

How to meet INDCs by Country?—

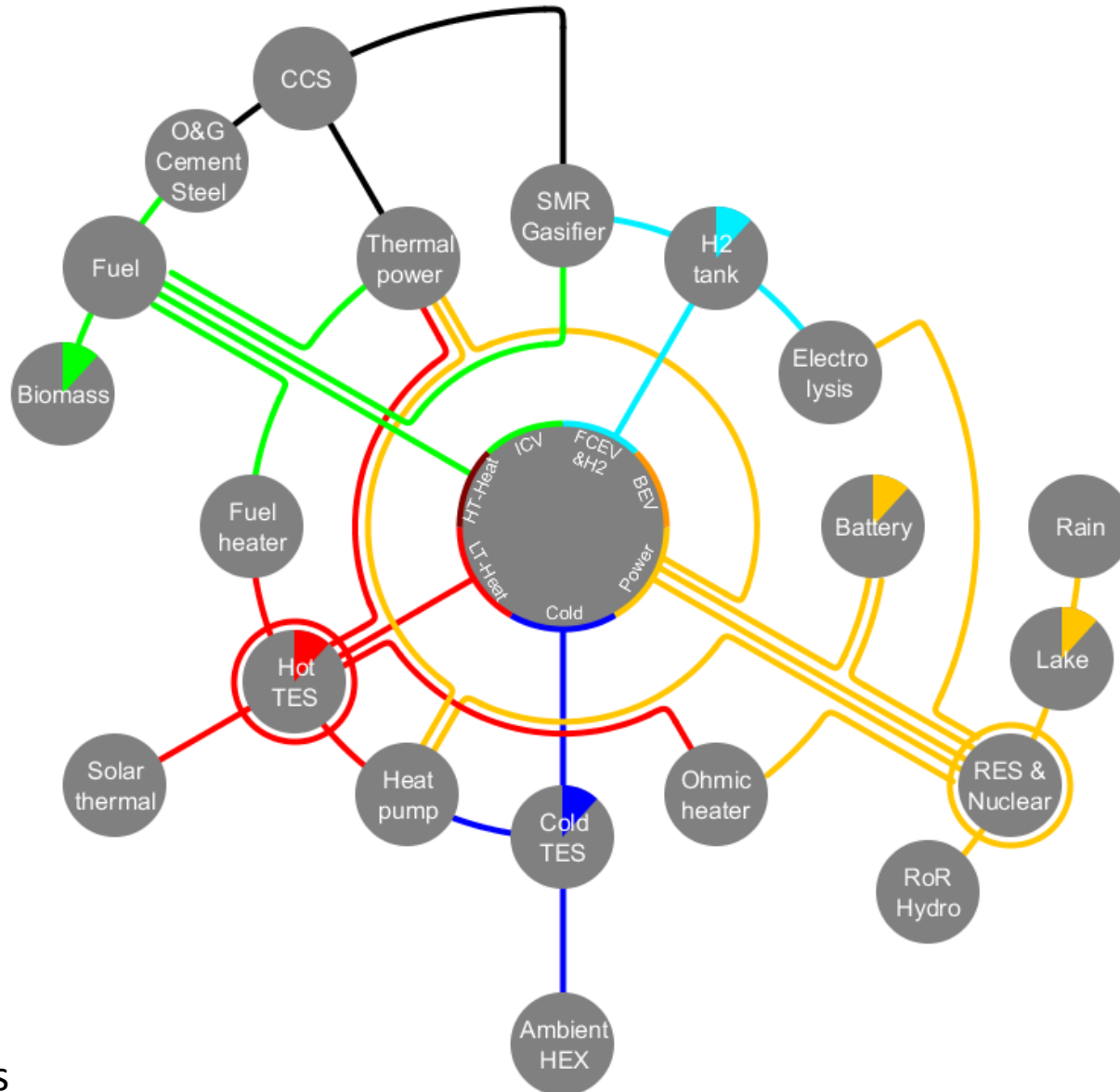
Modelling the cost of meeting
European Commitments

(ME5, work in progress)

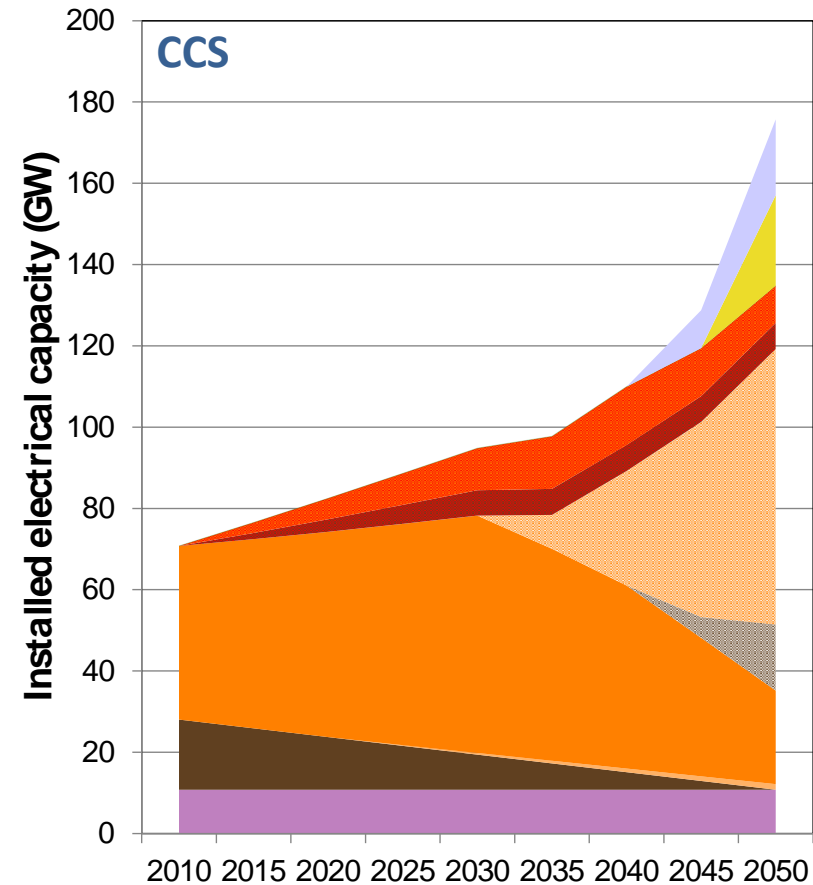
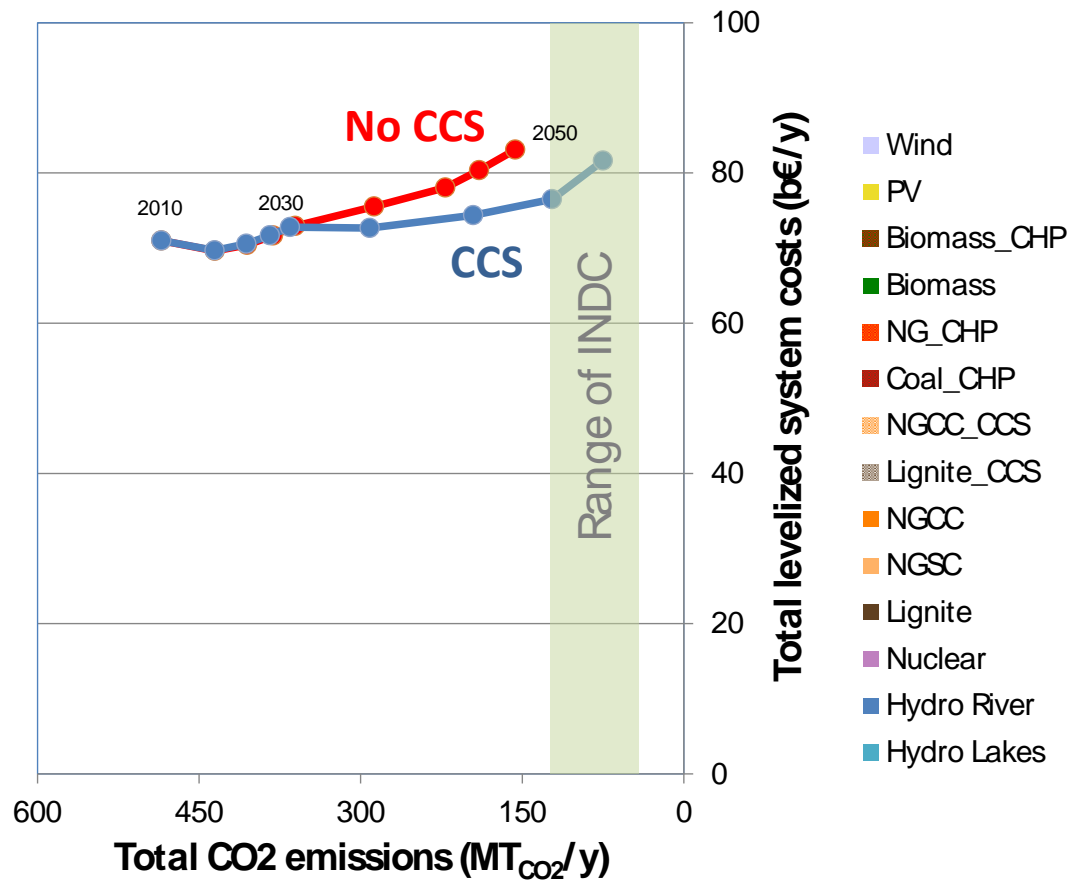
Motivation

- Previous modelling work
 - Focus on electricity & large industrial sector
 - Showed that CCS will save > 1000 b€ over the next 40 years to reach 80% CO₂ reductions by 2050
- New approach
 - Consider complete energy sector (power, heating, industry, transport), especially the interconnections, e.g. heat pumps, electric vehicles, etc.
 - Neglect power connections between countries
 - Derive tailored recommendations for selected member states (so far Poland, Netherlands, Germany, UK, Spain, France, Greece, Italy, Switzerland)

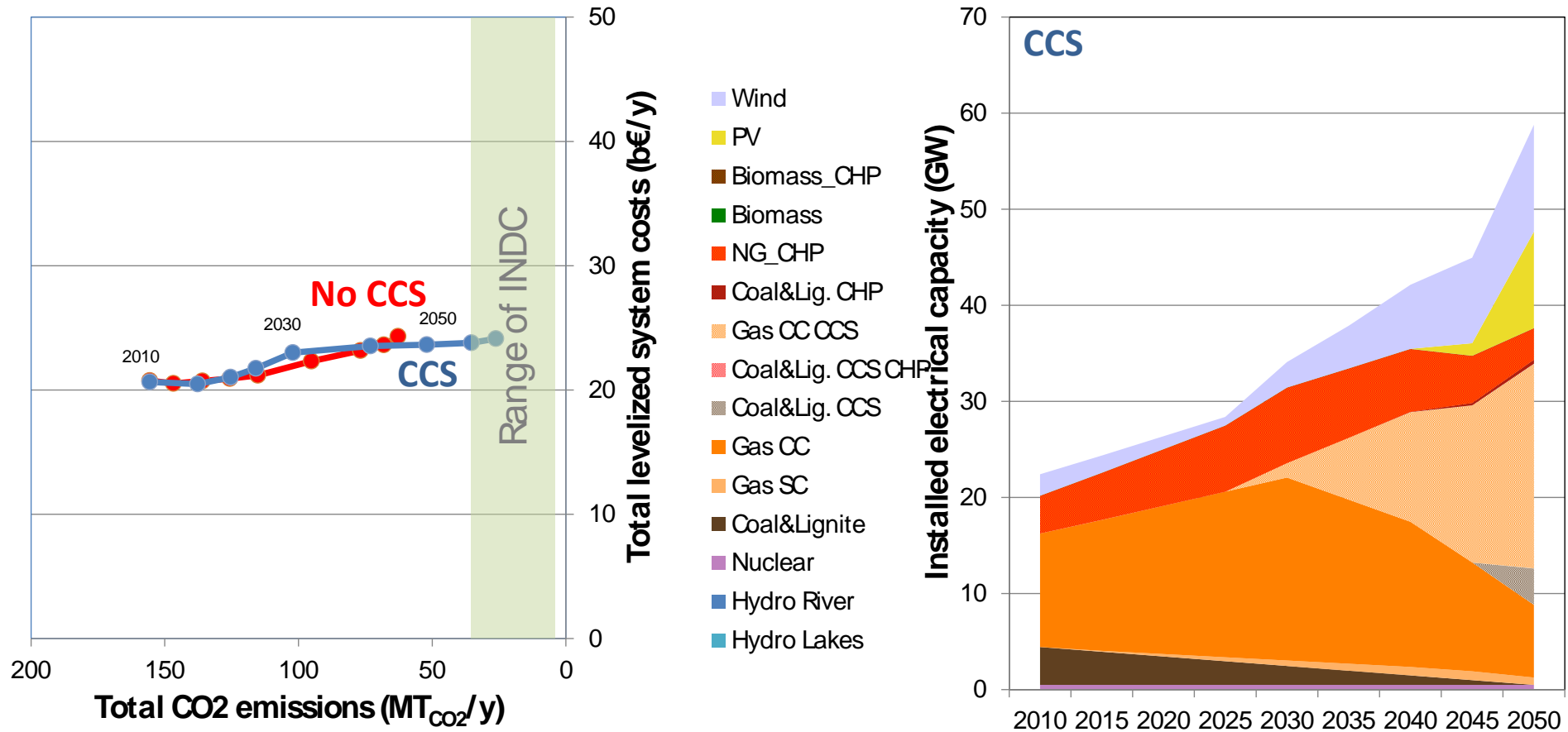
Energy system model



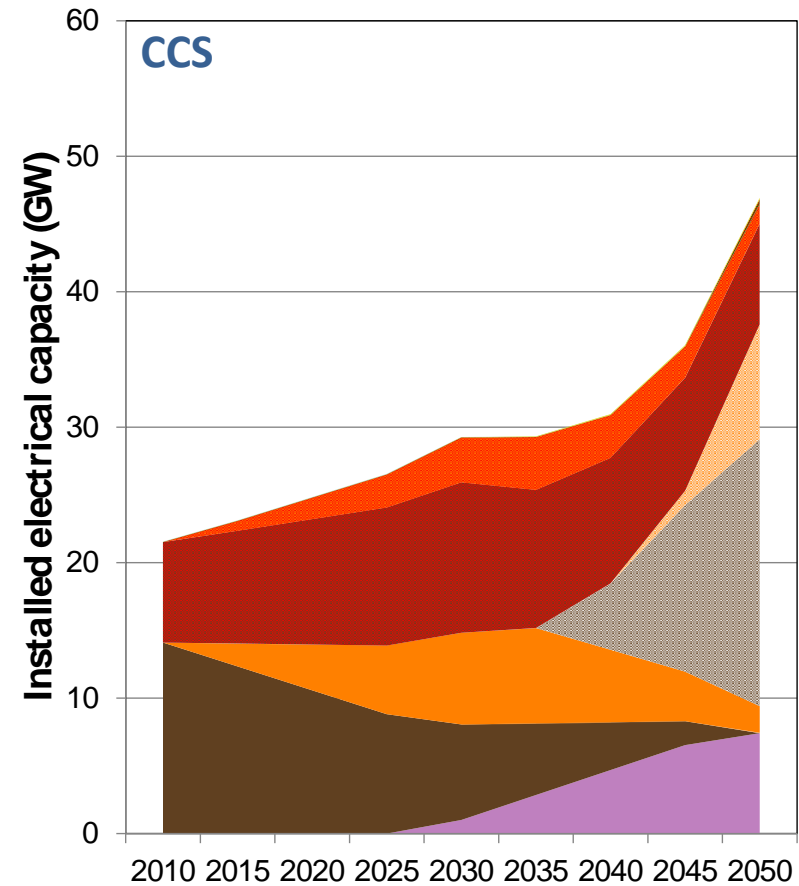
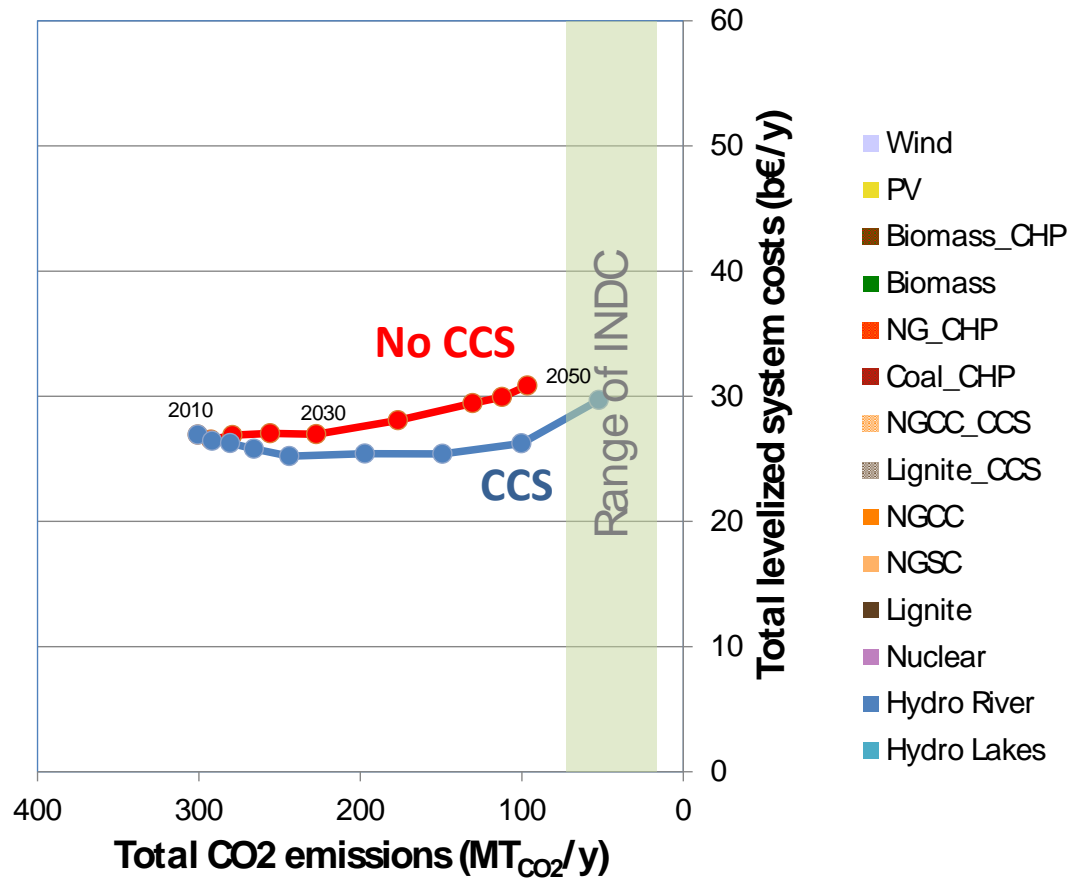
United Kingdom



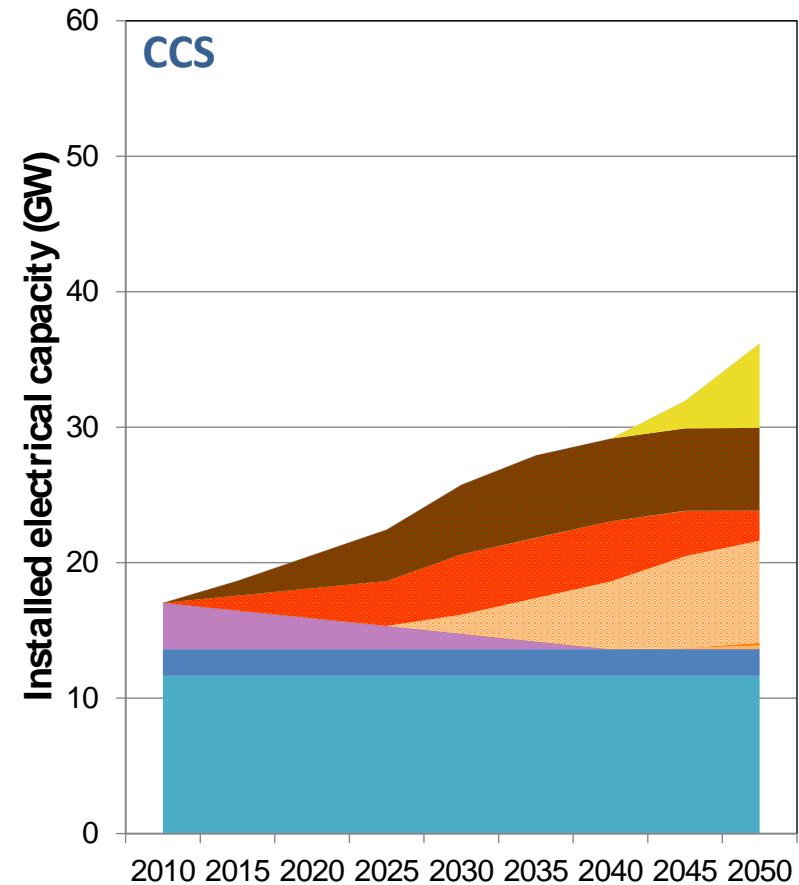
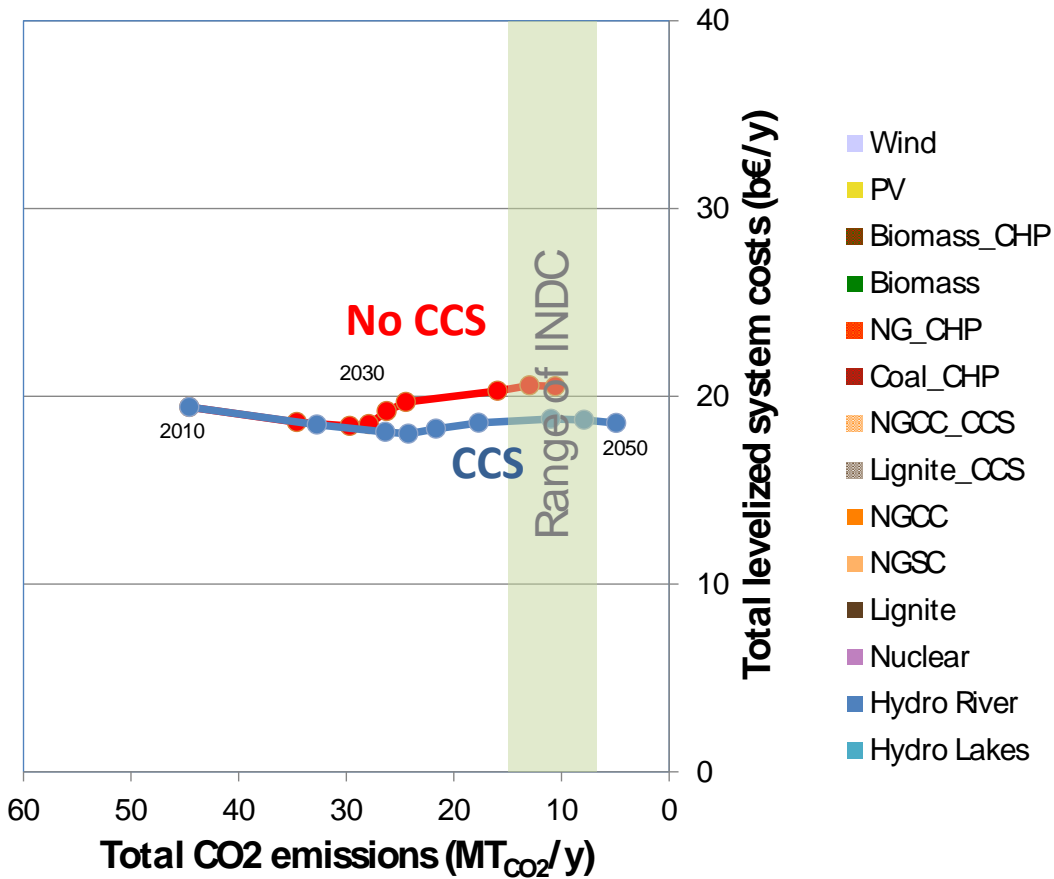
Netherlands



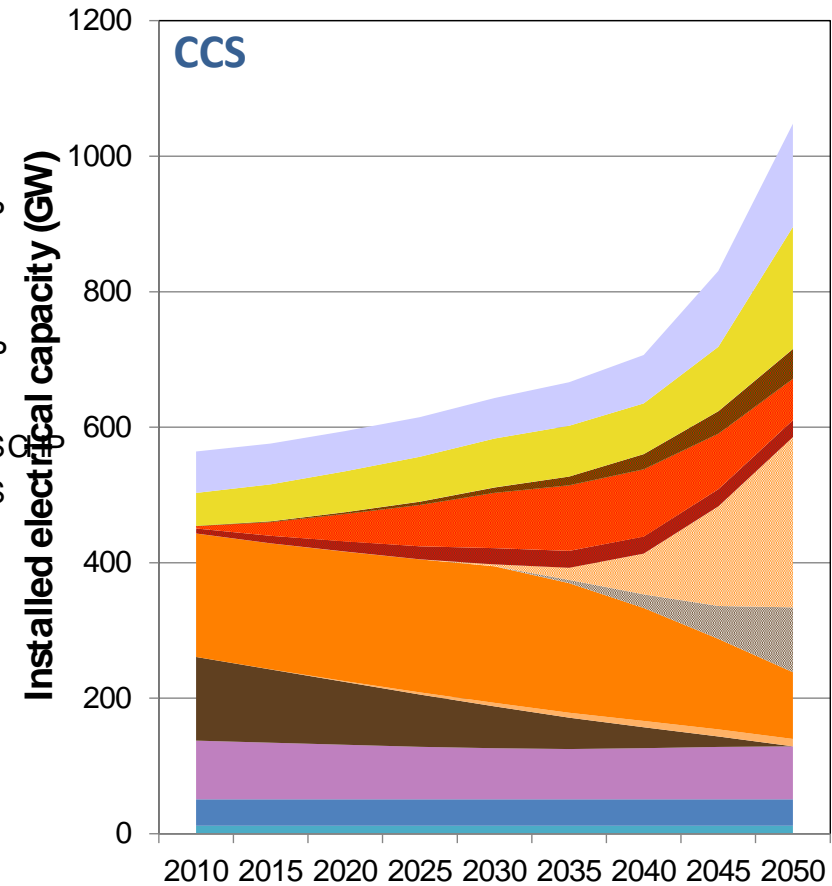
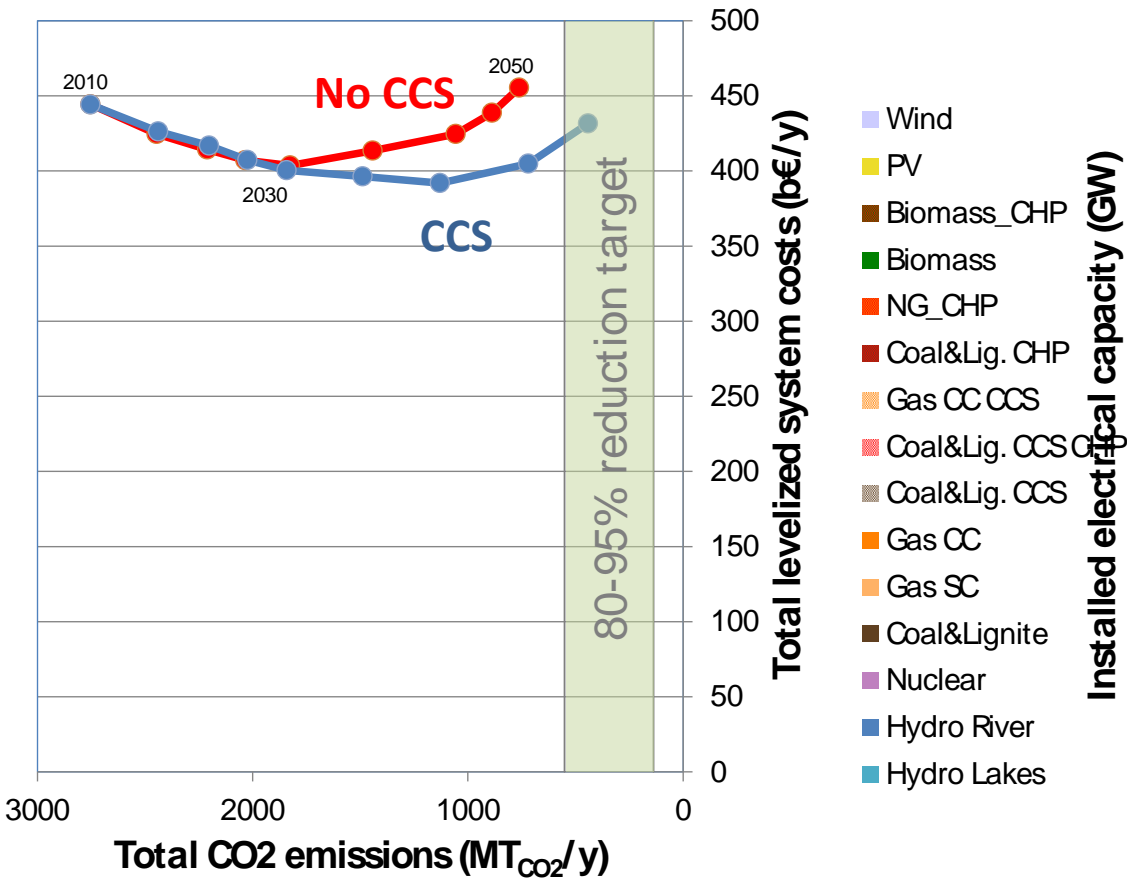
Poland



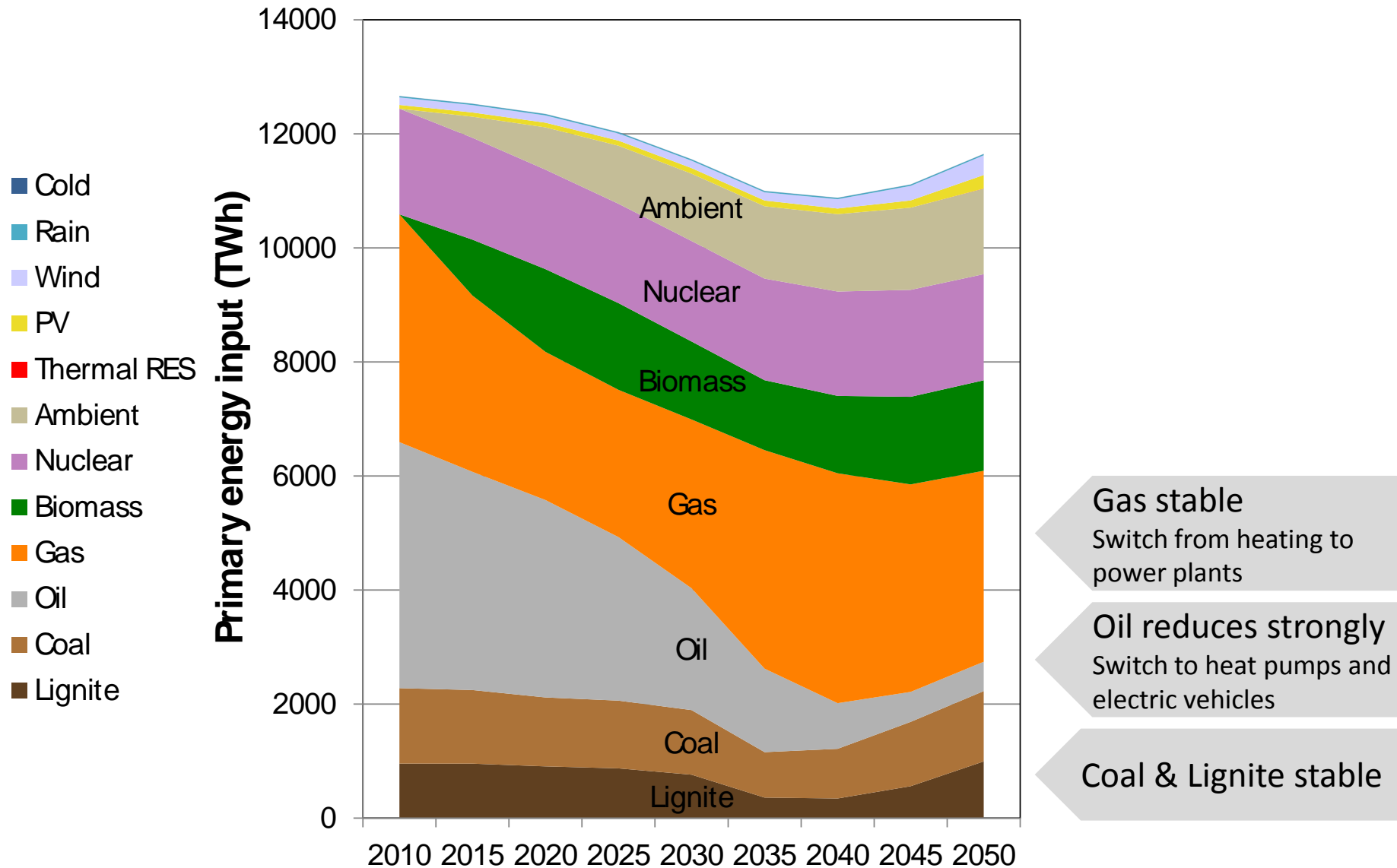
Switzerland



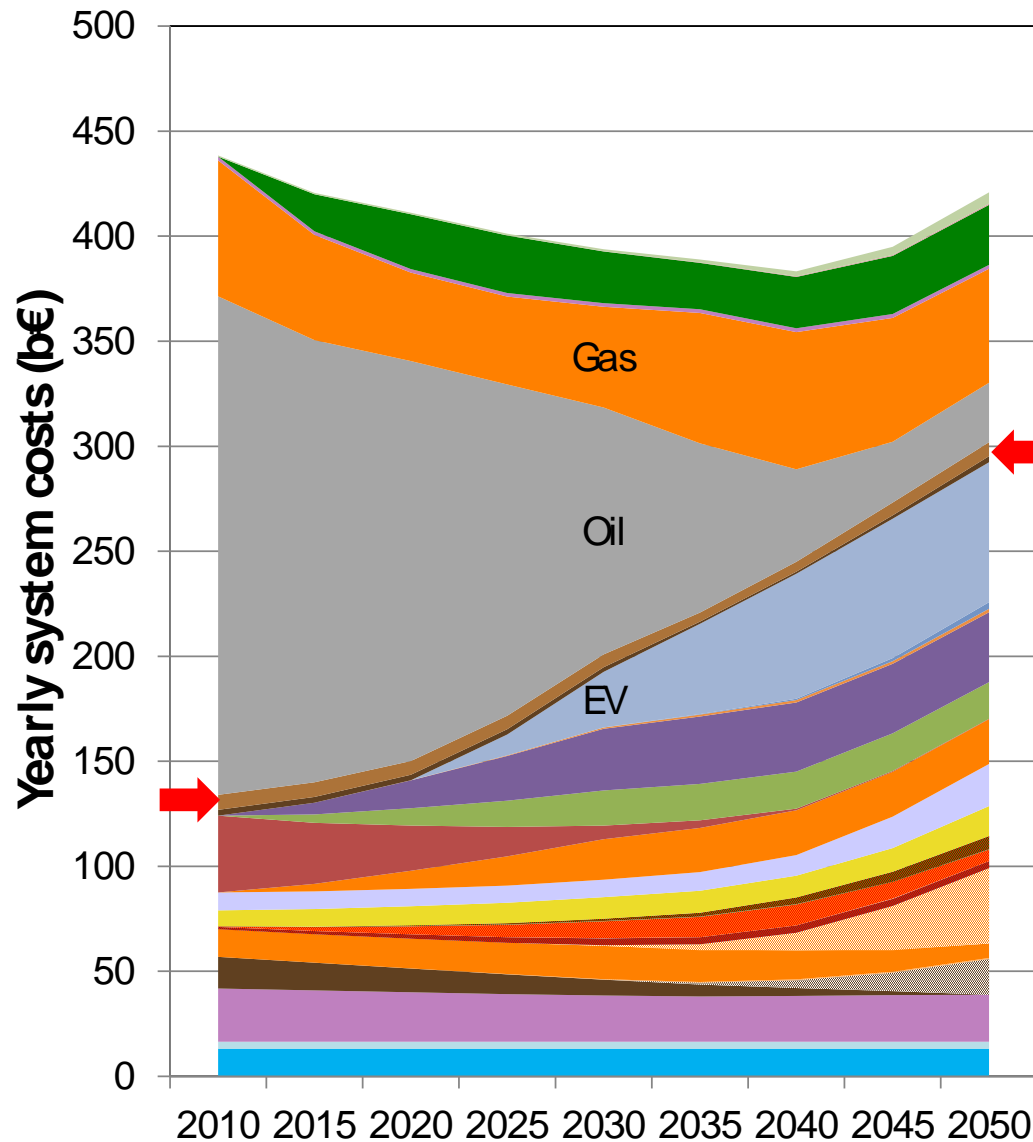
Sum of all countries



Sum of all countries (Total primary energy input)

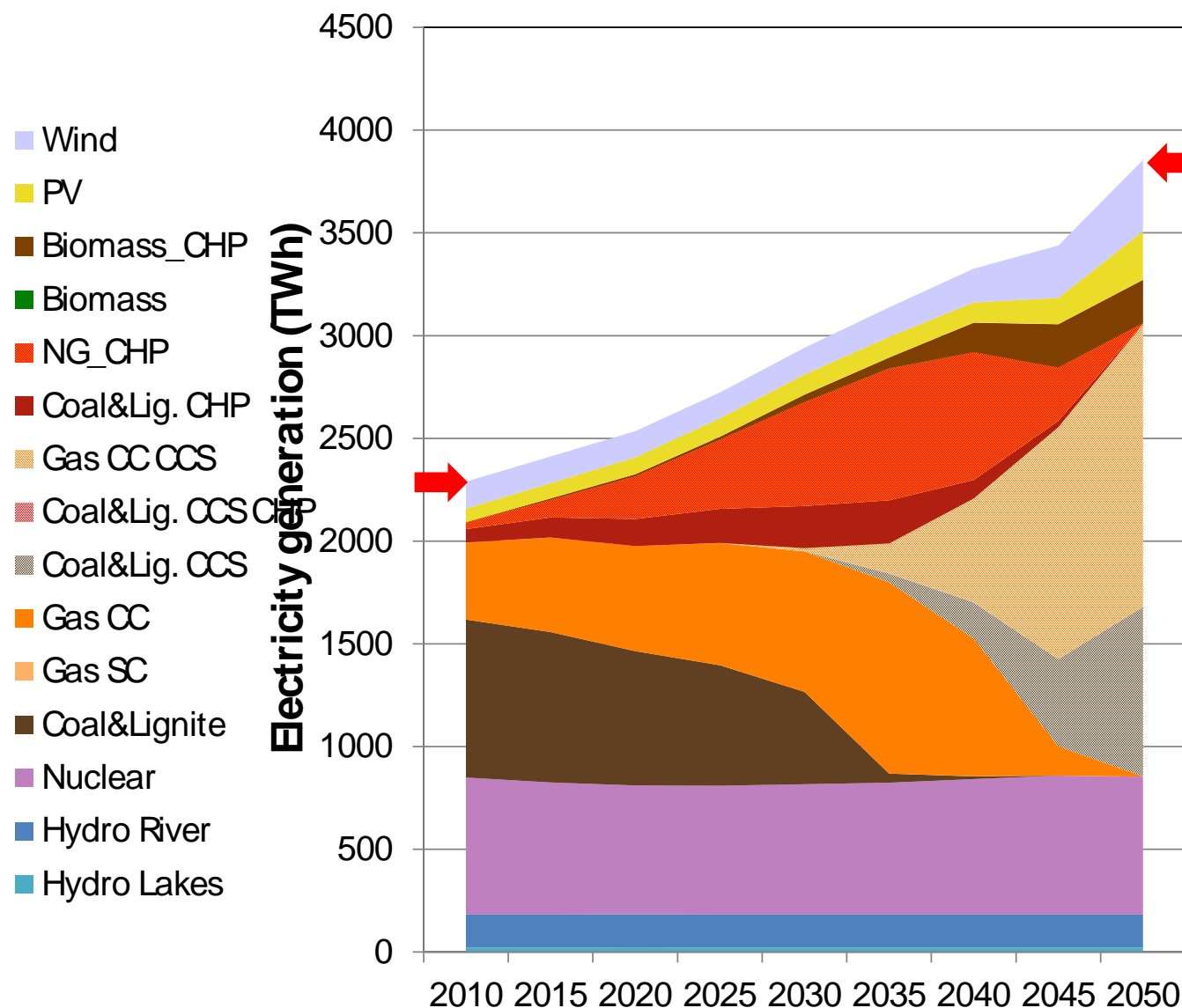


Sum of all countries (Yearly system costs)



Clear shift from operation expense for fuels to capital expenses for plants and infrastructure

Sum of all countries (Total electricity generation)



Overall electricity consumption grows due to heat pumps and e-mobility

Observations

- Only CCS allows to reduce CO₂ emissions from energy sector by 85% in 2050
 - First plants go into operation in 2030
 - Investment in infrastructure must start 10 years ahead, i.e. NOW
- Primary energy input
 - Coal & lignite constant
 - Gas usage constant as a sum – switch from house heating to combustion in gas power plants (NGCC, CHP, CCS)
 - Oil consumption declines with the rise of e-mobility – cost savings compensate increase in other sectors
- General
 - Link to heating sector highlights importance of CHP (combination of CCS and CHP promising – to be assessed in the next runs)
 - Electricity consumption growths due to electrification of heating and transport sector

Next steps

- Report in work
- Discussion with national reps
- Stakeholder communication