

Appendix to the Fuest-Pisani-Ferry report on EU own resources Technical assumptions

Effect of Brexit on EU ETS cap

The cap for the EU ETS was approximately 1.85 trillion in 2019. Following the linear reduction factor, the 2020 cap should theoretically have been of 1.82 trillion. In order to account for the effect of Brexit on the level of the cap, we subtract the share of allowances that have gone to the UK during phase 3 (6.3%). As a result, the adjusted 2020 cap that we use is 1.70 trillion. We also assume that the linear reduction factor will be adjusted to take into account the departure of the UK from the ETS (see below).

Yearly reduction of ETS cap

The cap on ETS allowances is reduced every year through applying a linear reduction factor to the average number of allowances emitted in the 2008-2012 period. In 2021, the linear reduction factor will be increased from 1.74% to 2.2%. The expected linear reduction factor for 2020 was 48 million. Adjusting for the departure of the UK, the expected linear adjustment factor is 45 million.

However, given the current Brexit-adjusted cap of 1.7 bn tCO₂-eq allowance, application of the linear reduction factor over the next 30 years would lead to a cap of approximately 342 million in 2050. In order to be in line with the 2050 carbon neutrality objective, we apply a slight increase to the pace at which the cap is reduced every year (while maintaining a linear reduction factor). This corresponds to increasing the yearly reduction of allowance by a little over 10 million (from 45 to 57 million). Table A.1 illustrates how this difference changes the quantity of ETS allowances over the next decades.

Table A.1. Evolution of ETS cap under current mandate and 2050 carbon neutrality objective

	Cap under current ETS mandate (million tCO ₂ -eq)	Cap under 2050 carbon neutrality objective (million tCO ₂ -eq)
2020	1,702	1,702
2025	1,475	1,418
2030	1,249	1,135
2035	1,022	851
2040	795	567
2045	569	284
2050	342	0

Impact of the Market Stability Reserve (MSR) on the amount of auctioned allowances

On the long run, we suppose that demand for allowances equals the supply (i.e. the ETS cap). Given the magnitude of the recession triggered by the Covid-19 pandemic in 2020, it is inevitable that there will be a significant drop in demand for allowances. However, on the

short-run, the supply for allowances is already substantially reduced by the intervention of the Market Stability Reserve.

The Market Stability Reserve began operating in 2019 with the objective of reducing the surplus of allowances that has accumulated in the market since the beginning of the ETS. This surplus is mainly due to the recessions of 2008-2009 and 2012-2013 during which the demand for emissions was lower than the cap. It represents an amount of allowances that are in circulation but have not been used. Every year, a fraction of this surplus is subtracted from the cap and placed into the reserve. From 2021 on, this fraction will amount to 24% of the total number of allowances in circulation (TNAC), computed the previous year. The withdrawal will apply as long as the TNAC is higher than 830 million (otherwise, the MSR won't intervene).

TNAC numbers are published in May and impact the market the following year. In May 2019, the TNAC was 1,655 million, therefore removing 397 million (0.24 x 1,655 million) allowances from the 2020 market. In May 2020, the TNAC was 1,385 million, therefore decreasing the 2021 supply by 333 million. For the following years, we compute the TNAC as the surplus computed in May results from the difference between supply and demand in the previous year's market. Therefore, the TNAC of May 2021 (that will impact the in 2022 supply) is equal to:

$$TNAC_{2020} - (\text{Demand}_{2019} - \text{Net Cap}_{2019}).$$

Table A.2 provides a roadmap on how the MSR might help eliminate the surplus over the next four years. We consider that the covid-19 recession will decrease the demand for emissions by 20% in 2020 and by 5% in 2021. For the following years, the demand equals the cap. As long as the TNAC is higher than 830 million, the cap is decreased by 24% of the TNAC resulting in a net cap of 1305 million in 2020 and 1313 million in 2021. In order to compensate the excess demand, the polluters allowances that are already in circulation, thereby decreasing the TNAC. Following the formula provided earlier, the TNAC in 2022 is equal:

$$TNAC_{2022} = 1385 - (1362 - 1305) = 1328$$

As a result, the TNAC will gradually decrease and pass under the 830 million threshold in 2024.

Table A.2. Reduction of the total number of allowances in circulation under the impulse of the MSR (in million)

Year	Cap	Demand	Previous Year TNAC	Allowances put in the MSR	Net cap
2020	1,702	1,362	1,655	397	1,305
2021	1,645	1,563	1,385	333	1,313
2022	1,589	1,589	1,328	319	1,270
2023	1,532	1,532	1,078	260	1,272
2024	1,475	1,475	760	0	1,475
2025	1,418	1,418	501	0	1,418

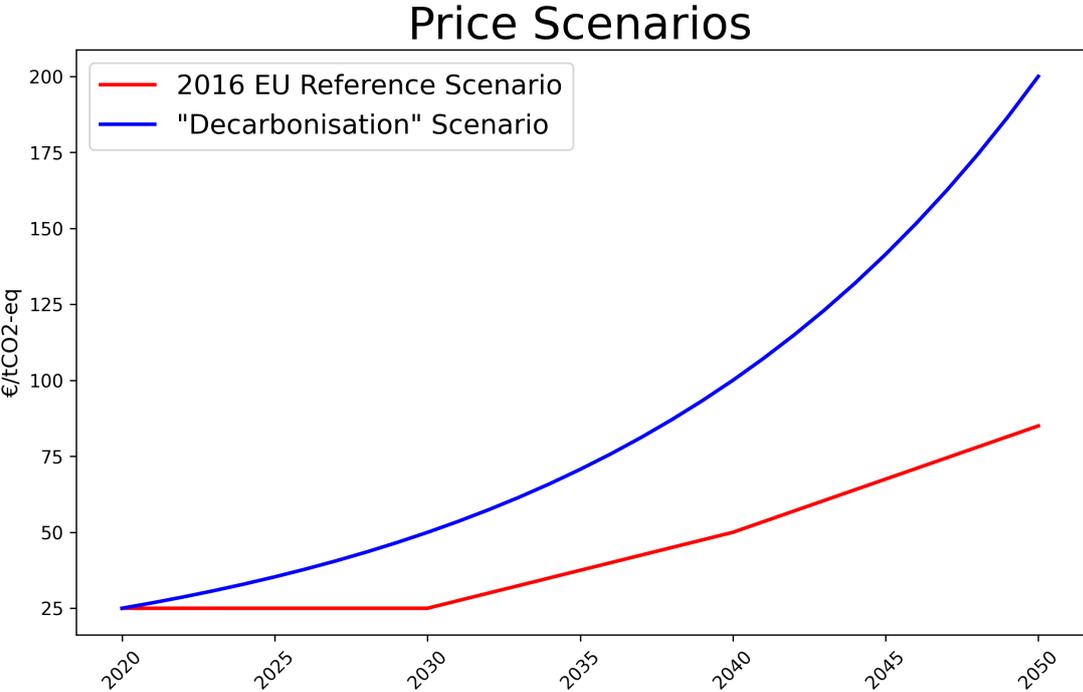
Price Scenarios

We consider three price scenarios. In the first one, the price of the ETS allowance remains stable at €25/tCO₂. The second trajectory is based on the 2016 EU Reference Scenario and the third on background material to the 2050 Long-Term Strategy (Fleiter, Herbst, Rehfeldt, Arens, 2019). Note that only the third price scenario clearly takes into account the carbon neutrality objective that is in line with our assumption of zero auctioned allowances by 2050. Table A.3 provides the data points from the scenarios 2 and 3. As can be seen in Figure A.1 and for the “decarbonisation” scenario, we estimate the price for each year using a polynomial equation that intersects the three data points.

Table A.3. Data points for the price scenarios (€/tCO₂-eq)

	2016 EU Reference Scenario	Decarbonisation scenario
2030	25	50
2040	50	100
2050	85	200

Figure A.1. Price of ton of CO₂ under two scenarios (€/tCO₂)



Figures 4 and 6 are based on computations of the relative importance of the different revenue sources composing the EU Budget. For the years 2020 onwards, we assume that revenue generated by the ETS (net of the repayment of the €390bn debt) enable a reduction in the GNI-based contributions. The total EU Budget is indexed on the projected EU GNI growth rate (-7.7% in 2020, +6.2% in 2021 and +1.5% onwards, 1.5% being the long-term growth rate according to the European Commission's economic projection and used in the 2016 EU Reference Scenario.

References

EU Reference Scenario 2016. Energy, Transport and GHG Emissions. Trends to 2050 (2016). European Commission, Directorate-General for Energy, Directorate-General for Climate Action and Directorate-General for Mobility and Transport.

Fleiter, Herbst, Rehfeldt, Arens (2019). Industrial Innovation: Pathways to deep decarbonisation of Industry. Part 2: Scenario analysis and pathways to deep decarbonisation (DG CLIMA, ICF Consulting Services Ltd, Fraunhofer ISI)