Carbon capture and storage (CCS) of coal power plants

Carbon capture and storage technology (CCS) reduces emissions of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). The 2050 Calculator assumes that the CCS technology can reduce coal power station emissions by 90% but at the expense of increased energy usage (coal input) of approximately 32%[1]. Research indicates that South Africa does not have a sizable onshore storage potential, but that there is some 150 billion tonnes of carbon storage capacity offshore in saline formations[2]. This would be roughly 100 years worth of storage.

The *CCS* Lever allows the user to choose the power capacity of new coal power stations that are fitted with CCS technology.

Level 1

In this level, only the CCS pilot project is built and starts operating by 2020. It captures 1 Mt of CO_2 by 2025 as per the CCS roadmap[3], which is equivalent to the capture of a 124 MW coal power plant with CCS.

Level 2

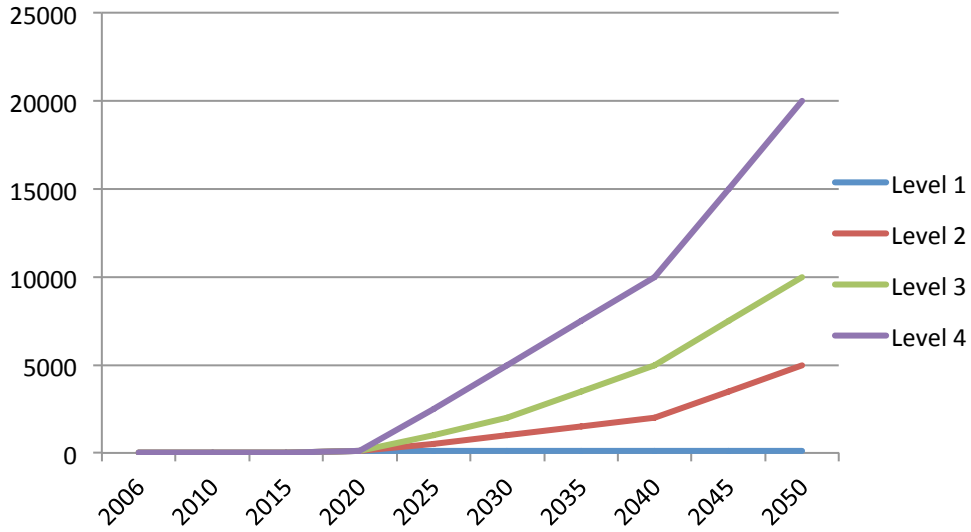
In this scenario, a 500 MW capacity coal power station with CCS is installed by 2025 and again by 2030 to provide total capacity of 1,000 MW. This capacity grows to 5,000 MW by 2050.

Level 3

Level 3 assumes that there is a steady increase in installed capacity of coal power stations with CCS from none to 500 MW by 2025, 2,000 MW by 2030, and to 10,000 MW by 2050.

Level 4

In this scenario the installed capacity of coal power stations with CCS is 2,500MW in 2025, with a further 2,500 MW coming online by 2030. This capacity grows to 20,000MW by 2050.



Installed capacity (in MW) of coal power stations installed with CCS technology

[1] Davidson, O., et al. "IPCC Special Report on Carbon Dioxide Capture and Storage. Prepared by Working Group III of the Intergovernmental Panel on Climate Change." (2005): 442.
[2] Viljoen, J. H. A., F. D. J. Stapelberg, and M. Cloete. "Technical report on the geological storage of carbon dioxide in South Africa." *Council for Geoscience, Pretoria* (2010).
3 Beck, B., A roadmap for CCS in South Africa, DoE SACCCS COP 17 presentation, 2011