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CCS and Europe's Contribution to the Paris Agreement Modelling Least-Cost CO_2 Reduction Pathways

Summary for Policy Makers

Since 2012, the European Zero Emission Technology and Innovation Platform (ZEP) has released a series of reports modelling the potential contribution of CCS to Europe's future energy system. This report is the fifth in the series and builds on the analysis and conclusions drawn from previous work. The analysis is based on achieving a 95% CO_2 emission reduction across the energy system (power, heat, industry and transport) of 10 countries: France, Germany, Greece, Italy, Netherlands, Norway, Poland, Spain, Switzerland and the United Kingdom,

The value of CCS to Europe

ZEP's modelling work supports previous analysis from the Intergovernmental Panel on Climate Change (IPCC) and others, including the European Commission, which demonstrates that tackling climate change is both easier and cheaper with CCS deployed alongside other low carbon technologies such as renewables. The analysis shows that **the value of CCS to the EU could exceed €1 trillion between now and 2050**, and that CCS could be worth more than €50 billion per annum thereafter.

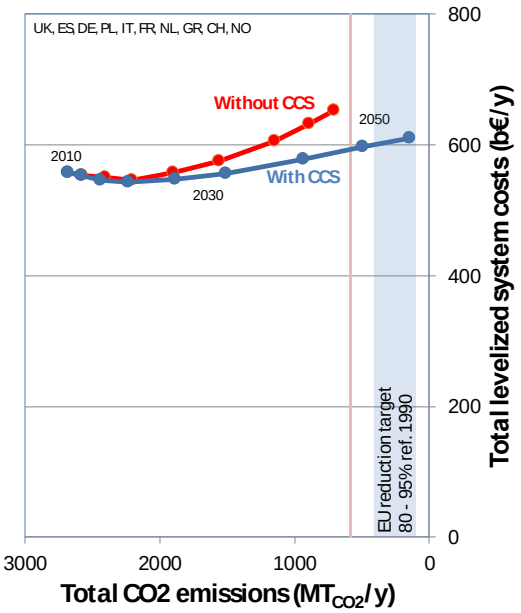

Figure 1. Comparing total emissions reductions and total levelized system costs in scenarios with and without CCS

Figure 1 shows the output of ZEP's modelling, which reveals that, for the 10 countries modelled, CCS will be essential to achieving the 80-95% emissions reduction target laid down in the EU 2050 Energy Roadmap. With the Paris Agreement potentially requiring greater emissions cuts than previously foreseen, CCS is likely to play an even more important role in achieving the EU's climate change objectives.

Only in the scenario with CCS included are emissions reduced by more than 80%. In the absence of CCS, emissions in 2050 are approximately 3-4 times higher, whilst the total system costs are also lower when CCS is deployed.

Energy Intensive Industries and CCS

In addition to enabling deeper emissions reductions, ZEP's modelling work once again highlights the importance of CCS to the future competitiveness of Europe's energy intensive industries such as steel, cement, chemicals and refining.

With CCS infrastructure (CO_2 pipelines, ships and stores) available, Europe's energy intensive industries can achieve substantially lower carbon emissions compared to scenarios without CCS. In the low carbon economy of the future this will be increasingly important to the competitiveness of

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European industry and will help ensure that as many high-skilled, highly-paid industrial jobs can be retained in Europe as possible.

The Urgent Case for Action

ZEP's modelling clearly shows that the cost-optimal pathway for reducing CO_2 emissions in Europe relies on CCS deployment from the early 2020s onwards. This can then enable negative emissions from 2025 and, ultimately, lower emissions in 2050 (Figure 2.). For CCS projects to be operating in Europe by the early 2020s however, work on the necessary CCS infrastructure needs to start now.

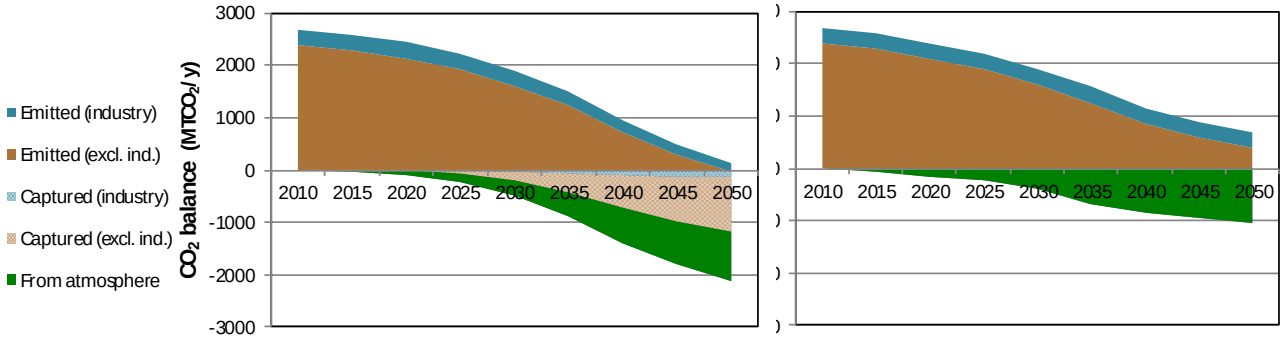

Figure 2: CO_2 balance for the 10 selected countries; CCS is available (left), CCS is not available (right).

For the first time, ZEP's modelling provides a new level of detail in terms of the infrastructure requirements for CCS, at both the EU and national level. The analysis provides confidence that Europe has access to sufficient indigenous CO_2 storage resources to 2050 and that only one country – Germany – might need to 'export' CO_2 to other European countries before 2050.

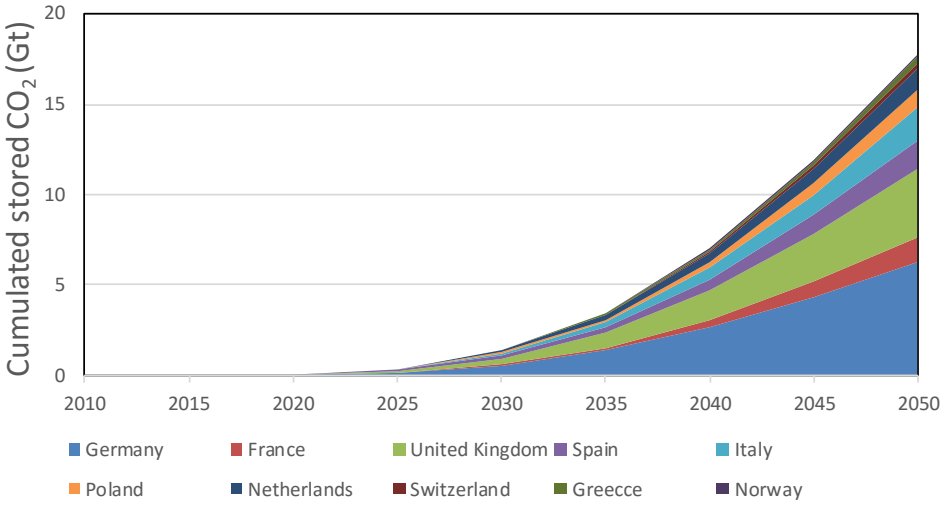

Figure3. Cumulative CO_2 storage requirements across the ten countries modelled (2010 – 2050)

The full report can be accessed online at: https://tinyurl.com/ZEP-ME5

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