

Pathways for the North European electricity supply

Researchers



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How will the electricity supply systems in Northern Europe (Germany, UK, Denmark, Finland, Sweden and Norway) develop until the year 2050?

The age structure of the power plants indicate that full turn-over in capital stock will take several decades with the present generation capacities accounting for around 50 percent of generated electricity in 2020.

40 €/ton CO₂

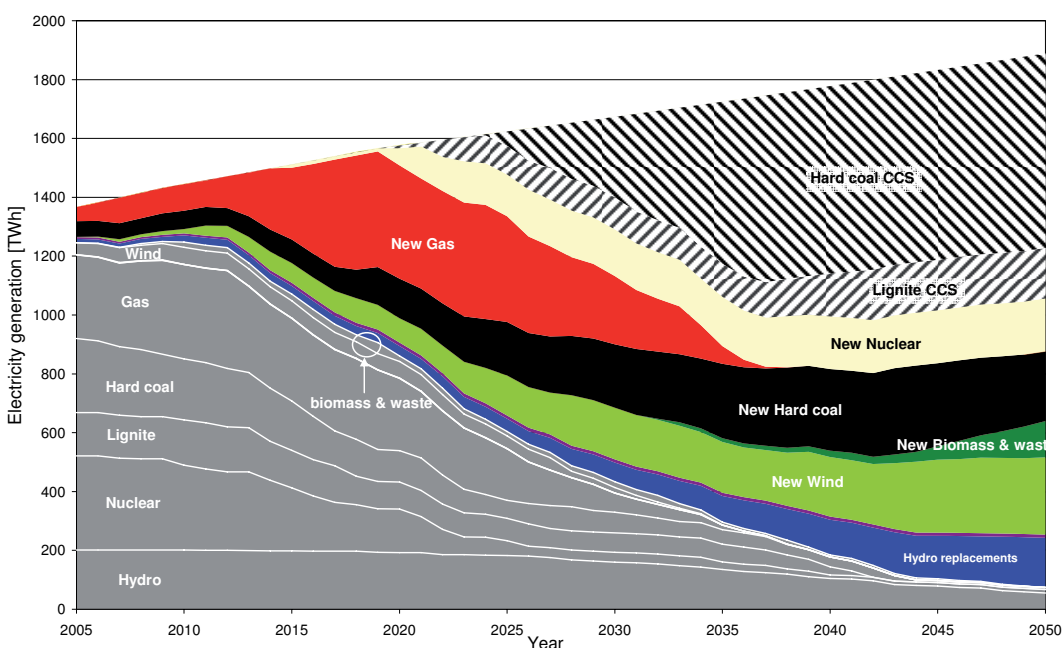
The results show that CO₂ emission reductions, of 20 percent and 60 percent by the years 2020 and 2050 respectively, can be met at a marginal cost of abatement of about 25 to 40 €/ton CO₂ over the period studied if CCS is included as an option from 2020. At the

same time the marginal cost of generating electricity lies in the range of 45 to 60 €/MWh. Excluding CCS raises the marginal cost of abatement with about 10 €/ton CO₂ whereas the marginal cost of electricity generation increase with roughly 5 to 10 €/MWh.

Renewables, gas and CCS

The CO₂ target by the year 2020 is met by implementation of renewable electricity and fuel shifting from coal to gas.

After 2020 CCS technologies constitute an attractive way for cost efficient and almost CO₂-free base load. However, wide spread application of CCS is an infrastructural challenge with respect to implementing capture plants as well as building up a corresponding CO₂ infrastructure for transportation and storage as well as in coal supply systems. Given the price assumptions applied, gas may not be competitive once CCS enters the system causing early retirements of such units or possibly stranded assets.



Electricity generation in the case including CCS aggregated from the Nordic system, Germany and the UK.