Supply and demand in the EU ETS: powering through the cap

sandbag
smarter climate policy

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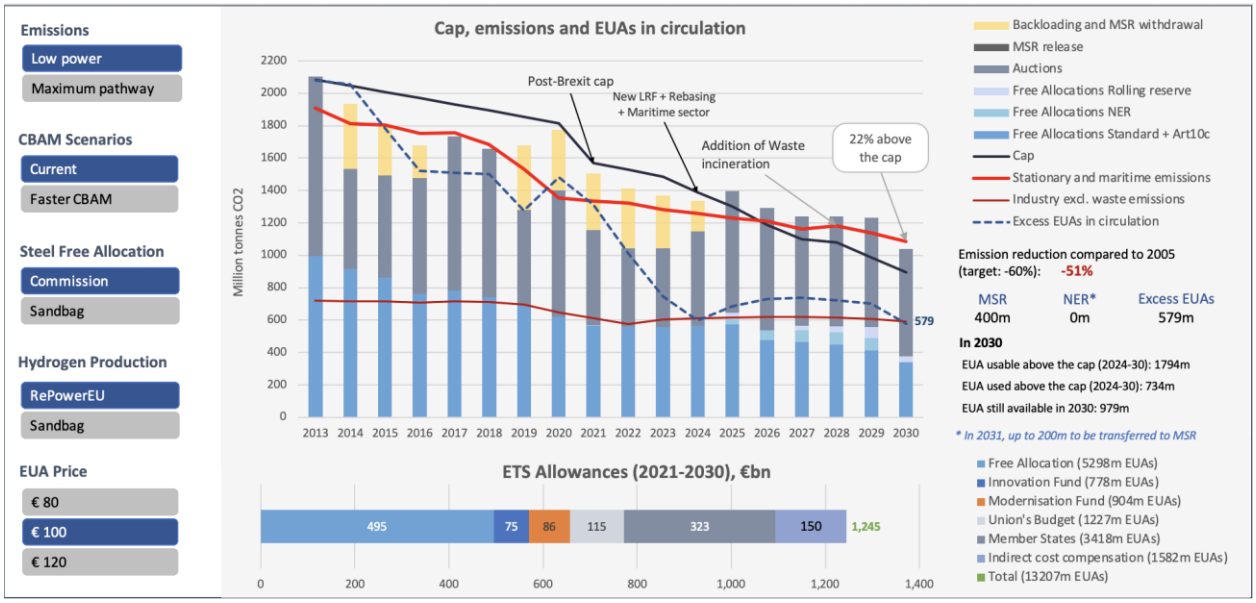
Key Messages

- The reform of the EU's carbon market adopted in May 2023 sets a more ambitious cap than its previous version, but many loopholes and wrong incentives for industry to decarbonise will cause emissions to exceed the scheme's cap.
- The bulk of the effort will rely on the power sector, at a time when all-out support to hydrogen production challenges the ability for electricity to decarbonise.
- It is still possible to avoid the worst scenario, by acting on the review of the Free Allocation Regulation (FAR) now, on the Carbon Border Adjustment Mechanism (CBAM) by 2025, and on support policies to hydrogen deployment.

The reform of the EU's carbon market is now voted. The deal was wrapped in December 2022 and was barely different from what the Commission had proposed nearly two years ago and for which we had analysed the supply demand impact in September 2021. In light of the energy crisis and multiple announcements regarding hydrogen, the situation has unfortunately worsened. If the electricity sector decarbonises according to plans, due to generous reserves still present in the system, the EU ETS is not set to force emissions down more than other policies already do, as it will retain a surplus of **nearly a billion spare EUAs at the end of the decade**. Even in this optimistic scenario, a lack of decarbonisation incentives set by the free allocation system could see emissions ending the phase **22% above the system's cap**.

Supply-demand in the 'low power' scenario



However, despite most of the parameters being set by the recently voted amendment, a number of uncertainties remain for the market, including the incentives set by the Free Allocation Regulation (FAR) which is currently being revised. So far, the Commission's proposals have been rather cautious and are unlikely to incentivise significant emission reductions from industry. In particular, the proposed revision fails to incentivise the use of scrap in steelmaking, which is the single largest abatement measure we have identified, with over **160m tonnes of CO2 reduction potential**.

Another uncertainty consists of the ramping-up of (green) hydrogen production. While the clean electricity used to produce it might possibly be *additional* (and therefore not slow down the decarbonisation of the power sector), it will more likely increase the demand for fossil-based electricity. In the REPowerEU case, promoted by the European Commission, 10 million tonnes of hydrogen are produced with little or no concern on *additionality*, which may lead power emissions to shoot up.

Such a scenario would make our "horror story" " Maximum pathway " scenario increasingly likely, where emissions covered by the ETS would follow the maximum trajectory possible. This situation of high-emission electricity would see rocketing carbon prices triggering little or no reaction to reduce emissions, due to badly set incentives, and emissions finishing the decade up to 33% above the cap.

This note reviews the carbon market's supply and demand balance with the newly settled rules and remaining uncertainty, using our ETS Simulator, which we updated for the first time since July 2022.

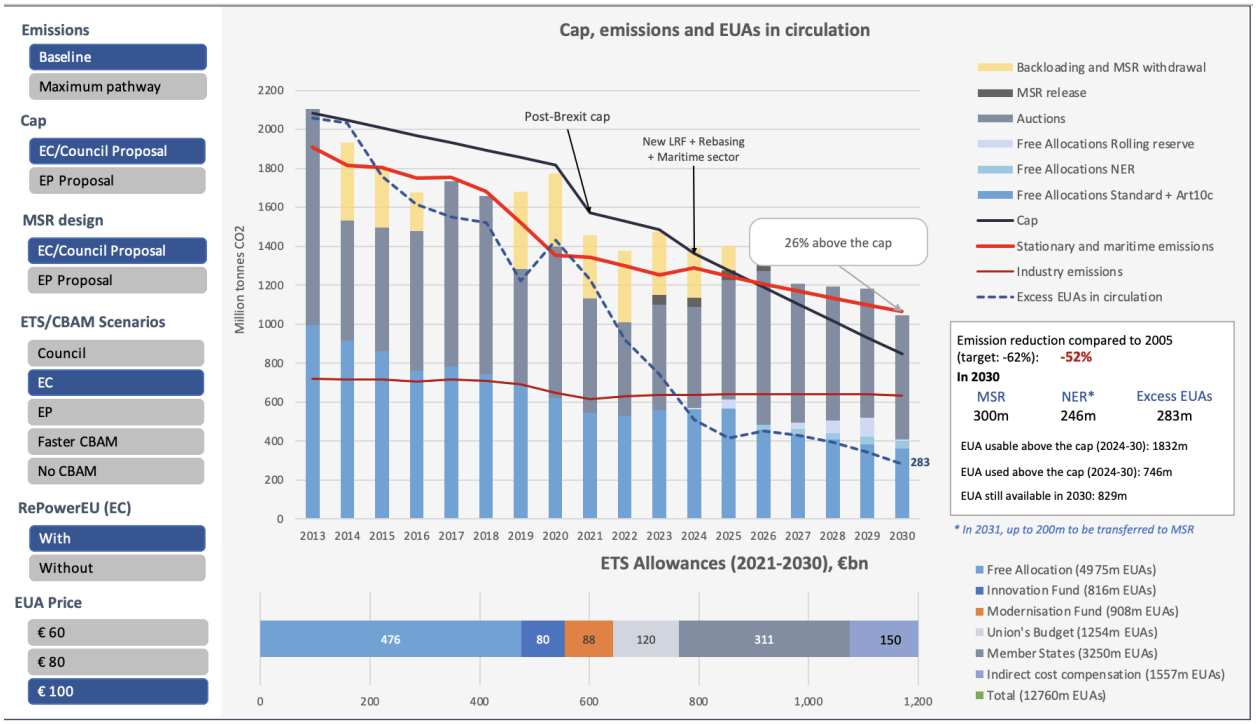
Table 1. EUA reserves and total surplus

EUAs (million)	2020	2021	2022	2023	2030
Allowances in circulation	1,479	1,313	1,015	746	579
NER*	331	327	333	350	-
Reserve of unallocated EUAs	-	79	141	200	0
MSR	1,925	2,633	3,001	425	400
Greece fund	25	25	25	25	0
Remaining from Phase 3	385	-	-	-	-
Total surplus	**4,145**	**4,376**	**4,516**	**1,746**	**979**

*The 2020 value take into account transfers from other reserves that actually occurred in early 2021

Overall, the final version of the EU ETS revision does not significantly change the market balance compared to the last version of our Simulator, which had already factored most of the changes. Our estimate of the total surplus of emission allowances in the EU ETS at the end of 2030 has however increased from 829 million to 979 million units under a " Low power " scenario working with some industrial decarbonisation. The comparison here is with the options proposed by the Commission regarding the cap, Market Stability Reserve (MSR) design, CBAM and RePowerEU financing, as illustrated on the below picture (the '2022 Commission's case') with also recent adjustments in emissions historical and pathway numbers.

Supply-demand in the '2022 Commission's case'



Demand

Our demand estimate **increased by 180 million** EUAs compared to the 2022 Commission's case, mostly driven by the addition of waste incinerators into the trading scheme and higher aviation emissions but partly mitigated by cuts due to the use of green hydrogen in industrial sectors such as steel and refining as a result of other policies. Our estimates take into account the latest verified emissions data for 2022.

2022 Emissions data update

In 2022, the stationary installations covered by the ETS emitted 1,322 million tonnes of CO2 with the data released by the European Commission on 4 May. This is 21 million more than our previous forecast and was explained by exceptional conditions on the gas market, partly prompted by the war in Ukraine, which caused an increased recourse to lignite in power generation.

Emissions in aviation rebounded strongly following the recovery of the travel industry after Covid-19, adding 7 million tonnes of CO2 from our last estimation.

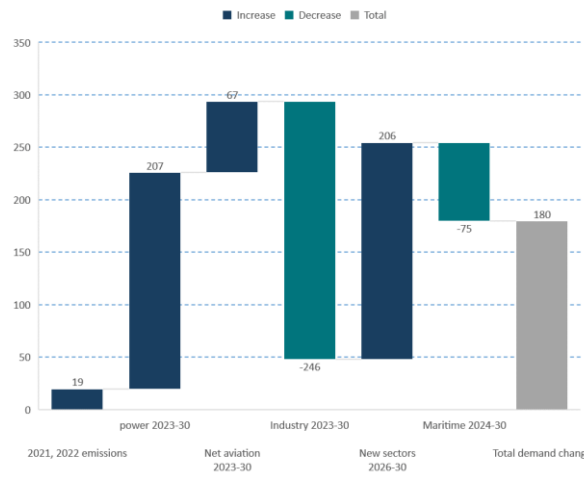
2023-30 emissions baseline

In our new '**Low power**' case, the emissions covered by the EU ETS over the period of 2023-2030 will be **160 million tCO2 more than in the 2022 Commission's case**. This breaks down as:

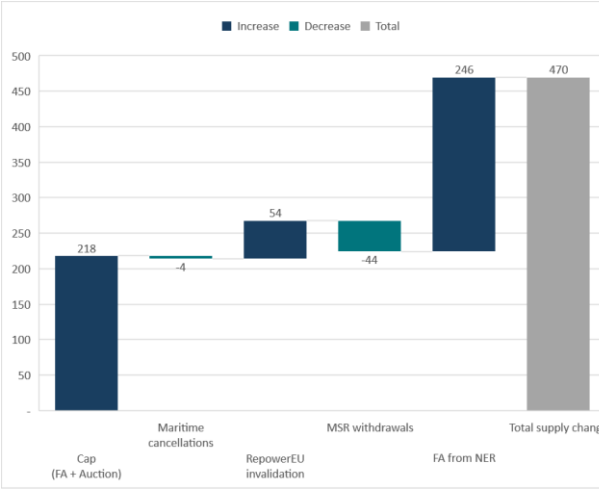
Power	An additional 207 million tCO2 for power, mainly driven by the higher emissions in 2022. In this scenario, power sector emissions decrease at a constant annual rate down to 65% below their 2015 level, as per the MIX scenario which the Commission calculated in its Impact Assessment (2021) as a result of a 32% renewable energy target by 2030. The MIX scenario was modeled focusing on the interaction of energy efficiency and renewable energy policies with carbon pricing. Due to the higher starting level after 2022's increase, we adjusted the annual reduction rate from -7.9% to -9.2% to meet the target.
Industry	A decrease of 246 million tCO2 for industry. The steel sector significantly contributes to this emission reduction. The annual production growth rate of the steel sector is based on Eurofer's market outlook, and emissions are reduced by the RePowerEU plan to use 1.5 million tonnes of "green" hydrogen for steel by 2030. Fuel Cells and Hydrogen Observatory's (FCHO) emissions data from grey hydrogen production was used, and the 2030 forecast for each hydrogen product is detailed in Sandbag's 2021 Hydrogen Report. These forecasts have been adjusted to align with the Renewable Energy Directive's RFNBO (Renewable Fuels of Non-Biological Origin) target. Up to 2030, cement production follows Eurostat Prodcom's 2017-2021 growth rate, and emissions are calculated based on 2022 actual cement emissions data accordingly. Emissions from the remaining sectors are based on GDP forecasts from the International Monetary Fund (IMF) until 2028, and from the Organisation for Economic Co-operation and Development (OECD) in 2029 and 2030, with a 0.5% annual improvement in carbon intensity.
Waste incineration	Emissions from waste incineration add 206 million to the demand during 2028-30.
Aviation	67 million tCO2 more net demand from aviation is expected from 2023 to 2030 compared to our previous estimates. Aviation emissions follow the growth path corresponding to Eurocontrol's traffic forecast until 2028, with -1% annual emission efficiency improvement until 2025 and -1.5% from 2026.
Maritime	75 million EUA demand has been reduced from the maritime sector, due to the adjustment of phase-in percentage. The sector will be fully covered by the EU ETS by 2026, after a phase-in period of 40% and 70% in 2024 and 2025.

Changes from the 2022 Commission's case

Demand



Supply



Supply

Our estimate of the supply over the 2021-30 period is up 470m EUAs, mostly driven by changes to the cap, increased drawdowns from the New Entrants Reserve and and free allocation to hydrogen production.

Cap

Increases in the cap are assumed to provide +218m more EUAs compared to our previous version, mostly thanks to the inclusion of waste incinerators (+197m). Extra supply is also expected from a spilt reduction in the cap (rebasing) of -90 million and -27 million EUAs in 2024 and 2026, whereas our previous version assumed a single 117m drop in 2024. The slight increase in Linear Reduction Factor (LRF) from 4.2% to 4.3% for 2024-27 and to 4.4% for 2028-30 period ultimately does not neutralise the increase in supply.

An additional 54m EUAs are expected from the blocking of MSR invalidation in 2024 and 2025, as part of the REPowerEU financing plan to compensate the effect of the frontloading of EUA auctions in the earlier years (to raise €20bn) and their subsequent automatic removal by the MSR.

Hydrogen, CSCF, New Entrants Reserve

The main change in supply pattern is expected to come from the New Entrants Reserve (NER). An additional 257 million EUAs will be drawn from the NER due to increased 'average activity levels'. Part of this is due to the addition of electrolytic hydrogen to the EU ETS and its foreseen inclusion under the same free allocation regime as "grey" hydrogen, i.e. hydrogen produced using fossil fuels. As the baseline scenario assumes full implementation of the REPowerEU plan to ramp up green hydrogen production to 10m tonnes by 2030, this creates 118m additional EUA supply over the period of 2026-30, which we revised upwards since our 2022 Commission's case (which only assumed reaching part of the plan's objective).

Part of the increased activity level effect causing more drawdowns from the NER comes from a base effect, as activity over 18-23 (which will be used as basis to draw from the NER) was marked by Covid

and an industrial slowdown linked to the Ukraine war. This will add to likely tactical production dispatch by ETS-covered entities across their fleet of production plants in order to maximise free allocation. As plants need to increase their output by at least 15% to received more free permits, a company owning three plants just needs to increase its production by 15% in one plant and reduce it by 7.5% in the other two to receive bonus allowances. We are projecting a 2% increase in free allocation as a result of such strategies.

As a result, there will be less "standard" free allocation (based on historical emissions) taken from the annual cap and more "activity-based" allocation taken from the New Entrants Reserve. Other consequences are that the 3% allowance buffer will not fully be used and the 'cross-sectoral correction factor' (CSCF), which aims to bring allocation back within the limit in case of excess, will not be triggered.

Surplus

We estimate the total surplus at 979m EUAs by the end of 2030, up 150m from the 2022 Commission's case. This breaks down as more EUAs in circulation (+296m EUAs) and MSR (+100m) but less NER (-246m). No allowances will be drawn from the MSR, unlike shown by our previous simulation which reflected the initial Commission proposal based on MSR use rather than frontloaded auctions.

Transfers caused by the CBAM

Our estimate of the number of EUAs transferred from free allocation to the Innovation Fund for auction as a result of the Carbon Border Adjustment Mechanism (CBAM) decreased by 104m since the 2022 Commission's case, from 148m to 233m.

Compared to that scenario, the CBAM sector scope was expanded to include hydrogen, alongside other products such as cement, fertilizer, iron and steel. In addition, the phase-out of FA in sectors covered by the CBAM will be completed by 2034, a year earlier than in the initial Commission's proposal. However, for the initial years of CBAM adoption (2026-2028), the sector exclusion factor for CBAM has been relaxed, meaning a slower initial switch from free allocation to CBAM compared to the earlier plan. In the initial plan, the switch happened in 10 equal tranches of 10% annually (10% in 2026, 20% in 2027 etc.). However, the final decision was a slower start with e.g. only 2.5% in 2026, 5% in 2027 and 10% in 2028.

What could happen next?

Thanks to generous reserves still present in the system over the decade, the EU ETS is not set to force emissions down beyond the effect of other policies, as it will retain a surplus of **nearly a billion spare EUAs at the end of the decade**. A lack of decarbonisation incentives set by the free allocation system should see emissions ending the phase-out **22% above the system's cap**, with reductions mostly driven by the power sector while industry gets away with little change.

However, a number of uncertainties remain for the market, such as the rules for free allocation. Although with the current rules there should be some spare free allocation buffer available, the reform may result in using up some of it. For example, an option presented by the Commission for the cement sector would significantly increase free allocation to that sector. We estimate that the spare buffer will be 376m EUAs, so part of it could be used up by such changes.

Given the lack of pressure set by free allocations and abundant EUA surplus, industry might not significantly change its emission levels in this decade. Therefore, decarbonisation efforts are likely to rely, once again, on the power sector. We have assumed in our Simulator that electricity would follow the MIX scenario set by the Commission in 2021 but this scenario is less than certain to happen, mostly due to three factors:

- The energy crisis has prompted some switching from gas to coal-based generation. Meeting the 2030 carbon intensity target from 2022's value would now require an **annual 9.2% reduction for 8 years in a row**.
- Renewable energy capacity is not increasing in line with what that scenario would require.
- As per the REPowerEU plan and numerous support programmes, **a large part of renewables capacity is likely to be consumed by hydrogen production**.

This last point could have important consequences but has been ignored in this version of the Simulator. The assumed carbon intensity of the 1.5m tonnes of hydrogen used for steel as per the REPowerEU plan, and the 3.5m tonnes used in substitution for steam methane-reformed hydrogen, are assumed to be produced from 100% additional carbon-free electricity. The remaining 5m tonnes expected from REPowerEU are assumed in the Commission's scenario to have a carbon-neutral impact (the related emission increase from electricity being compensated by savings caused to industry), but this is unlikely to be the case.

More likely, a lot of power capacity used to make green hydrogen will either be taken from the existing grid (causing more fossil-based generation to fill the gap) or from renewable capacity that would have otherwise contributed to decarbonising the grid, making this 9.2% reduction in carbon intensity even less likely.

Such a scenario could significantly reduce the projected surplus EUAs. Our "Maximum pathway" scenario represents the "horror story" where emissions would follow the maximum trajectory still made possible by the ETS. This situation would see rocketing carbon prices triggering little or no reaction to reduce emissions, due to badly set incentives, and emissions finishing the decade as high as 37% above the cap. It would then take enormous political will to continue the scheme on its current trajectory into the 2030s without raising the cap. Unfortunately, the Fit-for-55 deal and its aftermath (FAR, Innovation Fund reform, Hydrogen Bank, Net Zero Industry Act etc.) make this scenario increasingly likely.

However, all is not lost. Policies like the FAR reform could, if done right, still have a significant impact on emission reduction. The Carbon Border Adjustment Mechanism (CBAM) has a review clause in 2025 which might lead to a change in scope or implementation schedule. The European Commission's REPowerEU plan has set broad hydrogen production (and import) targets but details are not all finalised yet.