Coal-to-biomass conversions: Supplementing one (climate) disaster with another?

Which UK coal power stations are to be converted to biomass and how much wood will they be burning?

Planning consent has been granted for four power stations to convert, either partly or completely, to biomass (excluding Tilbury B which was closed by RWE Npower in August 2013, having burned wood pellets from late 2011 until then - and excluding Rugeley Power Station where the operators also got planning permission to convert but publicly dropped those plans).

- Drax: Drax has so far burned more (imported) wood than any other UK power station and they are about to convert half their power station to biomass, which will require pellets from up to 14.89 million tonnes of green wood a year. So far they have already converted one unit to biomass and they plan to convert another two. They have been guaranteed long-term subsidies (i.e. a Contract for Difference) for a second unit conversion;

- Ironbridge (E.On): Both of Ironbridge's units were converted to biomass in early 2013. At full capacity, the power station would require pellets made from up to 7.88 million tonnes of green wood a year. Ironbridge is currently scheduled for closure in 2015, however E.On could put forward a planning application for continuing to run it long-term;

- Eggborough: The operator has permission to convert the power station to 100% biomass and they have been offered long-term subsidies for a 75% conversion. Such a 75% conversion would require pellets made from 11.82 million tonnes a year. Actual work towards a conversion has not yet been announced but the Chinese General Nuclear Power Group is reportedly negotiating a take-over bid, which would see them proceed with the conversion;

- Lynemouth Power station (bought by RWE Npower in late 2012): The previous owners obtained planning consent to convert to 100% biomass. A full conversion would require pellets from up to 3.31 million tonnes of green wood. RWE has been guaranteed long-term subsidies (i.e. a Contract for Difference) for this conversion;

(Note: Figures calculated on the assumption that the power stations would not run non-stop but for 7,000 hours a year.)

Altogether, those four power stations would need around 19 million tonnes of pellets made from around 38 million tonnes of green wood. By comparison, total UK wood production is only 10 million tonnes annually. And total global wood pellet production was just 14 million tonnes in 2010, though it is now expanding rapidly, especially in North America.

Where will the wood come from?

Virtually all of the wood will be imported. At present, most imported pellets come from British Columbia and the southern US, some from Latvia, Portugal, South Africa and New Zealand. British Columbia and the southern US are both regions where biodiverse and

carbon-rich forests are being clearcut, increasingly for wood pellets. In many cases, such forests are then converted into industrial tree plantations. In the southern US, investigations have shown that some of the wood used by pellet company Enviva (who supply Drax and have agreed to supply Ironbridge) comes from ancient trees, more than 100 years old logged in swamp forests. Pellets imported from the southern US are being made from whole trees. In British Columbia, the number of logging concessions/quotas has been increasing at the same time as demand for wood pellets for UK and other power stations has been rising.

Information obtained by Biofuelwatch through a Freedom of Information request shows that, for technical reasons, the only type of biomass that can be burned in converted coal power station units is pellets made from wood from slow-growing trees and with little bark. Other types of biomass - such as straw, miscanthus, eucalyptus and other fast growing trees - corrode the boilers. The same problem significantly limits the amount of forestry/sawmill residues that can be used: Sawmill offcuts, for example, are high in bark and therefore cannot be burned in such power stations. [Note that new-built biomass power stations can often burn a greater range of biomass because they are differently designed.]

As a result of the massive new demand for wood from northern forests for bioenergy, industrial tree plantations are set to expand much further in countries such as Brazil and South Africa, to produce the wood for paper that would previously have come from North America or Europe.This will mean more land-grabbing, less food sovereignty and food security and, directly or indirectly, more destruction of tropical forests.

Climate impacts:

Power stations burning wood emit around 50% more carbon than ones burning coal.[1] Companies and policy makers ignore this carbon, claiming that new trees will grow back and absorb the carbon emitted from cutting down and burning mature ones. Yet it tends to take decades – 70 years for UK conifers – before that can happen. And when forests are destroyed and turned into monoculture plantations, much of that carbon will simply stay in the atmosphere. Such a carbon spike is a disaster at a time when scientists have shown that emissions must be reduced rapidly if we want to have any hope of avoiding the worst impacts of climate change.

Local impacts:

Burning biomass in power stations causes similar levels of air pollution as coal burning overall. It emits less sulphur dioxide (SO_2) but more very fine particulates (PM 2.5, which pose a particularly serious risk of lung and heart disease and for which there is no safe level, according to the World Health Organisation) and more harmful Volatile Organic Compounds. By far the main air quality concern, however, is that biomass conversions will allow power stations which would otherwise be shut down to operate for decades to come. Communities such as those around Tilbury B and Ironbridge will thus be exposed to high levels of air pollution for much longer. Furthermore, conversion to biomass greatly increases the risk of accidental fires and explosions.

What is behind the UK's coal-to-biomass conversions:

There are two reasons why big energy companies are investing in such conversions in the UK:

[1] This figure is not contested – it is confirmed for example in permitting details for biomass power stations by the US Environmental Protection Agency. See http://www.pfpi.net/carbon-emissions

Firstly, they have been able to persuade the Government to grant generous subsidies, paid currently as Renewable Obligation Certificates and for future conversions as 'strike prices'. Drax can expect around £694 million in subsidies a year if they convert to 50% biomass and all four conversions together would attract around £1.2 billion a year in renewable electricity subsidies.

Secondly, UK coal power stations emit more sulphur dioxide (SO2) than those in any other EU countries. All but one of the power stations withh planning consert for conversion to biomass either fail EU air quality regulations in respect of sulphur dioxide (SO2), or will fail them from 2016. Burning biomass is a subsidised and thus lucrative way of reducing SO2 emissions from power stations. Tilbury B and Ironbridge would legally have to close before the end of 2015 unless they can drastically reduce their SO2 levels. Drax and Eggborough are meeting EU requirements only because they are buying 'SO2 permits' from others and they will no longer be able to do so from 2016. Their options are to close their old, polluting power stations, or to invest hundreds of millions of pounds into SO2 scrubbing (something they have refused to do so far), or to convert, at least partly, to biomass. Biomass conversion thus allows energy companies to keep their old, polluting power stations running for much longer, rather than having to shut them down or invest in highly expensive technology for reducing SO2. And by converting to biomass, they will cash in on billions of pounds of public subsidies every year.

A replacement for coal – or a way of keeping old, polluting power stations running for longer?

Energy companies are not investing in biomass conversions because they want to burn less coal. RWE for example is investing in far more new coal capacity in the Netherlands and Germany than it is trying to replace with biomass in the UK. Without the conversions, several large coal power stations would have to be closed down imminently – biomass is thus not an alternative to coal but to closing down power stations. In fact, partial biomass conversion is likely to allow some to also burn coal for much longer than they would otherwise have been able to. Stopping the conversions would reduce the UK's old, inefficient, polluting and high-carbon power station capacity, and thus create real incentives to cut energy use and invest in genuine renewable energy.