



CLC background memo on the EU's climate target for 2040

Introduction

As part of CLC's response on the EU Commissions 2040 climate target consultation we carried out a rough analysis of the development of emissions and carbon dioxide sequestration to get a long-term overview of the mitigation needs. We are publishing our analysis because we believe it is important to start the discussion and prepare for the period after achieving carbon neutrality.

We approach the 2040 target and the necessary policy instruments examining the longer-term development of emissions against carbon removal through natural sinks and technical carbon sequestration. The analysis is our own, but we have used key EU Commission initiatives as sources where available. The review has been carried out at an overview level and is only intended to illustrate the magnitude of emissions reductions and carbon sequestration and provide a starting point for assessing the need for emissions reductions and the roles of different sectors and technologies.

Rough analysis of emissions and removals

The table below presents our analysis. The figures for 2020 are based on real data. The forecast for emissions and net sink for 2030 is based on the targets of the Commission's *Ff55* package, and the figures for 2050 are in line with the *Clean Planet for All* impact assessment. The assumptions regarding CCS in 2030 are based on the *Net Zero Industrial Act's* target for carbon dioxide injection capacity and Commission President von der Leyen's speech on 8 March 2023. Estimates for BECC and DACC are based on the 1.5TECH scenario in the *Clean Planet for All* impact assessment. The longer-term development for both CCS and BECCS is based on the assumption of a reduction in combustion-based energy production.



	Emissions, Mt	CCS from fossil emissions, Mt	Technical sequestration			Annual net emissions, Mt	Cumulative net emissions, Mt ¹⁾
			LULUCF, Mt	BECCS, Mt	DACCS, Mt		
2020	3 707	0	-209	0	0	3 498	
2030	2 540	-50	-310	0	0	2 230	28 002
2040	847	-175	-395	-4	-3	445	40 511
2050	480	-300	-480	-26	-21	-47	41 970
2060	300	-260	-500	-61	-117	-378	37 953
2070	300	-220	-500	-96	-213	-508	30 965
2080	300	-180	-500	-130	-308	-639	21 364
2090	300	-140	-500	-165	-404	-769	9 152
2100	300	-100	-500	-200	-500	-900	-5 673

1) From 2020 onwards.

Table 1. Projected emissions development in the EU between 2020 and 2100, Mt CO₂eq.

Conclusions

This simple calculation confirms that emissions reductions are a priority for climate change mitigation. Even if the EU achieves climate neutrality by 2050, cumulative emissions will increase to more than 40 G tonnes by that date. This is despite the fact that the EU succeeds in increasing natural sinks to over double the current level and to enable storage of about 300 Mt of carbon dioxide in geological reservoirs, as von der Leyen proposed in her speech in March.

Currently, many studies estimate that the 1.5 °C threshold will be exceeded in the 2030s. Soon after, at the latest, we will need to globally sequester carbon dioxide from the atmosphere on a net basis to avoid the worst effects of exceeding the 1.5 °C target. If the EU achieves climate neutrality by 2050, the delay between exceeding the target and the EU starting net carbon sequestration could be almost 20 years.

Another conclusion is that in the long term, the capacity of technical carbon sequestration must increase to 4-5 times that of current nature-based sinks.

After 2050, technical sequestration will need to be based mainly on DACC technology, as combustion-based energy production will decrease and thus also the potential for BECCS and CCS.

In the longer term it is unlikely that we will be able to store the amount of CO₂ that would need to be sequestered underground, and the EU should start to consider material uses for sequestered CO₂ and its conversion into a solid state.

Summarising remarks from the long-term analysis:

- 1) Emissions reductions must continue to be the first priority in climate mitigation during the coming decades, otherwise we will not get back to 1.5 °C from the overshoot path.
- 2) Since net-zero emissions by 2050 will not be sufficient to meet the targets of the Paris Agreement, especially the 1.5 °C target, carbon sinks will need to exceed emissions after 2050. In the longer term, technical carbon sequestration will need to increase significantly and achieve a capacity 4-5 times the current LULUCF sink.



- 3) After 2050, technical sequestration will need to be based mainly on DAC technology, as combustion-based energy production will decrease and with it the potential for BECCS and CCS.
- 4) Since large amounts of CO₂ cannot be stored underground, long-term material use and conversion into a solid state should be considered as preferable alternatives.

Sources:

- 1) EC, Clean planet for all, impact assessment, 2018. https://climate.ec.europa.eu/system/files/2018-11/com_2018_733_analysis_in_support_en.pdf
- 2) EC, Net Zero Industrial Act, https://single-market-economy.ec.europa.eu/publications/net-zero-industry-act_en
- 3) Fit for 55 https://ec.europa.eu/commission/presscorner/detail/en/IP_21_3541