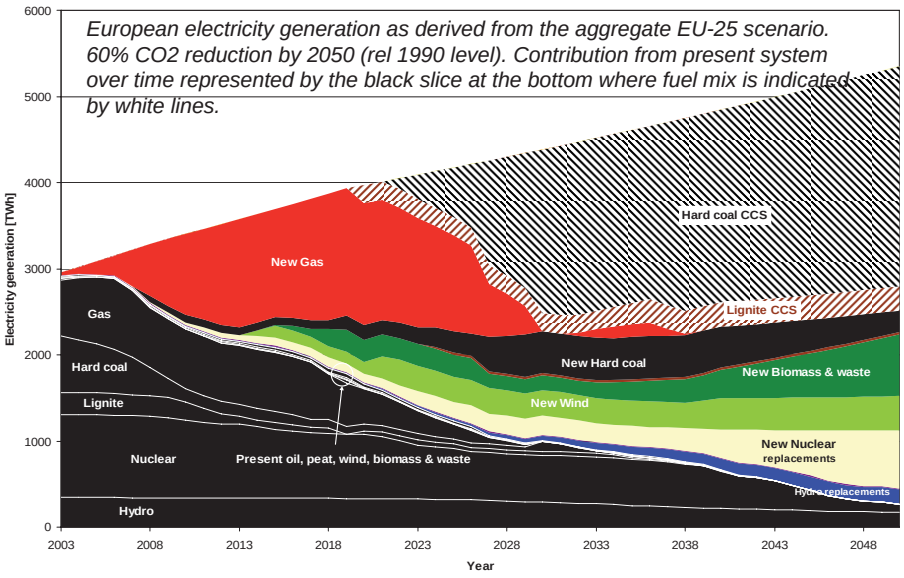


European electricity generation as derived from the aggregate EU-25 scenario. 60% CO2 reduction by 2050 (rel 1990 level). Contribution from present system over time represented by the black slice at the bottom where fuel mix is indicated by white lines.

The EU has committed to 20% CO_2 emission reductions by 2020 possibly increasing to 30% pending on international commitments. The EU commission has suggested that the developed world should reduce its emissions by 60-80% by 2050. The EU commission considers CCS as one of its key options to reduce CO_2 emissions while at the same time enhancing Security of Supply and is targeting twelve large-scale CCS demonstration plants in Europe by 2015 and that all coal fuelled power plants commissioned after 2020 should include CCS. In order to model future European power generation including the effects of the European Emission Trading Scheme and the use of CCS, the authors have developed a comprehensive database containing all power plants in Europe with a capacity of 10 MW or more as well as CO_2 storage sites such as gas and oil fields and aquifers.

Ramp-up of CCS within EU

- at time and in scale

CCS can play a significant role in reducing CO_2 emissions at a cost in the range of 20 to 60 €/ton over the period studied. In EU25 as much as 48 gigatonnes CO_2 may be captured over the period 2020 to 2050 implying a steep ramp up after 2020.

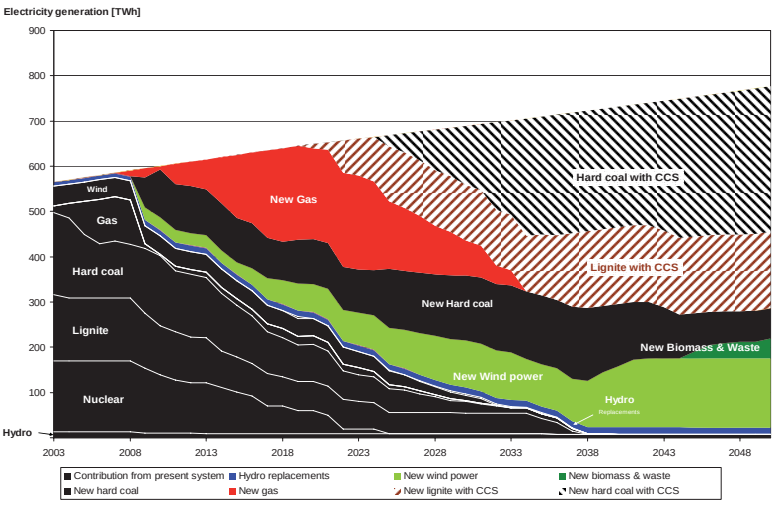
Aim

This work investigates the role of CO_2 capture and storage (CCS) technologies as part of a portfolio for reducing CO_2 emissions from the European electricity generation system until the year 2050. Special emphasis is put on the ramp up of CCS with respect to timing of investments and requirement of corresponding CO_2 transportation and storage infrastructure. The investigation comprises scenario analysis through modeling possible development of the electricity supply system for EU25 and with a more detailed analysis of Northern Europe (Germany, UK, Denmark, Finland, Sweden and Norway). In EU25 48 gigatonnes CO2 may be captured over the period 2020 to 2050 implying a steep ramp up, i.e. most CCS capacity is added during the first decade after 2020 from which it is assumed to be commercially available. See figure above.

Germany

Capture in Germany and UK amounts to 8 and 5 gigatonnes, respectively. The analysis show that a transportation infrastructure can be put in place for about 2 to 5 €/ton CO_2. Figure illustrates the German results.

The steep ramp-up obtained from the model do not take into account other issues which must be resolved for a large scale implementation of CCS. Thus, a key issue for CCS will be if it can be implemented in time and at required scale.



Example of electricity generation in Germany. Northern European simulations with a common CO_2 cap for the region which gives trading of CO_2 emissions permits. Cap = 20 % reduction by 2020 and a 60 % by 2050 (relative to 1990 emissions).

For further information:

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