

Biomass power stations

In 2009 the UK had 400 MW capacity of dedicated biomass plants, and 255 MW capacity of biomass co-firing plants, which can burn both coal and biomass. If these plants were running 90% of the time and using just energy crops, it would require around 1700 km² of land to grow the fuel on, if it all came from purpose-grown energy crops.

Level 1

Level 1 assumes dedicated biomass plants reach an installed capacity of 600 MW by 2010 and remain at that level until 2050, delivering 4.7 TWh/y of electricity.

Level 2

Level 2 assumes that 180 MW of biomass power plants are built or converted from coal plants every year, reaching 3 GW of installed capacity in 2025 and just under 8 GW by 2050. This is equivalent to a third of the current coal power station fleet and generates 62 TWh/y of electricity. The biomass power plants require solid biomass amounting to 16 times the UK's current use, and if this were all from purpose-grown energy crops they could cover an area the size of Wales.

Level 3

Level 3 assumes there is a sustained build/conversion rate of biomass plants just above the historical maximum rates in Sweden and Italy for every year from 2010 to 2050. The installed capacity reaches 5 GW in 2025 and over 12 GW by 2050. This is roughly equivalent to half the UK's current fleet of coal power stations and generates about 100 TWh/y of electricity. These biomass power stations use up to 26 times more solid biomass than we do today, which could be sourced from 32 000 km² of land, or 1.5 times the area of Wales.

Level 4

Level 4 assumes that the UK constructs a fleet of biomass power stations roughly equivalent to the current coal power stations' installed capacity of 23 GW. Total capacity reaches 8 GW in 2025 and over 22 GW by 2050. Based on the size of today's average power stations, this requires over 500 dedicated biomass power stations or 11 coal-plant-sized equivalents. The power stations use just under the maximum available solid biomass of 535 TWh/y, representing 58 000 km² of energy crops, an area nearly 3 times the size of Wales. After efficiency and processing losses, these biomass power stations produce nearly 180 TWh/y of electricity output.



Figure 1. Drax power station, which burns both coal and solid biomass. Photo ©Ashley Lightfoot.

