

2. Coal power technology

Modern power plants are considerably more efficient, with further innovations undergoing testing. The two main routes of research are moving towards Supercritical (and Ultra-Supercritical) power plants or the more complex Integrated Gasifier Combined Cycle Plants. In a supercritical system, the water is heated to high temperatures under high pressure. After passing through the turbine to generate electricity, the steam temperature has dropped below critical, resulting in slightly greater fuel efficiency compared to sub-critical plants. Integrated Gasifier Combined Cycle Plants (IGCC) work on a different principle and require a great capital outlay, but achieve further efficiency savings over Super Critical (SC) or Ultra Super Critical (UCC) Technology.

The last decade

The only existing coal power-plant in Bangladesh uses sub-critical technology, but super-critical and IGCC coal generation plants are already in use in a number of countries around the world.

Assumptions of model

The model assumes a simple percentage split between technology types as new plants are built in each 5 year period. This is unrealistic at extremely low build rates as modern Coal Power Plant typically have a minimum viability size of 1 GW.

Levels

Level 1

Least effort. There are no new Sub-Critical power stations built after 2025, and USC and IGCC plants both start being built in 2040.

Level 2

Current policy. There are no new Sub-Critical power stations built after 2020, and USC and IGCC plants both start being built in 2035, representing 40% and 50% of newly built capacity in 2050.

Level 3

There are no new Sub-Critical power stations built after 2020, USC Plants start to be built in 2025 but by 2050 IGCC represents 65% of new plants built that period.

Level 4

There are no new Sub-Critical power stations built after 2022, USC Plants start to be built in 2025 but by 2050 IGCC represents 80% of new plants built that period.

Interaction with other levers

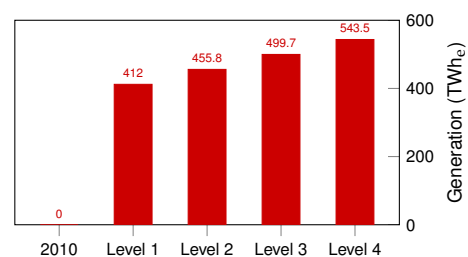


Figure 2.1: Electricity produced per 100 GW capacity

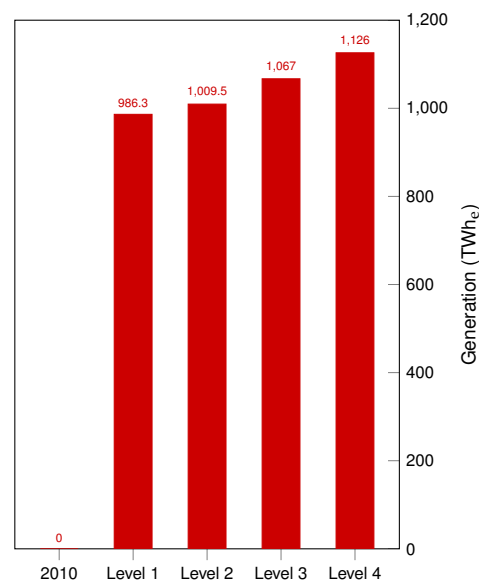


Figure 2.2: Coal required per year for 100 GW capacity



Figure 2.3: An example Coal Power Plant