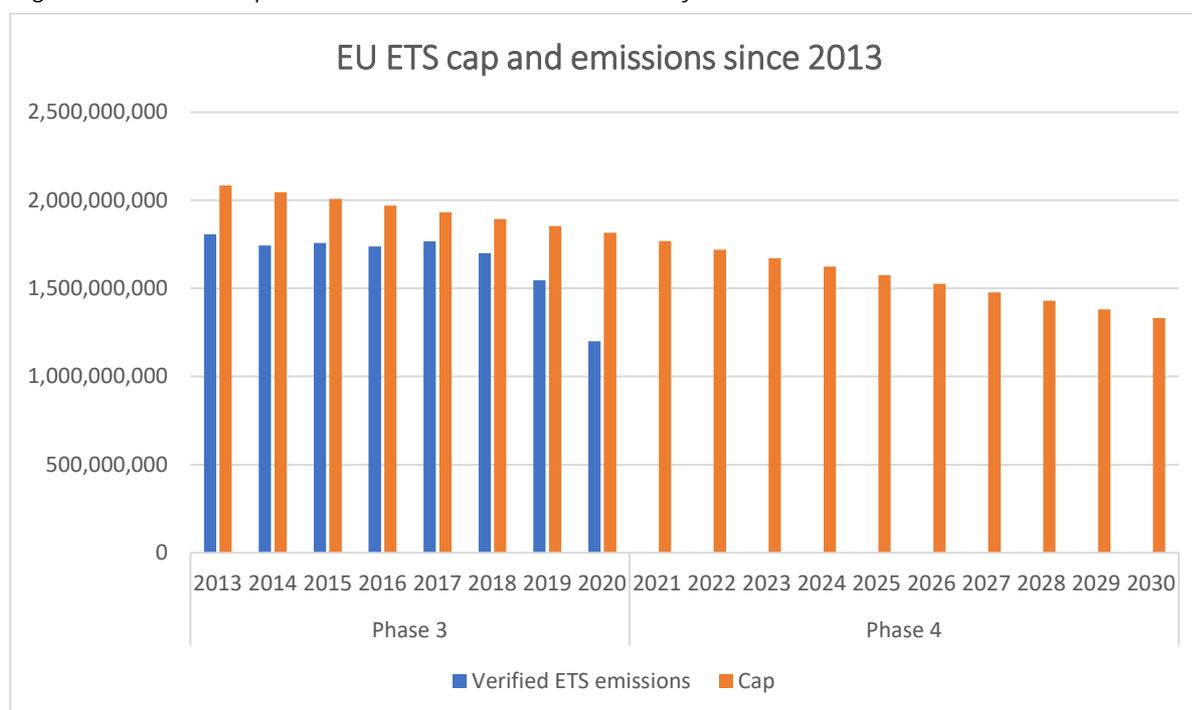
⁴ <https://www.bundesregierung.de/breg-de/aktuelles/deutsch-franzoesische-initiative-zur-wirtschaftlichen-erholung-europas-nach-der-coronakrise-1753760>.

the Paris Agreement, but also the EU long-term climate strategy for 2050 and the European Green Deal.

The Green Deal sets out a roadmap to revise the EU's climate and energy policies from June 2021 onwards. The next revision of the ETS can therefore account for the more ambitious climate policies endorsed since 2015, including the climate neutrality target for 2050 and the potentially increased target for 2030. This would increase scarcity in the long run. In the short term, however, the effects on emissions of the Covid-19 downturn will unfold in relation to the existing trajectory of the cap.

Figure 1 shows the trajectory of the ETS cap from 2013 (the start of Phase 3) to 2030 (the end of Phase 4) together with emissions up to 2019 (and an estimate for 2020).

Figure 1. EU ETS cap⁵ and emissions since the start of Phase 3



Source: EUTL

For 2020, ETS emissions are virtually certain to be significantly lower due to reduced energy consumption and industrial output. Estimates by carbon analysts ICIS⁶ suggest that 2020 ETS emissions will be about 1.17 billion tonnes (the auction volume of 2020 will be just under 600 million), a further significant decline compared to last year's already low emissions. However, even if ETS emissions recover to 2019 levels, the figure shows that they will most likely remain below the cap until at least 2025. It is unlikely (though not impossible) that the cap will be

⁵ From 2013 onwards, the ETS cap is reduced annually by a fixed amount of 38 million tonnes. These numbers do not account for the supply from previous trading periods, or the 900 million backloaded allowances.

⁶ <https://www.linkedin.com/pulse/european-power-carbon-markets-affected-covid-19-early-ferdinand>.

adjusted before then. Changing the linear reduction factor requires a change of the ETS legislation through co-decision, which usually takes at least two years once the European Commission has made a proposal.

The MSR will therefore have to address a more rapidly growing surplus for a number of years. The MSR reduces the auction volume based on the ‘total number of allowances in circulation’ (TNAC)⁷ – a number that is published every May by the European Commission. The 2019 notice⁸ put the number at 1.65 billion,⁹ while in the notice for 2020 the number dropped to 1.39 billion.¹⁰

Of this number, 24% of allowances (approximately 400 million for 2019 and an additional 332 million for 2020) are withheld from auctions and placed in the MSR. This means that if the surplus increases, the number of allowances that are removed from the subsequent year’s auction volume will also increase. However, this 24% ‘withdrawal rate’ represents a temporary five-year derogation agreed in the ETS revision of 2018. After 2023, it will revert to the 12% rate originally agreed in 2015 when the MSR Decision¹¹ was passed. Furthermore, from 2024 onwards, allowances kept in the MSR that exceed the previous year’s auction volume will be invalidated and then permanently removed from the market.

1. Estimated Market Stability Reserve response to Covid-19

This 12% withdrawal rate would not be able to address the accumulating surplus, leading to a return to structural supply-demand imbalances. Using a spreadsheet model (modified from Burtraw et al., 2018),¹² we have estimated how the total number of allowances and auction volumes respond to emission changes due to Covid-19. The graphs below show our estimates of the development of the TNAC under different emissions scenarios. The emissions up to 2019 are verified emissions; for 2020, an estimate with a considerable Covid-19 induced shock is assumed; and for 2021, a partial rebound following the end of the pandemic is assumed. For subsequent years, three trajectories are used corresponding to annual emissions reductions of 1.1% (‘slow’), 2.2% (‘normal’) and 3.3% (‘fast’) respectively. The 2.2% annual reductions would be in line with the annual reductions of the ETS cap.

⁷ We use the measure TNAC, which is similar to surplus but not a wholly equivalent concept: some calculations of the ‘ETS surplus’ may account for unused allowances from ETS funds, or include allowances in the MSR.

⁸ https://ec.europa.eu/clima/sites/clima/files/ets/reform/docs/c_2019_3288_en.pdf.

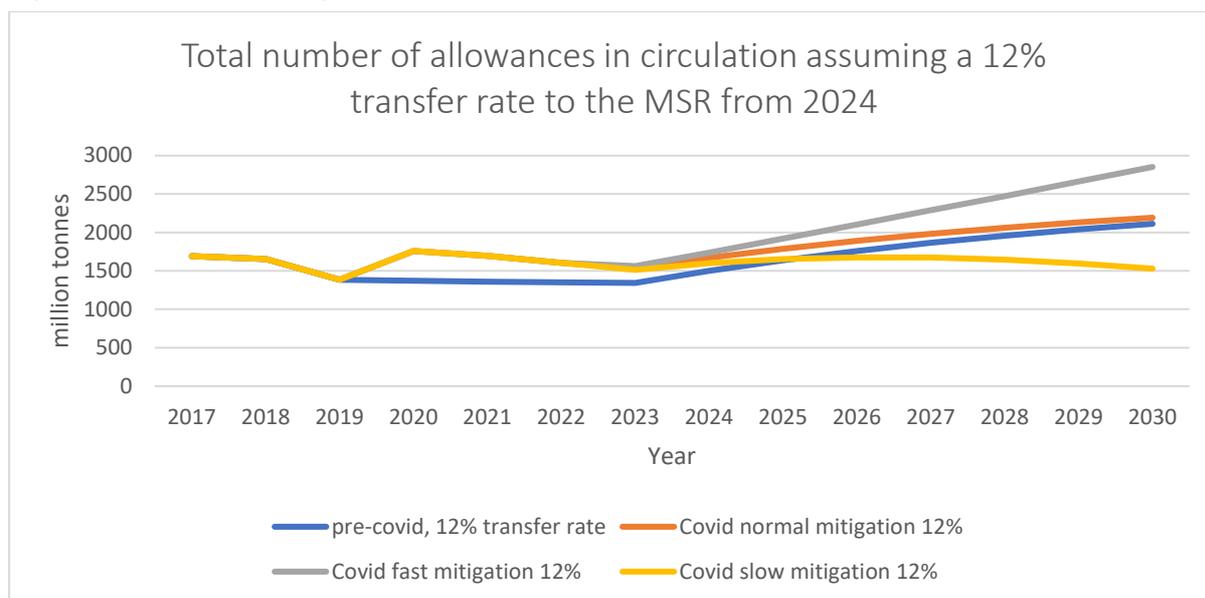
⁹ This figure represents the surplus that has accumulated since 2008.

¹⁰ https://ec.europa.eu/clima/sites/clima/files/ets/reform/docs/c_2020_2835_en.pdf.

¹¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32015D1814>.

¹² Burtraw, D., Keyes, A., Zetterberg, L., Companion Policies under Capped Systems and Implications for Efficiency – The North American Experience and Lessons in the EU Context. 2018. IVL-report C312, available at www.ivl.se.

Figure 2. Total number of allowances in circulation with a 12% MSR withdrawal rate

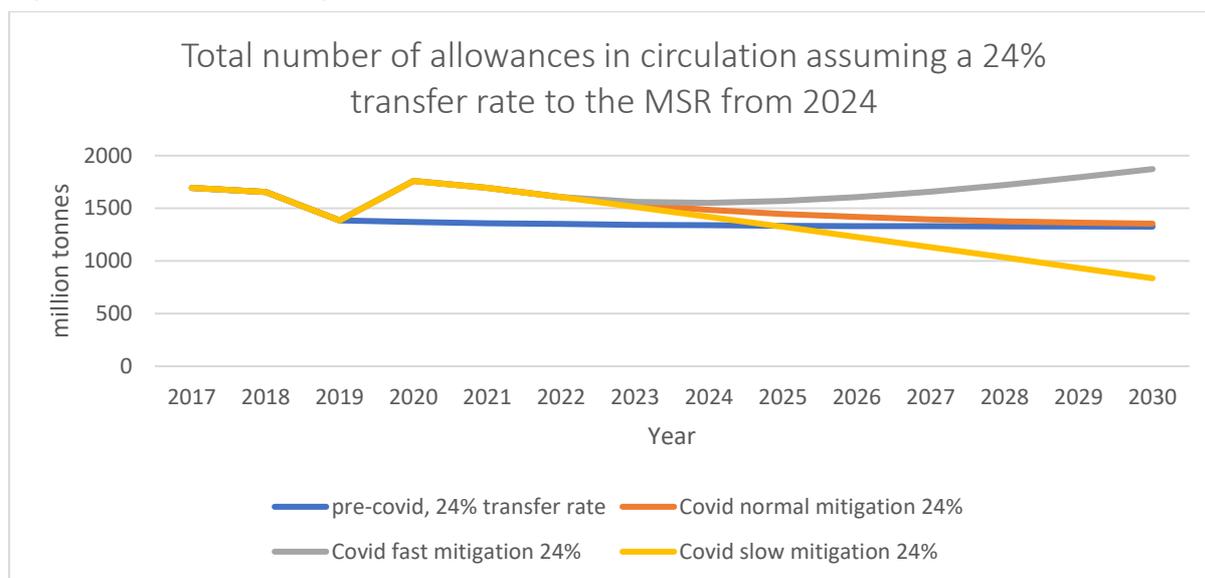


With a 12% withdrawal rate from 2024 onwards, the TNAC would start expanding again after 2023 under every emissions scenario. Even if emissions reductions were relatively limited at 1.1% per year, by 2030 the TNAC would still be around the same level as today. In all emissions scenarios, the TNAC is sustained above 833 million tonnes, meaning that the annual auction volume is reduced, and allowances are fed into the reserve where they are later invalidated. While a high TNAC leads to continued reductions of the auction volume, the annual auction reduction by 2030 would still be less than in 2019, even with a TNAC as high as three billion (360 million versus 397 million in 2019). Only if the TNAC drops below 833 million would the MSR stop intervening in the market; a level agreed in the legislation.¹³

If the withdrawal rate is instead maintained at 24%, the TNAC remains largely stable if emissions drop in line with the cap trajectory of 2.2% ('normal mitigation'). But it is noteworthy that even in the slow mitigation scenario (1.1% per year), the TNAC remains above the 'non-intervention' limit of 833 million allowances over the decade until 2030. Under these scenarios, the MSR would reduce auctions by roughly similar amounts to today, with a maximum of 470 million allowances removed from the auction supply by 2030 under the 'fast mitigation' scenario of a 3.3% annual reduction, and 200 million by 2029, followed by no intervention in 2030 under the 'slow mitigation' scenario of 1.1% annual emissions cuts.

¹³ Below a TNAC of 400 million, allowances held in the MSR will be reintroduced to the auction schedule. However, in the scenarios analysed in this report this level is never reached.

Figure 3. Total number of allowances in circulation with a 24% MSR withdrawal rate



The MSR review planned for 2021 is therefore a key moment to revisit its parameters. In fact, even the 24% rate may not be sufficient if the economic downturn is prolonged or if mitigation continues at the pace we saw before the Covid-19 crisis. If it is considered desirable that the TNAC drops below the 833 million ‘non-intervention’ level before the 2030s and therefore stops adjustments to the auction volume earlier, a higher rate than 24% would be required, even if emissions reductions slow down.

The Commission’s current TNAC of 1.39 billion (published in May 2020) does not yet account for the lower emissions of 2020 and is therefore likely to grow again, even when accounting for the allowances withheld from auctions that need to be subtracted.¹⁴ The greater the number of allowances withheld from auctions, the greater the number of allowances permanently removed (‘invalidated’) after 2023. Under the different scenarios, the total volume of invalidated allowances ranges from 3.5 to 4.8 billion, about two to three times 2019 ETS emissions.

We conclude that the 12% withdrawal rate of the MSR is therefore insufficient to stabilise the carbon market after 2023. The 24% withdrawal rate is still sensitive to emissions trends: in the case of slowed down mitigation efforts the TNAC approaches (but does not quite reach) the ‘non-intervention’ level by 2030, and in the case of continued rapid emissions reductions, the TNAC keeps expanding while accumulated invalidations are also larger.

¹⁴ See European Commission documents (footnote 9 & 11) for the precise way in which the TNAC is calculated.

2. Impact of sustained surpluses on carbon prices

If the allowance surplus keeps expanding, estimates show that the ETS price may go down (ICIS, 2020). Expectations of increased future scarcity due to the MSR review and emissions reduction targets may prevent prices from falling, but the outcome is uncertain.

Cap and trade systems such as the EU ETS have an anticyclical property: as emissions decline along with economic activity, so does the carbon price. Compared to carbon taxes, for instance, this property is beneficial in the short term, limiting carbon costs for industry in times of economic recession. The EU ETS is also intended to be a cost-effective climate policy. From that perspective, lower prices are desirable as climate objectives are met at the lowest costs.

However, while this perspective may be sensible from a short- and medium-term perspective, i.e. 2030 which the current cap trajectory reflects, it may not hold for the longer term when climate neutrality should be reached. At lower carbon prices, some energy-intensive industries will not commit to radical low-carbon innovation, as the costs for these investments cannot be justified. For the electricity sector, lower carbon prices make it more difficult to invest in new renewables capacity.

A carbon price floor may be seen as an attractive alternative, or complement, to ensure that the ETS supports low-carbon investments.¹⁵ Such a price floor has been proposed before and is controversial for a number of reasons. These objections have been analysed and rebutted in a *Climate Policy* article (Flachsland et al., 2020)¹⁶ and CEPS report.¹⁷

Some see a price floor as tantamount to a tax and therefore requiring unanimity to implement. However, Fischer et al. (2018) reject this claim. Some stakeholders point towards the ETS' quantity-based design and think a price floor is therefore incompatible. However, a pure quantity target is not necessarily optimal; rather it is the consequence of a scientifically informed regulatory negotiation. From economic theory, a hybrid instrument that combines elements of quantity and price regulation could be superior to either approach taken alone for regulating greenhouse gas emissions under uncertainty (Flachsland et al., 2020).

Nevertheless, one issue could constitute a more significant obstacle from the perspective of the political capital required for agreement to be reached between 27 member states and parliament: even if the legislators agree that a price floor is merited, there may be disagreement as to the appropriate price level. A price floor that exceeds the current ETS price

¹⁵ Strictly speaking, the ETS only “promotes emissions reductions” as per Article 1 of the EU ETS Directive. Opinions differ on whether the ETS should directly support low-carbon investment.

¹⁶ Christian Flachsland, Michael Pahle, Dallas Burtraw, Ottmar Edenhofer, Milan Elkerbout, Carolyn Fischer, Oliver Tietjen & Lars Zetterberg (2020), How to avoid history repeating itself: the case for an EU Emissions Trading System (EU ETS) price floor revisited, *Climate Policy*, 20:1, 133-142, DOI: [10.1080/14693062.2019.1682494](https://doi.org/10.1080/14693062.2019.1682494).

¹⁷ https://www.ceps.eu/wp-content/uploads/2018/12/EU%20ETS%20Carbon%20Price%20Floor_Myths%20and%20enlightenment%20final.pdf.

would raise the spectre of industrial competitiveness, while a price level below the current price could raise questions about what the added value is compared to the MSR.

A price floor below the current ETS price could nevertheless have benefits, even if it is never reached, as it provides insurance against further price drops, thereby protecting low-carbon investments. From the economic perspective of option theory, a price floor that precludes future low-carbon price outcomes would reduce risk and the hurdle rate for new low-carbon investments. Besides investment, a price floor would also protect auction revenues and make them more predictable, which could be attractive in the context of the EU's own resources discussion. The floor level could be ratcheted over time. A price floor could also be designed as an auction reserve price so that it would, in principle, only affect the primary market through the auction supply, and not be a form of hard price regulation.

A price floor could also be implemented by only a few member states, following the UK's example (and indeed the Netherlands is investigating this) but this could be seen as fragmenting EU climate policy. In the end, the EU may shy away from opening up another east-west dividing line. It is noteworthy that member states that unilaterally introduce a price floor might realise less auction revenue, if the auction reserve price is not met.

A carbon price floor would represent a significant change in the design of the EU ETS. It would likely require significant political capital to agree on a new policy design. However, with ETS emissions already declining at a rapid pace before Covid-19 and the crisis accelerating this, policymakers will need to revisit the ETS and MSR design for the EU ETS to continue to be an effective climate policy tool not just for 2030, but especially for the 2050 ambition of climate neutrality.

3. Conclusions

- The ETS cap only reflects the reduction target of “at least 40%” for 2030. While the European Council has endorsed climate-neutrality for 2050, it has yet to agree on a new reduction target for 2030, such as the suggested 50 to 55%. Until the linear reduction factor reflects higher 2030 and 2050 ambitions, the short-term ETS performance may not reflect the EU's long-term climate policy.
- In the short term, we have already seen emissions being significantly reduced due to Covid-19. This will lead to an additional surplus of allowances in 2020 and 2021. We estimate, however, that most of these surpluses (over 80%) will be cancelled by the year 2030 due to the automatic invalidation mechanism of the MSR.
- If Covid-19 leads to sustained low emissions, the current MSR will not be able to prevent the TNAC from growing fast, which may lead to price declines. In general, the effectiveness of the MSR to handle supply-demand imbalances will rely heavily on future emission trends. The larger these imbalances get, the more important it will become to revisit and recalibrate the different mechanisms for dealing with supply-demand imbalances.

- The first feature of the MSR that should be revisited is the withdrawal rate of the MSR. A 12% withdrawal rate after 2023 would be insufficient to address the growing supply-demand imbalances following a Covid-19 economic downturn. The MSR review should consider increasing the withdrawal rate further from 24%.
- If there is a desire to support low-carbon investments more directly through the ETS price signal, a carbon price floor should be considered. This price floor can be set as an auction reserve price below the current carbon price (close to €20) to act primarily as an insurance mechanism, so that the carbon price is sustained at a level that incentivises private sector investments, which trigger energy transformation.
- When considering a price floor mechanism, the impact on automatic invalidation from the MSR should be considered. After 2023, allowances held in the MSR that exceed the previous year's auction volume will automatically be invalidated, thereby dynamically strengthening the cap based on previous performance. With 2019 ETS emissions already down by 8.9% and the Covid-19 downturn adding to this, the number of allowances that will be invalidated in 2023 is growing as well.
- Hybrid solutions are possible: currently the MSR only adjusts the auction volume if the TNAC exceeds 833 million. This trigger could also be replaced with a price trigger, e.g. the auction volume would be reduced by a given percentage if the average ETS price in the preceding 12 months was lower than a given amount in euros.
- The MSR review also offers a chance to simplify other design levers, such as the intervention thresholds of 400 and 833 million. These thresholds reflect power sector hedging demand at the time of the first MSR proposal, but there is no fundamental reason why the MSR needs a (relatively narrow) corridor where no adjustments are made to the auction supply.

Annex: calculating the accumulated effects of the Covid-19 crisis

From 2021 onwards, it is difficult to estimate the impacts on emissions due to Covid-19. If the lower economic activity in 2020 is sustained for several years, it is likely that emissions will also be low after 2020. If the economy recovers quickly and investments are directed towards renewable energy and cleaner industrial processes, this may also lead to emissions being reduced at a fast rate. In 2019, before the Covid-19 crisis, coal-based power had been reduced by 24% in the EU. However, if these investments are instead directed towards older, fossil technologies, we may see emissions being reduced at a slower pace. We have therefore studied three scenarios: where emissions are reduced at the same rate as the linear reduction factor (LRF) (2.2%), at a faster rate (3.3% per year) and at a slower rate (1.1% per year).

12% transfer from 2024

For these three emission scenarios, we first assume that the feed-in rate to the MSR is according to current rules, i.e. 24% to 2023 and 12% from 2024 onwards. Our calculations show that for all three scenarios the TNAC will be at least 1.5 gigatonnes (Gt) throughout the decade, with a high value of 2.9 Gt for the fast mitigation scenario. Therefore, regardless of the post-Covid-19 emission scenario, the TNAC is not likely to be low, but could be significantly large. In addition, we estimate that a total of 3.5-3.8 Gt of allowances will be cancelled up until 2030.

24% transfer from 2024

We have studied the same emission scenarios assuming that the transfer rate is kept at the higher rate of 24% per year from 2024 onwards. Our calculations show that in the fast mitigation scenario the TNAC grows to 1.9 Gt, and in the slow mitigation scenario the TNAC is reduced to 835 megatonnes (Mt), just above the threshold of 833 Mt when transfers to the MSR stop. It is interesting to note that regardless of which emission scenario we study, in every year from 2023 to 2030, allowances will be transferred to the MSR and the amount of allowances to be auctioned will be reduced. We estimate that a total of 4.2 to 4.8 Gt of allowances will be cancelled up until 2030.

Scenario	TNAC in 2030 (Gt)	Accumulated EUA invalidation from MSR (Gt)
Pre-Covid, 12% transfer rate	2.1	3.3
Pre-Covid, 24% transfer rate	1.3	4.1
Covid normal mitigation 12%	2.2	3.7
Covid normal mitigation 24%	1.4	4.5
Covid fast mitigation 12%	2.9	3.8
Covid fast mitigation 24%	1.9	4.8
Covid slow mitigation 12%	1.5	3.5

Unit: billions of tonnes of EU emission allowances (EUAs)



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