# IEA 2013

**The prospect of a breakthrough for CCS** seems further away in the IEA's World Energy Outlook | Special Report REDRAWING THE ENERGY-CLIMATE MAP (June 2013) and the Technology Roadmap: Carbon Capture and Storage (2013) compared to previous publications such as the Technology Roadmap: Carbon Capture and Storage (2009).

**Technology Roadmap: Carbon Capture and Storage (2013)**

http://www.iea.org/publications/freepublications/publication/TechnologyRoadmapCarbonCaptureandStorage.pdf

This report speaks for first time about a limiting CO2 budget. (p. 8)

The report notes that progress has been slower than expected and completed projects has been especially with enhanced oil recovery (EOR) - which has given technological experience, but climatically they do not contribute to net reductions but on the contrary, lead to a multiplication of emissions.

With respect to the necessary legislation IEA sees satisfactory progress in Europe, USA, Canada and Australia. International law has been implemented in the OSPAR Convention (adopted and ratified) and London Protocol (decided, but not yet sufficiently ratified). Finally CCS has been approved under the CDM.

**2013 forecast figures**

- Over 30 projects in 2020.
- In 2050, 2/3 of all coal-fired capacity and 1/5 of gas-fired capacity will be with CCS. (That is a total of 8% of global capacity in 2050).
- Hereof 30% in OECD countries; 70% in non-OECD countries. (25% in China.)
- In 2030 IEA expects 2 Gt CO2 to be stored per year; two out of three new coal plants are with CCS.
- BECCS have begun to play an important role in removing CO2 from the atmosphere.
- By 2050 IEA expects 7 Gt CO2 to be stored per year.
- 45% of 120 Gt CO2 captured CO2 from 2013 to 2050 are from the industrial sector.
- 25-40% of cement, steel and chemical industries will be with CCS.
- 14% of the total CO2 reductions from 2015 to 2050 will come from CCS.

**Technology Roadmap: Carbon Capture and Storage (2009)**

http://www.iea.org/publications/freepublications/publication/CCS_Roadmap.pdf

2009 forecast figures for comparison (comparison is made difficult due to changes in the calculation method):

- 100 projects in 2020, including 38 in the energy sector and the rest in industry and gas sectors.

- On average 10 projects per year.
- 3400 projects globally by 2050. 1700 in the energy sector and 1000 in the industrial sector. 35% in OECD countries.
- On average 85 projects per year over the period 2010-2050.

Overall, IEA expressed greater expectations for CCS in the 2009 Roadmap than in the new Technology Roadmap 2013.

**World Energy Outlook | Special Report REDRAWING THE ENERGY-CLIMATE MAP (2013)**

http://www.iea.org/publications/freepublications/publication/WEO_Special_Report_2013_Redrawing_the_Energy_Climate_Map.pdf

This IEA report is all about the global energy-climate situation. Despite the low momentum CCS is still awarded a prominent role in the future energy system – and is seen as one of the most important climate tools.

- The report speaks like Technology Roadmap (2013) about a limiting CO2 budget. (p. 16)
- There will be negative emissions through BECCS (p. 17)
- CCS at power plants will capture less than 1% of the sector's CO2 emissions in 2012 (p.25).
- In the 450 Scenario, delaying CCS deployment by ten years would increase the cost of decarbonisation in the power sector by $1 trillion and result in lost revenues for coal producers ($690 billion) and oil and gas producers ($660 billion). (p. 43)
- The investments in nuclear power and renewable energy will more than cancel the reduction of investment in coal plants and CCS. Reduction in electricity demand can correspond to a weaker deployment of CCS in the power sector, but there are limits to the amount of energy if we are to maintain the services. (p. 78)
- While the lack of CCS can be compensated by nuclear power and renewable energy in the energy sector, it looks difficult in the industry. The efficiency can be further improved, but the potential for alternatives in the industry is limited. The lack of success of CCS in industry may result in increased costs in sectors such as transport and energy. (p. 78)
- The large deployment of CCS after 2020 is partly required as a strategy to protect the investment in fossil energy sector. In 2020 it will represent 58% of total electricity production. CCS - incl. retrofitting - will counter that much of the capacity shut down prematurely while helping to make it more economical to meet climate targets in regions with good storage options. (IPCC, 2005).
- There is still not a single case of CCS in the power sector or in energy intensive industries. (p. 77)
- CCS also lacks resolve legal issues regarding the imposition of liability in case of leakage of the stored CO2. (p. 77)
- CCS can not only guarantee investments in the energy and industrial sectors, but also a

value for the producers of fossil fuels. To achieve climate goals CCS would be applied especially in coal and gas power plants as well as in the iron, steel and cement industries, which are mainly dependent on coal. If CCS is delayed significantly, the coal consumption should be lowered to reach the climate targets. The IEA estimates that while the current coal consumption of 5,200 million tons of coal equivalent (Mtce) would be reduced to 3,300 Mtce in 2035 if CCS quickly spread after 2020, coal consumption would be reduced by a further 900 Mtce if CCS was delayed ten years. (p. 80)

- Oil and gas producers will also be affected by a late deployment of CCS. The shift from coal to gas would be slower without CCS. And for oil, it would mean that the transportation sector increasingly had to convert to electricity to keep the total CO2 emissions down. It could reduce oil consumption by 1.3 million barrels per day in 2035.

Overall, a delayed deployment of CCS results in the loss of revenue of $690 billion for the coal-producing countries; gas producers would lose $430 billion. Oil producers would lose $230 billion (see Figure 2.21 below) (p. 81).

IEA calls for stronger political support for CCS, because the market can not handle it. There is a need for a high enough price on CO2, either through taxes or through a quota system a la ETS. (p. 79f)

IEA warns of physical impacts from climate change on the energy sector installations. It is both sudden events such as severe weather or tidal waves and gradual as lack of water or as seawater increases. Gradual and sudden changes reinforce each other, such as rising sea levels and storm surges. Urban areas are experiencing higher increases than the global average. Extreme heat or cold places great demands on supply. (p. 83f)

**Figure 2.21 ▷ Change in fossil fuel cumulative gross revenues by type and region if CCS is delayed, relative to the 450 Scenario**

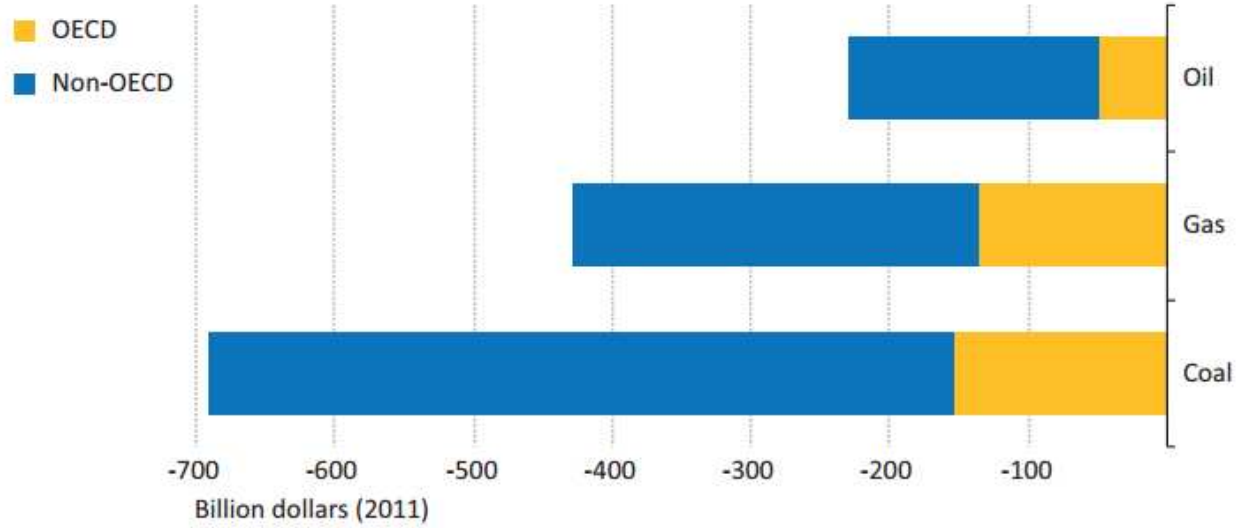


Fig. 2.21 from IEA's World Energy Outlook | Special Report REDRAWING THE ENERGY-CLIMATE MAP, (Juni 2013) p. 80