Electricity: Biomass with CCS

This lever controls the sub-levers listed in the table, and ambition levels are for the end year shown on the right-hand side.

The use of biomass in power generation has the potential to reduce carbon dioxide emissions from electricity production because most of the CO_2 emitted from the combustion of biomass in power generators has been previously absorbed by the crop.

By using biomass in combination with carbon capture and storage (CCS), known as BECCS (bioenergy with carbon capture and storage), there is the potential to remove CO_2 from the atmosphere resulting in negative emissions. This happens because biomass contains CO_2 absorbed during its growth. Ordinarily this is released back into the atmosphere during combustion (net zero emissions). If these emissions are captured, they are prevented from re-entering the atmosphere (negative emissions).

Drax is the UK's largest single power station at nearly 4 GW made up of six 660 MW units. Four of these units are converted from burning coal to biomass, but without CCS.

There is currently no CCS used in power generation in the UK.

Key Interaction

Biomass for power has a direct impact on the demand for biomass. Biomass can be created from waste and biomass grown in the UK, but these have limited availability. Any demand not met by UK biomass is satisfied by imports. However, dependency on large quantities of imported biomass may not be possible in reality and would result in a less robust energy system. UK bioenergy production can be controlled through the Land Use & Biofuels levers.

The amount of CO_2 actually captured and stored is dependent on the capture rate controlled by the CCS Capture Rate lever.

Level 1

CCS is not developed resulting in no biomass with CCS used in power generation.

Level 2

Biomass CCS rises to 5 GW.

Level 3

Biomass CCS rises to 10GW, corresponding to using all of the potential UK domestic biomass supply.

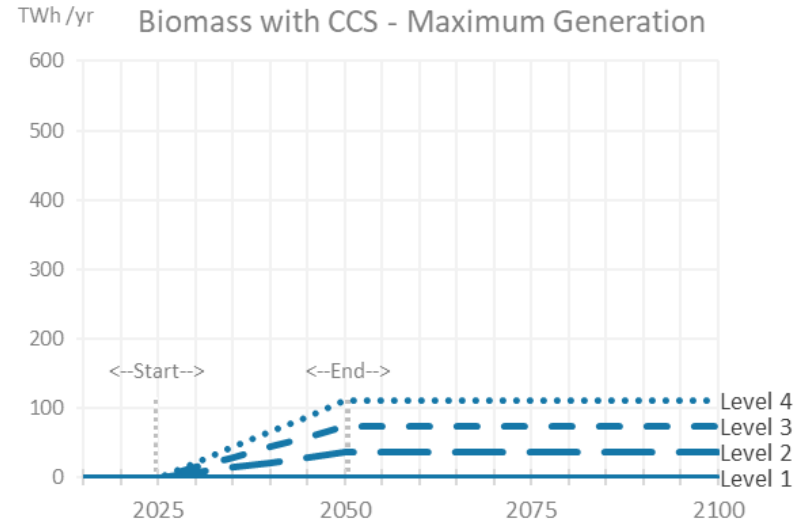
Level 4

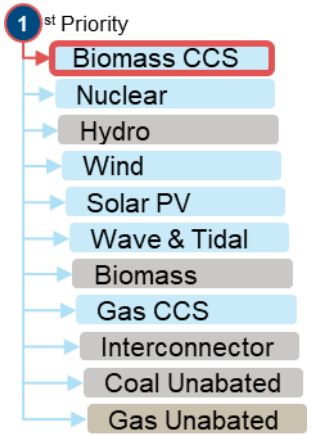
Biomass CCS rises to 15GW providing 110 TWh of energy, and requiring around 1.5 times the maximum available raw biomass of around 300 TWh/year (CCC 'Global Governance and Innovation' scenario).

Default Timing

Start year: 2025, End year: 2050

Sub-Lever	Units	2015	Level 1	Level 2	Level 3	Level 4
Biomass CCS Capacity	GW	0	0	5	10	15





Lever Priority

Biomass with CCS is first in the priority order for generating electricity.

Where supply would otherwise exceed demand, measures lower in the priority order will be superseded by those above them. Unabated gas will meet any shortfall in demand.