# European carbon market to shift gears


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## Scenario-based impact analysis of the market stability reserve in context of the EU ETS review

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As the EU ETS starts its fourth trading phase (2021-2030), market participants are looking for direction on how new carbon legislation will affect the market in the coming years. Amid the large number legislative processes in the pipeline related to the EU ETS, the Market Stability Reserve (MSR) review and the EU climate law stick out as the most prominent discussions this year.

The MSR review and the EU ETS reform need to be considered in tandem, as the interplay between these policy measures is significant. While the 2030 emission reduction target determines the overall ambition of the market, the MSR remains an important price driver for the period until this change happens. Decisions taken in this regard will be critical, as they will determine whether the MSR plays a more prominent role increasing market scarcity or stays in the back to be activated only in times of systemic shocks.

In order to simulate the interplay between MSR parameters and cap trajectories, we run a consistent set of 26 scenarios. Further, we introduce a self-adjusting MSR setting, adjusting withdrawal rates as a function of oversupply and decreasing thresholds accounting for a continuous decarbonising economy.

Our modelling suggests that a review of the MSR settings remains particularly important for the middle part of the fourth trading period (TP4), mainly defining the market balance during the years 2024 to 2026. With the 2030 cap setting being revised, the MSR reduces its impact on the market balance and remains in place as a backstop in case of a system shock. Our modelling highlights that re-basing the cap at an early stage results in the most steady price trajectory bridging towards a higher climate ambition and decreasing the importance of the MSR as a scarcity provider.

**MSR**

Our modelling highlights that re-basing the cap at an early stage results in the most steady price trajectory

### The MSR is up for review

The MSR decision was adopted in October 2015, and the MSR started to reduce auction volumes in January 2019. The aim of the MSR is to address the oversupply of allowances in the EU ETS and to improve the system's resilience to supply-demand imbalances. In March 2018, the amendment to the EU ETS directive was adopted, setting the rules for the fourth trading period (2021-2030), and temporarily doubling

European leaders on 11 December 2020 agreed to raise the EU's emission reduction target to 55% in net terms (including carbon sinks) below 1990 levels by 2030.

the MSR withdrawal rate from 12% to 24% until the end of 2023.

The decision includes a review clause calling for a check-in of the mechanisms functioning in 2021 and periodically thereafter. The European Commission held its first workshop discussing the matter on 3 December 2020.

## The EU climate law adding to the complexity

European leaders on 11 December 2020 agreed to raise the EU's emission reduction target to 55% in net terms (including carbon sinks) below 1990 levels by 2030. This mirrors the proposal made by the European Commission in September 2020. The European Parliament pushed for a target of 60% emission reductions compared with 1990 levels in two votes at the beginning of October 2020. Ongoing trilogue negotiations are expected to end in a compromise in March. For the sake of our modelling, we attribute the highest likelihood to a scenario with a 55% net reduction target and use this as a base assumption for all modelling carried out in this report. We also assume a higher burden for ETS-related emissions compared to the Effort-sharing sectors of 35% EU ETS versus 65% non-ETS sector emissions in 2030.

The Commission announced to put forward legislative proposals for the implementation of such target by June 2021. These proposals will include:

- Cap trajectory and linear reduction factor adjustment for the EU ETS
- Burden sharing of emission reductions between the EU ETS and Effort-sharing emissions
- Potential proposal for re-basing the cap

All of these factors have obviously a significant impact on how the market balance develops over time, how the EUA price performs and how the market stability reacts within this environment.

We therefore run a consistent set of 26 scenarios to identify the interplay between the different factors related to the ETS reform and the MSR review, also including a proposal for a more dynamic MSR parameter setting.

## Scenario analysis: Interaction of MSR review and ETS reform

The MSR review could lead legislators to amend the MSR parameters, including the withdrawal rate and the thresholds. We first look at the isolated effect of changing MSR parameters in the context of a 55% net reduction target by 2030 to identify the working principle of the mechanism in a tightening market environment. That is followed by the introduction of several rebasing scenarios and their interplay with the MSR. As a last step, we introduce and analyse a proposal for a self-adjusting MSR setting to overcome the sub-optimal step-function approach of the current MSR parameters. All scenarios run under the assumption that UK installations would not be linked to the EU ETS.

**26**

We run a consistent set of 26 scenarios to identify the interplay between the ETS reform and the MSR review

## Isolated effect of changing MSR parameters (threshold, withdrawal rate, aviation sector)

This section focuses on scenarios where we adjust the different known MSR levers such as thresholds, withdrawal rate, aviation sector accounting. Table 1 highlights the different scenario settings and the shading marks the difference compared to the current regulatory setting. The two columns to the right indicate the number of years where our modelling results in the MSR reducing auction volume and the cumulative TP4 MSR withdrawal volume.

**€60/t**

Both scenarios assuming a 24% withdrawal rate result in a significant price increase in 2024 and 2025 towards €60/t compared to the other scenarios

By merely changing these parameters, we conclude that:

- A reduced upper threshold increases the number of years during which the MSR is triggered
- The higher the withdrawal rate, the higher the volume of EUAs being transferred to the reserve for each MSR withdrawal
- Not accounting for aviation EUA demand (current legislation) when calculating the total number of allowances in circulation (TNAC) causes the TNAC to remain on a higher trajectory, therefore triggering the MSR more often.

The business-as-usual scenario (scenario 1), continuing the aviation sector demand from being excluded in the TNAC calculation, results in the TNAC plateauing at the highest level of all scenarios tested, approaching the upper 833m threshold in 2023 and hovering around it for the remainder of TP4. The MSR withdraws allowances for all years except 2026 and 2030. Testing different withdrawal rate settings after 2023 (12%, 18%, 24%) while maintaining the thresholds unchanged (833/400m), shows the MSR stopping to withdraw allowances after 2025, as the TNAC is pushed below the upper 833m threshold during the 2021-23 period (scenarios 2, 3, 4).

Aligning the upper and lower thresholds to lower TP4 hedging requirements, choosing 600m and 200m as of 2024, results in three additional years of MSR withdrawal in a 12% withdrawal rate scenario, or 229m allowances compared to maintaining the 833/400m thresholds (scenario 7). Increasing the withdrawal rate to 18% or 24% (scenarios 5 and 6) with the lowered thresholds results in additional volumes moved to the reserve, with the 24% scenario triggering one year less than the 12% and 18% scenarios.

Our EUA price modelling of the different MSR settings shows that the EUA price in the mid- to long-term is significantly influenced by how the MSR operates. Chart 1 highlights the EUA price trajectories associated with the outlined scenarios. Both scenarios assuming a 24% withdrawal rate (scenarios 3 and 5) result in a significant price increase in 2024 and 2025 towards €60/t compared to the other scenarios, as the higher withdrawal rate results in scarcity. The 24% scenario in combination with the 833/400m thresholds (scenario 3) results in a steady price around the €40/t level for the remainder of TP4 as the MSR does not get triggered post-2025. The decreased thresholds (600/200m) in scenario 5 cause a price increase towards €50/t as the MSR gets triggered again late in TP4.

**Table 1: Scenario-matrix on isolated MSR effect**

| Name | Thresholds as of 2024 | Withdrawal rate as of 2024 | Rebasing | Aviation in TNAC | UK ETS linked | Years with MSR withdrawal | Cumulated TP4 withdrawal |
|---|---|---|---|---|---|---|---|
| **1_833_12%_exclaviation** | 833/400 | 12% | No | Excluded | No | 8 | 1343 |
| **2_833_12%** | 833/400 | 12% | No | Included | No | 5 | 1138 |
| **3_833_24%** | 833/400 | 24% | No | Included | No | 5 | 1324 |
| **4_833_18%** | 833/400 | 18% | No | Included | No | 5 | 1231 |
| **5_600_24%** | 600/200* | 24% | No | Included | No | 7 | 1474 |
| **6_600_18%** | 600/200 | 18% | No | Included | No | 8 | 1453 |
| **7_600_12%** | 600/200 | 12% | No | Included | No | 8 | 1367 |
| **8_Brexitadj_12%** | Brexit-adjusted** | 12% | No | Included | No | 5 | 1138 |

Note: Shading highlights the changes compared to the current regulatory setting
*The reason for lowering the thresholds is due to the continued decarbonisation of the power sector over 2021-2030. With decreasing emissions, the power sector will have lower hedging needs. The 600m level is an approximate hedging requirement we estimate for utilities at the beginning of TP4.
**Assuming a pro-rata reduction of thresholds accounting for the share of the UK auction volume of the total TP3 auction volume. This is equivalent to 11.56% and would be reflected in the thresholds as of 2024, in order to account for the UK-rebasing. Such adjustment should be made to reflect the lower cap as a result for the UK leaving the system. Per current legislation the MSR trigger would be the minimum withdrawal volume of 200m tons until 2023 and 100m tons as of 2024. With UK installations not covered by the EU ETS anymore, changing these minimal withdrawal volume requires an active change of the MSR regulation.

**Chart 1: EUA price trajectory on isolated MSR effect**

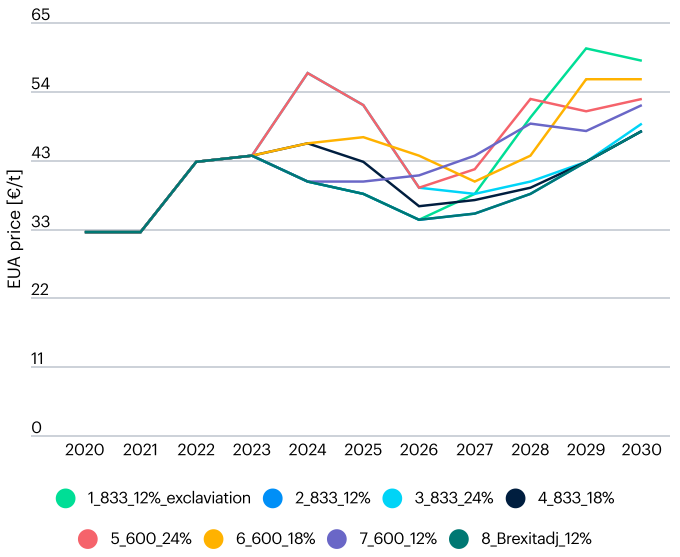
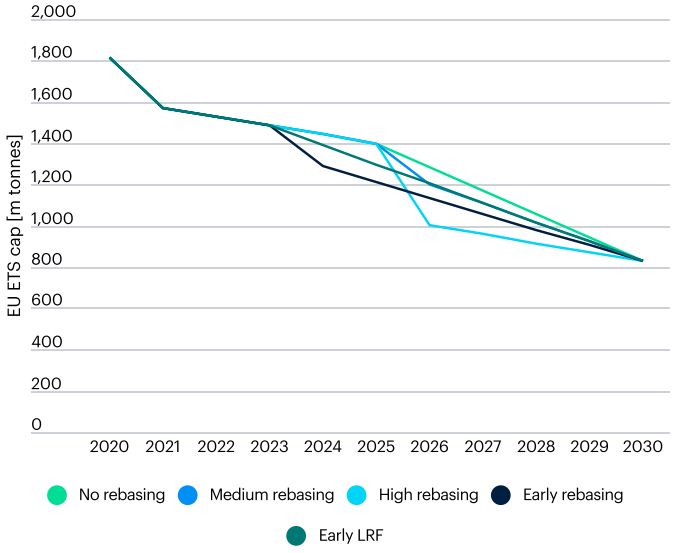



**Chart 2: Rebasing scenario cap trajectories**




This price support towards the end of TP4 is seen also for other scenarios with the reduced 600/200m threshold assumption, the combination with a 12% withdrawal rate results in the steadiest upwards pointing price trajectory (scenario 7). The exclusion of the aviation sector demand in scenario 1 leads to a significant price spike towards the end of TP4, as the market balance gets tighter while the MSR continues to withdraw on the basis of a higher-than-realistic TNAC. All scenarios assuming a continued 833/400m threshold setting (except for the aviation scenario) result in an upward pointing price trajectory during the second half of TP4 at the low end of the scenario range (scenarios 2,3,4). The dip in mid-TP4 is much more pronounced with 833/400m threshold scenarios than with the lower 600/200m thresholds.

## Interaction of MSR setting with rebasing scenarios

Within the European Commission impact assessment, the option of rebasing the cap towards a lower trajectory during phase 4 is mentioned without being very specific on modalities. In order to assess the interplay between a re-based TP4 cap and the MSR operation, we designed four different rebasing scenarios. Chart 2 depicts the different rebasing trajectories.

- High rebasing: When the cap is shifted towards the 55% target trajectory, the LRF is capped at 2.0%. This requires a reduction of 398m tons in 2026 compared to the previous year and results in a 709m tons lower TP4 budget compared no rebasing
- Medium rebasing: Halves the impact of the high rebasing scenario during the year of implementation to 198m tons, resulting in a 212m tons lower carbon budget for TP4 compared to no rebasing
- Early LRF change: Instead of applying the change towards a higher 55% ambition in 2026, it already happens in 2024. This limits the LRF to 4.3% for the years 2024 to 2030, about one percentage point lower than the no rebasing scenario. This reduces the TP4 cap by 355m compared to the no rebasing scenario.
- Early rebasing: On top of the 2024 trajectory change, the same annual rebasing takes place as in the medium rebasing scenario, so 198m tons in 2024 compared with the previous year, resulting in 722m fewer allowances in TP4 compared to no rebasing.

In order to evaluate the MSR interaction with the different cap trajectories, we run the same set of MSR scenarios as above against different rebasing scenarios as explained by Table 2.

By analysing the interplay of rebasing scenarios with threshold setting, we conclude that:

**Table 2: Scenario-matrix Rebasing/MSR interplay**

| Name | Thresholds as of 2024 | Withdrawal rate as of 2024 | Rebasing | Aviation in TNAC | UK linked | Years with MSR withdrawal | Cumulated TP4 withdrawal |
|---|---|---|---|---|---|---|---|
| **12_833_12%_mediumRebase** | 833/400 | 12% | Medium | Included | No | 5 | 1138 |
| **13_833_12%_highRebase** | 833/400 | 12% | High | Included | No | 5 | 1138 |
| **14_833_12%_earlyLRF** | 833/400 | 12% | Early LRF | Included | No | 5 | 1138 |
| **15_833_12%_earlyRebase** | 833/400 | 12% | Early | Included | No | 5 | 1138 |
| **16_600_12%_mediumRebase** | 600/200 | 12% | Medium | Included | No | 7 | 1293 |
| **17_600_12%_highRebase** | 600/200 | 12% | High | Included | No | 5 | 1145 |
| **18_600_12%_earlyLRF** | 600/200 | 12% | Early LRF | Included | No | 6 | 1216 |
| **19_600_12%_earlyRebase** | 600/200 | 12% | Early | Included | No | 6 | 1212 |

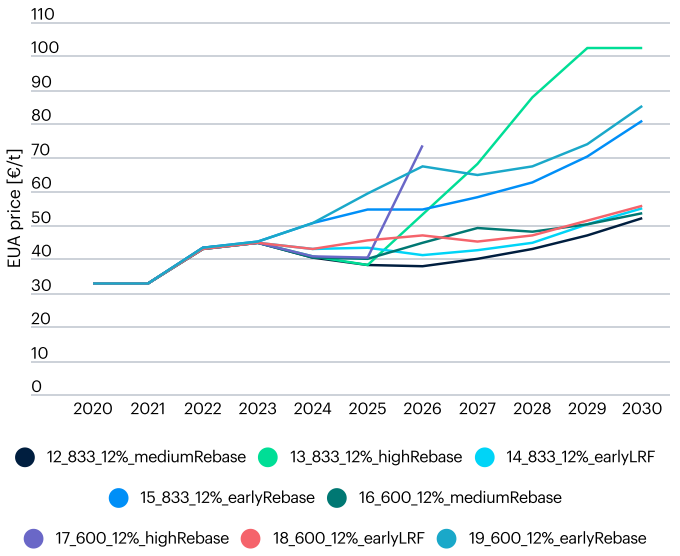
Note: Shading highlights the changes to the set of scenarios in the previous section

Our modelling shows that high rebasing scenarios cause stress for the market balance

- High rebasing as defined by our assumptions would be disruptive to prices and market balance as a result of a too-high one-off cap reduction, irrespective of MSR setting
- Early rebasing seems most compatible with the current MSR setting or a lower threshold in terms of producing a steady, non-disruptive price signal
- Medium rebasing produces only a very temporary price effect compared to non-rebasing, same holds true for early LRF change.

The high rebasing scenarios (13 and 17) cause stress for the market balance due to the significant reduction in the cap. For both scenarios, the TNAC drops quickly below the 600m allowance level when the rebasing takes place, resulting in no post-2025 MSR withdrawal and the TNAC approaches the 400m tons level by 2030. The medium rebasing scenario with the 833/400m thresholds in place (scenario 12) results in the same MSR operation as without rebasing, given the upper threshold being undercut by the TNAC early on, leading to a slightly more pressured market balance as a result of the tightened TP4 cap. Combining the medium rebasing with lower 600/200m thresholds (scenario16) causes the MSR to be triggered for two additional years, resulting in 155m additional withdrawal compared to the higher thresholds.

**Chart 3: EUA price trajectory Rebasing/MSR interplay**




When comparing both early LRF scenarios (14 and 18), assuming an LRF change already in 2024 compared to 2026 as in all other scenarios, the MSR is triggered also in 2026 for the lower threshold (scenario 18). The early rebasing scenarios (15 and 19) show the same MSR reaction, albeit with the early rebasing scenarios producing a lower TNAC than the early LRF scenarios.

A high rebasing in combination with the 833/400m thresholds and a 12% withdrawal rate leads to a significant and sharp EUA price increase towards €100/t and beyond (scenario 13). For scenario 17 the available short-term abatement required in our model to solve the market is not sufficient, hence our modelling stops to produce results after 2026. Meanwhile the two early rebasing scenarios (assuming both sets of thresholds) display a continuous and steady price trajectory (scenarios 15 and 19). Medium rebasing and early LRF change scenarios result in a

The current MSR setting results in a step-function like operation

rather flat price trajectory between €40/ and €50/t as of implementation.

## Increasing the dynamic of the MSR parameter adjustment

From the scenario analysis above we conclude that one of the issues with the current MSR settings is the erratic nature of the MSR withdrawing allowances when the TNAC approaches the upper threshold. This can lead to situations where the withdrawal of hundred million allowances depends on the marginal ton that pushes the TNAC above or below the upper threshold. In that context, we have analysed various approaches and developed a methodology that would smoothen the effect of the MSR operation and avoid a step-function like operation. The overall MSR concept remains identical as the original and changes are proposed only in terms of adding a dynamic element to the parameter setting.

As analysed above, different MSR parameters will translate into different surplus dynamics, different price trajectories, and therefore different investment signals for abatement technologies.

In the following section, we analyse a potential new setting of MSR parameters resulting in a more dynamic and less disruptive approach for a smoother functioning of the mechanism and market.

The below methodology would automatise the mechanisms functioning. The proposed setting works in a market that remains significantly influenced by power sector emissions. However, with a growing shortage in industry sector positions and increased holdings of non-compliance positions, the liquidity discussion must be considered in this context.

## Automatise withdrawal rate as function of oversupply

Historically we have seen many debates on setting the right level of the withdrawal rate. Namely that it should be high in times of high oversupply and low once the

The self-adjusting proposal lowers thresholds aligned to the cap and adjusts the withdrawal rate as function of oversupply

oversupply was shrinking. With the current MSR setting, the withdrawal rate is fixed at a higher level of 24% for the first five years of operation, dropping to 12% in 2024 for the remainder of phase 4. With the current MSR set-up, the level of the mechanisms withdrawal rate is static and does not differentiate between the TNAC barely undercutting the lower threshold and a close-to-balance market situation.

According to our analysis, flexibly adjusting the withdrawal rate to the oversupply in the market would help to prevent a situation where a TNAC slightly above or below the upper threshold results in auction volumes being reduced by some hundred million allowances or not.

## Thresholds declining as a function of a decarbonising economy

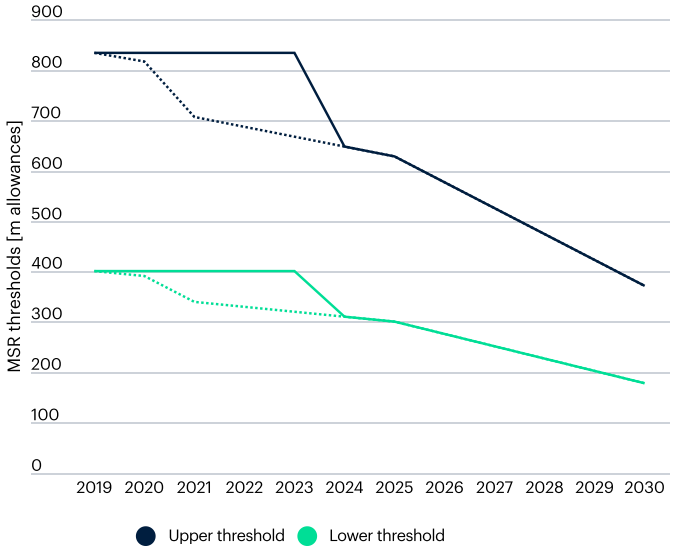
With the current MSR setting, the thresholds for triggering the MSR are fixed and do not reflect the decarbonisation of the European power sector as a result of steadily increasing renewable generation or coal plant closures across many European member states. The thresholds are fixed at 833m and 400m allowances. The static nature of the thresholds provide a situation where the MSR stops withdrawing allowances from the market in 2030 under the same conditions as in 2019, not accounting for a decarbonising economy.

The thresholds were set in order to guarantee the availability of physical allowances in a liquid market to allow power plant operators to hedge their positions. In a decarbonising economy, the thresholds could be aligned with required decarbonisation trajectories, resulting in a declining pathway as a function of the cap.

## The proposal in practice – a self-adjusting mechanism

We see the declining cap acting as a potential proxy for the threshold setting. Such approach would set the 833m and 400m thresholds in relation to the 2019 cap, the year when the mechanism started its first withdrawal. For 2019, 833m allowances in comparison to a cap of 1,854,716,380 allowances results in a share of 44.91%, the equivalent share of the lower 400m threshold would be 21.57%. This ratio is hence fixed and applied to all following annual cap decisions, so with a declining cap the thresholds decrease and the MSR trigger corridor narrows over time as depicted by chart 4. This also automatically accounts for cap changes such as in the case of UK installations leaving the market or potential future scope extensions.

**Chart 4: Thresholds as a function of cap**

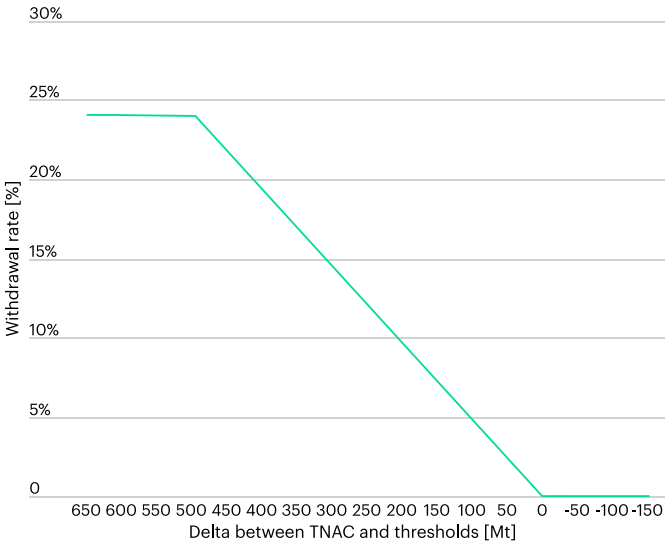



In our scenario we expect such “threshold rebasing” to take place in 2024 as depicted by the solid lines, when we also expect other review-related changes to be implemented and form the basis for our “dynamic threshold scenarios” below. However, the approach allows for time-flexibility and can be implemented in any given year (see dotted lines for in-between threshold adjustments).

The lower threshold is adjusted accordingly in relative terms compared to the cap, leading to a higher absolute change of the upper threshold due to the higher starting value. This results in a narrowing threshold channel over time.

The withdrawal rate is adjusted in order to remove the

**Chart 5: Definition of withdrawal rate dependent on distance of TNAC to thresholds**




step function of the mechanism as displayed by chart 5, depicting the dynamics for the upper threshold. According to our analysis, a suitable approach would be to adjust the MSR withdrawal rate linearly in line with the delta between the TNAC and the upper/lower threshold. The definition of the steepness of the adjustment curve as well as the cut-off point by which the withdrawal rate are subject to political decision-making processes and will continue to require a review, including:

- The cut-off maximum delta between the TNAC and the upper threshold
- The cut-off maximum delta between the TNAC and the lower threshold
- The maximum withdrawal and re-injection rates

Between the maximum delta and zero between TNAC and upper/lower threshold, the maximum withdrawal rate will decrease in linear fashion. As an example for the upper threshold: If the TNAC is 600m tons higher than the upper threshold, the withdrawal rate would be at the maximum, in this case 24%. If the delta between TNAC and upper threshold reduces to 300m, the withdrawal rate would be at 14%.

In practice, this would mean a higher impact by the MSR on the market balance in times of high oversupply and a lower impact in times of a more balanced market. Once the TNAC approaches the upper threshold, the withdrawal rate drops to zero. This takes away the "gaming potential" from the current MSR set-up and adjusts the auction supply the more, the higher the delta between the TNAC and the upper threshold.

The same approach holds true for the release of allowances from the reserve. The highest release takes place when the delta between TNAC and lower threshold is the highest, with the release dropping to zero in case the delta is zero or sub-zero.

As displayed by table 3, we have run a set of scenarios with the proposed self-adjusting MSR setting, also in context of different review scenarios.

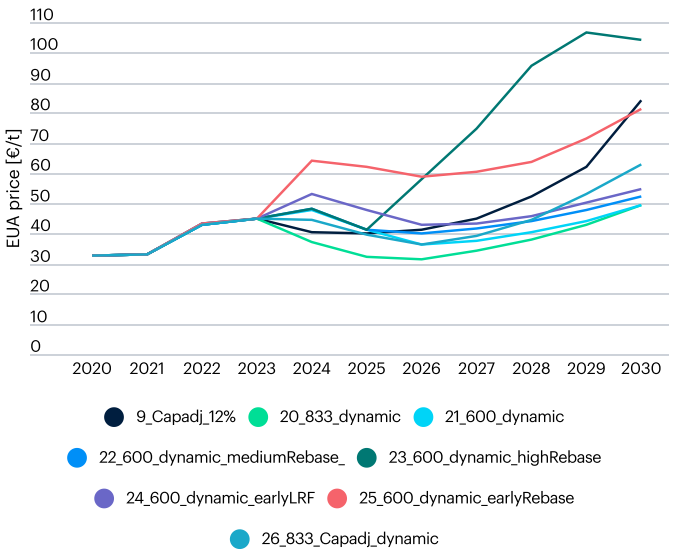
The cap-adjustment of MSR thresholds causes the MSR to be triggered during all

**Table 3: Scenario-matrix self-adjusting MSR setting/rebasing**

| Name | Thresholds as of 2024 | withdrawal rate as of 2024 | Rebasing | Aviation in TNAC | UK linked | Years with MSR withdrawal | Cumulated TP4 withdrawal |
|---|---|---|---|---|---|---|---|
| **9_Capadj_12%** | Cap-adjusted | 12% | No | Included | No | 10 | 1517 |
| **20_833_dynamic** | 833/400 | Dynamic | No | Included | No | 5 | 1034 |
| **21_600_dynamic** | 600/200 | Dynamic | No | Included | No | 9 | 1241 |
| **22_600_dynamic_mediumRebase** | 600/200 | Dynamic | Medium | Included | No | 8 | 1227 |
| **23_600_dynamic_highRebase** | 600/200 | Dynamic | High | Included | No | 7 | 1221 |
| **24_600_dynamic_earlyLRF** | 600/200 | Dynamic | Early LRF | Included | No | 8 | 1211 |
| **25_600_dynamic_earlyRebase** | 600/200 | Dynamic | Early | Included | No | 5 | 1208 |
| **26_833_Capadj_dynamic** | Cap-adjusted | Dynamic | No | Included | No | 10 | 1365 |

Note: Shading highlights the changes to the set of scenarios in the previous section

**Chart 6: EUA price trajectory self-adjusting MSR setting/Rebasing**




years of TP4, as the TNAC does not drop below the upper threshold (scenarios 9 and 26). In combination with a fixed 12% withdrawal rate (scenario 9), the MSR withdraws 1517m allowances between 2021 and 2030, the highest value of all analysed scenarios in this paper. While a dynamic MSR withdrawal rate by itself does not increase the number of withdrawal years compared to the fixed withdrawal rate scenarios above, the dynamic element ensures a smoothened withdrawal over time. This results in a more steady price trajectory compared to similar scenarios with a fixed rate (compare dynamic scenarios 20 to 25 with static scenarios 2 to 7 above). Combining the dynamic MSR withdrawal rate with several rebasing scenarios (22 to 25) shows a higher number of MSR trigger years compared to the static 12% withdrawal rate (scenarios 16 to 19).

The price trajectories of all scenarios including a dynamic MSR withdrawal rate remain close to the static counterpart, with a tendency to produce more steady trajectories over TP4 as depicted by Chart 6.

## Conclusions

Our modelling shows that the current MSR parameters ensure the market to remain tight until 2023, resulting in an increasing EUA price path. The 2030 target starts to impact the market balance as of the point when the LFR trajectory is changed, in most scenarios as of 2026. This effect gets amplified by a potential rebasing of the cap.

Therefore, we conclude that a review of the MSR settings remains particularly important for the middle part of TP4, mainly defining the market balance during the years 2024 to 2026. With the 2030 cap setting being revised, the MSR reduces its impact on the market balance and remains in place as a backstop in case of a system shock.

Our modelling shows that with an early rebasing approach, the MSR-related market impact gets reduced with the long-term ambition setting the tone. The most steady price trajectory is provided by combining current or slightly changed MSR parameters with an early rebasing approach (scenarios 15, 19, and 25) while a too ambitious rebasing would be disruptive for the market balance (scenarios 13, 17, and 23).

Adjusting the EU ETS cap early during phase 4 reduces the MSR impact on the market balance

When looking at the impact of different MSR parameters, the MSR threshold setting requires most attention to avoid a step-function approach and to align with liquidity requirements in a decarbonising economy. The ICIS self-adjusting MSR proposal takes these conclusions into account, resulting in a more seamless operation of the MSR, accounting for market scarcity in a phased-approach.

In the current market setting with power emissions present, the ETS and with it the MSR are meaningful instruments to provide incentives to reduce emissions. Accounting for hedging requirements will likely be a good-enough proxy for providing liquidity to the EU ETS until 2030. However, with a high-speed decarbonisation in the power sector, industry sectors will get more and more attention to deliver towards the long-term EU emission reduction targets. The short

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position for industry sectors increases significantly over the course of TP4, as free allocation is steadily reduced and the stockpile of banked allowances decreasing. Discussing options to unlock a higher decrease in industry emissions over time should take place either during this reform process or shortly thereafter and is likely not for the MSR to trigger these investments but for a more robust target setting framework.

**Chart 7: EUA price trajectories all scenarios**