Dear Mr Bond,

2nd May 2012

Re: E.On's application for variation of Environmental Permit for coal-to-biomass conversion, Ironbridge

I am writing on behalf of Biofuelwatch to comment on E.On's variation of permit application on behalf of Biofuelwatch.

We would like to comment on air quality impacts, health and safety implications and carbon emissions.

Air quality impacts:

1) E.On state that they believe that NOx emissions will be reduced, based on their short-term trial of co-firing 20% wood pellets with coal in 2011. Nonetheless, they are asking for the current NOx limit of 500 mg/m3 to be retained, acknowledging uncertainties. We note that this limit is significantly higher than actual NOx stack emissions from Ironbridge Power Station over the past two years. Yet for the purpose of the air quality model carried out for the purpose of the permitting variation application, E.On has chosen to use not this maximum permitted level they wish to retain, but a lower one, of 450 mg/m3. Using an emissions level lower than what is permitted for an air quality model appears highly questionable to us.

2) E.On's claim that NOx stack emissions will likely be reduced, not increased appears to be supported by evidence. Nitrogen content of fuel is just one of different factors that affect NOx emissions. With regards to co-firing, as a report published by the International Energy Agency sums it up:

   "*NOx may increase, decrease, or remain the same, depending on fuel, firing conditions, and operating conditions*." (http://ieabcc.nl/publications/paper_cofiring.pdf)

   A European Commission briefing confirms:

   "*Research results on NOx formation in co-firing are somewhat contradictory. Some research groups claim that NOx levels decrease when biomass is mixed with coal. Some results show just the opposite. NOx formation is a complex process. What is certain is that the combustion process is affected by a number of factors.*"

   (http://ec.europa.eu/energy/renewables/studies/doc/bioenergy/2003_cofiring_eu_bionet.pdf) Combustion conditions – and thus NOx emissions – are known to be significantly affected by the proportion of biomass to coal burnt.

3) While co-firing a minority proportion of biomass with coal is a widely-tested and commercially established technology, burning mainly or solely wood pellets in a pulverised fuel burner designed for coal combustion is not. It raises quite different challenges and creates different combustion conditions. We understand that varying the type and proportion of biomass burnt in such boilers can, for example, lead to excessive fouling and slagging which in turn can result in very high NOx emissions (http://www.ieabcc.nl/). Apart from the fact that emissions testing in E.On's 2011 wood pellet trial only involved 20% co-firing, the fact that it only lasted for a few hours means that such potentially very adverse effects could

not have been ruled out. We have been unable to find any literature about air emissions from such a process. Indeed the only three examples (except for Tilbury B which was operating for only a few weeks before the fire), which we have found about technically successful coal-to-biomass conversions include one gasification unit in the Netherlands (very different from pulverised fuel combustion) and two combined heat and power plants in Scandinavia – thus very different designs from Ironbridge. We therefore cannot see how a predicted maximum level of 450 mg/m3 NOx emissions (for the purpose of the air quality model), nor can we see how there can be confidence that a level of 500 mg/m3 would not be breached.

4) The meteorological data used for the purpose of the air quality model is that for Shawbury. Our local contacts have advised us that there are substantial differences in relevant micro-climate in Shawbury compared to Ironbridge and the Wrekin area. Shawbury is on the Shropshire plain, with conditions allowing for free convection and strongly mitigating against temperature inversions. On the other hand, we understand that Ironbridge Gorge and the surrounding area experiences regular temperature inversion, particularly during the winter, with convection restricted by the geographical features of the area. Reliance on Shawbury data means that the effects of temperature inversion and restricted convection on air quality would have been ignored.

5) Given the high range of uncertainty over NOx emissions and the possibility of high and potentially increased emissions, we are concerned that primary (low NOx burners) without secondary NOx mitigation should be considered to be 'best available technique'.

6) Although we note from the Air Quality Assessment that Chromium VI emissions are expected to be lower from wood than coal combustion, we are deeply concerned to read that they will reach 360% of the EAL. This is ascribed primarily to 'background levels' yet I presume that those background levels themselves will be strongly affected by operations at Ironbridge. Given the serious health problems associated with Chromium VI, much stricter action to curb those emissions would appear vital to us.

Health and safety implications:

E.On's permitting documents make it clear that replacing coal with wood will increase the risk of fires and dust explosions. We are concerned that during the trial in 2011, the process only ran without incident for a very short duration. After an explosion and a second over-pressurisation incident, E.On claimed that six hours of smooth operation showed that their mitigation measures were working and that the process was now safe. We cannot see how a 'safe operation' conclusion can be based on such a short period. Furthermore, we note that the fire response plans put forward by E.On have been shown, by the recent Tilbury B fire, to be inadequate and inappropriate, since they rely on water, not foam.

Carbon emissions and sustainability:

As far as stack emissions of CO2 are concerned, those are higher from wood than from coal combustion per unit of energy, due to the lower energy density of biomass. This has been confirmed in the IPCC's 2006 Greenhouse Gas Inventory Guidelines.

Questions about biomass CO2 emissions relate entirely to life-cycle emissions.

The CO2 analysis put forward by E.On does not include all emissions associated with a full life cycle analysis. In the case of wood-based bioenergy, the carbon debt stems not from land use

change alone but also from the long time it takes new trees and forests to re-absorb the carbon emitted from logging, shipping and burning older trees. Three recent studies look in detail at the 'carbon debt' incurred by increased logging in temperate forests in the US and Europe.

+ One is the Biomass Sustainability and Carbon Policy Study by the Manomet Center for Conservation Sciences, commissioned by the Massachusetts Department of Energy Resources (http://www.manomet.org/sites/manomet.org/files/Manomet_Biomass_Report_Full_LoRez.pdf).
The two main conclusion from the Manomet study were:
If biomass is used in electricity-only power stations, the overall carbon emissions/climate impacts will still be worse than those of generating the same electricity of coal after a period of 40 years – the period is 90 years if biomass is compared to gas. The carbon impact of burning biomass for heat generation or CHP may be better, however even for CHP, when biomass is compared to natural gas, the climate impacts are still significantly worse after 40 years. (see: tinyurl.com/35lb35e).

+ Another scientific study which looks at the carbon debt from wood-based bioenergy has been published by Joanneum Research in Austria (www.birdlife.org/eu/pdfs/Bioenergy_Joanneum_Research.pdf).
The main findings are: When trees are felled for bioenergy, there will be no 'climate benefits' compared to fossil fuels for a period of 200-300 years, i.e. bioenergy from whole trees will worsen climate change for two or three centuries. The removal of logging residues from forest soils will worsen the carbon balance of bioenergy by 10-40%; Where bioenergy results, whether directly or indirectly, in land conversion for tree plantations, the full greenhouse gas impact must be taken into account and if forests are converted to plantations, bioenergy will be worse for the climate than the fossil fuels replaced for at lest 150 years.

+ A recent study by the Southern Environmental Law Center together with Biomass Energy Resource Center, Forest Guild and Spatial Informatics Group finds that burning wood from South-eastern US forests results in a carbon debt of 35-50 years compared to fossil fuels. (http://www.southernenvironment.org/uploads/fck/file/biomass/biomass-carbon-study-021412-FINAL.pdf). This is particularly relevant since E.On have entered into an agreement with Enviva under which they will be sourcing wood pellets from North Carolina and Virginia and the South-eastern US.

All of those studies strongly contradict E.On's carbon savings claims.

Best regards,

Almuth Ernsting
Biofuelwatch