

Dear Sir/Madam,

**Re: Objection to Balfour Beatty's and Nexterra's planning application for a waste-wood fuelled combined heat and power station at Fiddlers Reach, Ref 15/00510/FUL**

I am writing on behalf of Biofuelwatch an organisation which provides research, education and advocacy in relation to large-scale industrial bioenergy (see [www.biofuelwatch.org.uk](http://www.biofuelwatch.org.uk)). We wish to object to the planning application for a waste wood biomass gasifier at Fiddlers Reach. Our grounds for objecting are:

- + Lack of convincing evidence that the proposal complies with the waste hierarchy principle;
- + Low-efficiency design of the plant which we believe is contrary to 'good design' principles contained in national planning policy;
- + Adverse impacts on local air quality posing a threat to public health.

Before discussing our grounds for objecting in detail, we wish to provide background information about Nexterra's record and about the technology involved in this development.

General comments on Nexterra's waste wood gasification technology:

Biomass gasification for electricity generation (whether in combined heat and power or electricity-only power plants) is not an established technology. It remains a technology beset with serious technical problems, problems which elsewhere have resulted in serious health and safety problems (including fires and explosions) and excessive emissions of air pollutants. Those are not problems which can be easily overcome – they are problems which have been routinely encountered in biomass gasification developments worldwide since attempts to use the technology to produce electricity were first made in the 1970s and '80s. The extremely poor record of biomass gasification technology for electricity generation was acknowledged by the World Bank in 1995<sup>1</sup>. It was confirmed by a report commissioned by the German government in 2010<sup>2</sup>. According to that report, around 50 biomass gasifiers had been installed in Germany between 2000 and 2010, however: *"Many have been taken out of operation after some months of trial. Some plants went up in flames and developers went bankrupt. The few plants that achieved more or less continuous operation were operating under special circumstances: They were part of university research programmes or were operated by the developers themselves. Moreover, in almost all cases about one to two years of adaptation were necessary"*.

Research by Biofuelwatch has revealed that across the UK 9 biomass gasifiers with a capacity of at least 1 MW have been built with the aim of generating electricity. 8 of those have failed and been shut down and there is no evidence that the ninth has so far operated successfully either. These biomass gasifiers appear to have largely failed early on during the commissioning phase. However, in Dargavel in Scotland, a similar Municipal Solid Waste gasifier was operated intermittently from December 2009 until

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<sup>1</sup> [http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/1999/08/15/000009265\\_3961214154711/Rendered/PDF/multi\\_page.pdf](http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/1999/08/15/000009265_3961214154711/Rendered/PDF/multi_page.pdf)

<sup>2</sup> <http://www.gvepinternational.org/sites/default/files/resources/gtz2010-en-small-scale-electricity-generation-frombiomass-part-i.pdf>

summer 2013. During that time, hundreds of breaches of air emission limits, dozens of noise complaints and at least 88 bypass stack activations were recorded according to the Scottish Environmental Protection Agency (SEPA). Bypass stack activations were incidents where toxic gases were vented straight into the atmosphere, bypassing the mitigation systems, in order to prevent pressure inside from the gasifier from building up and causing an explosion. Following an explosion and a fire, SEPA finally revoked the environmental permit in August 2013<sup>3</sup>.

Nexterra, the company which would design the Fiddlers Reach gasifier if approved, has so far built three gasifiers designed to generate electricity. The first of those, built at the University of South Carolina, experienced three incidents described as 'potentially lethal' by a senior university staff member. The third one was an explosion which blew a metal plate 60 feet towards the control room. It was then shut down<sup>4</sup>. The second such Nexterra plant was commissioned at the University of British Columbia in October 2012. This gasifier failed within a few months and the university had to purchase biogas from a different provider instead of burning syngas from Nexterra's gasifier<sup>5</sup>. The third Nexterra power plant was to have been commissioned at a health centre in Michigan in March 2014<sup>6</sup> but neither Nexterra nor the health centre have announced commissioning of this plant, which means that it is now 15 months beyond schedule.

The prospects of this plant, if approved and built, consistently complying with permitting and planning conditions therefore appear slim.

Lack of convincing evidence that the proposal complies with the waste hierarchy principle:

The development would involve gasification of up to 110,000 tonnes of waste wood annually. Therefore, the waste hierarchy principle set out in the EU Waste Framework Directive, the National Planning Policy for Waste and the Waste Management Plan for England applies to this development. The waste hierarchy principle is also recognised in Thurrock Council's Core Strategy and Policies for Management of Development 2011 (CSTP29 – Waste Strategy).

This principle requires waste to be used as far high up the waste hierarchy as possible. Diverting waste from recycling to energy-from-waste would contradict this principle.

In 2012, Defra published a review of research into wood waste in the UK<sup>7</sup>. It summarises a 2011 report by Tolvik which estimated that by the end of 2012, waste wood recovery would be 3.3 million tonnes, demand from other sectors 2.1 million tonnes and that a mere 100,000 tonnes per year would be available for new biomass plants across the UK – a figure that could rise to 500,000 tonnes, if waste wood recovery was improved to 85% by 2015. The report showed that if only 25% of the biomass capacity planned at the time was developed, there would be a waste wood shortfall by 2015. Defra warned that the shortfall could be even greater because 85% waste wood recovery might not be achieved. Additional reports by Pöyry and WRAP with similar findings were cited by Defra. Finally, Defra's research showed that the UK is a net importer of wood fibre, including waste wood.

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<sup>3</sup> <http://media.sepa.org.uk/media-releases/2013/sepa-revokes-scotgen-dumfries-limiteds-permit/>

<sup>4</sup> <http://www.thestate.com/news/business/article14396069.html>

<sup>5</sup> <http://www.nrcan.gc.ca/energy/funding/current-funding-programs/cef/4971>

<sup>6</sup> <http://www.nexterra.ca/files/us-veterans-affairs.php>

<sup>7</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/82571/consult-wood-waste-researchreview-20120731.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/82571/consult-wood-waste-researchreview-20120731.pdf)

Since Defra's research was published, significant new capacity for bioenergy from waste wood has been commissioned or reached financial closure – including the Tilbury Green Power Plant which is to initially burn 270,000 tonnes of Grade B and C waste wood annually. In future, and in accordance with existing planning consent – that plant could be scaled up to burn up to 350,000 tonnes of waste wood a year. Grade C waste wood includes Grades A and B and thus includes all waste wood not officially classed as Hazardous (i.e. Grade D). Both the Tilbury Green Power plant and the proposed Fiddlers Reach gasifier would, according to their developers, burn the same type of feedstock (Grades B and C waste wood) from a largely identical sourcing radius<sup>8</sup>. As the planning documents for this development confirm, the intended sourcing region for the Fiddlers Reach plant also overlaps with the catchment area for waste wood sourcing for a waste wood biomass plant currently under construction at Ridham Dock (requiring 172,000 tonnes of Grade C waste wood) and with the sourcing region for the 65 MWe Markinch biomass power station (i.e. with the region from which SITA intends to source waste wood for that plant, to be shipped from Ridham and Brighinglea to Scotland). The planning documents state that the expected total demand from the Fiddlers Reach catchment area will be 492,000 tonnes of waste wood per year without and thus 602,000 tonnes per year with the proposed development (not including an additional 80,000 tonnes of waste wood which might be burned in future by the Tilbury Green Power Plant. This is more than the maximum waste wood availability for post-2012 biomass plants across all of the UK (500,000 tonnes) which was projected by Tolvik's research for Defra in 2011.

We note that the developers have commissioned Tolvik to provide their Market Need Assessment and that Tolvik claims that enough waste wood to supply all of those plants could be sourced from within the region without the waste hierarchy principle being breached. We are seriously concerned to see that Tolvik's claims contradict the results of their own research for Defra in 2011. We are further concerned that the basis for their claims made in this planning application (i.e. in <http://edocs.thurrock.gov.uk/AnitePublicDocs/00145583.pdf>) is not transparent. Tolvik's Market Need Assessment states:

"A combination of Tolvik's own in house knowledge and databases and government data has been used to assess the availability of Biomass Feedstock for the Proposed Development. These include:

+ EA's Waste Data Interrogator:

[http://www.geostore.com/environmentagency/WebStore?xml=staticweb/xml/dataLayers\\_WDI.xml](http://www.geostore.com/environmentagency/WebStore?xml=staticweb/xml/dataLayers_WDI.xml);

+ Government Renewable Energy Planning Database:

<https://www.gov.uk/government/statistics/renewable-energy-planning-databasemonthly-extract> ".

"In house knowledge" is not verifiable and the supposed weblink for the "EA's Waste Data Interrogator" does not work nor have we been able to find such figures anywhere on the Environment Agency's website.

We believe that Defra's research report and the studies cited in this provide a credible assessment of waste wood availability for biomass in relation to the waste hierarchy. We also would also suggest requesting further evidence regarding Tolvik's report for this planning application, in particular the actual sourcing data related to presumed waste wood arisings (given that at present, only one wrong weblink is cited for that).

Finally, we would like to emphasise that Grades B and C waste wood include Grade A waste wood and that there is nothing to prevent the plant from gasifying the cleanest

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<sup>8</sup> See Figure 8 of the Market Need Statement submitted by Nexterra and Balfour Beatty, <http://edocs.thurrock.gov.uk/AnitePublicDocs/00145583.pdf>

types of waste wood and thus competing with all existing types of waste wood recycling. In fact, Defra's 2012 report highlighted the lack of separation of contaminated from clean waste wood as a concern.

Low-efficiency design of the plant which we believe is contrary to 'good design' principles contained in national planning policy:

According to the figures contained in the planning application, this plant will achieve a mere 33% efficiency. 33% is very inefficient for a combined heat and power (CHP) plant of this size. Biomass CHP plants can easily achieve 70% or greater conversion efficiency.

The low efficiency of the proposed plant is due to the technology and design choices made by the developers. Nexterra is proposing a plant consisting of four small biomass gasification units, using steam cycle technology. A plant of this type will be significantly less efficient than one standard biomass combustion plant with the same overall capacity. Other biomass gasification technologies, i.e. ones that rely on gas engines or gas turbines, would – if they could be operated successfully – be more efficient still (compared to standard combustion plants). This is because

a) Burning fuel in gas engines or gas turbines is more efficient than burning it to power a steam turbine (only clean gas can be burned that way);

b) Steam turbine efficiency depends on size: A small power plant unit using steam cycle technology will be less efficient than a larger one and a 14 MWe plant with four units will be far less efficient than a single unit 14 MWe biomass plant.

Government policy on biomass (UK Bioenergy Strategy 2012<sup>9</sup>) emphasises the need to maximise the efficiency of bioenergy. It does support efficient biomass gasification – but, as we have shown, this is not a proposal for efficient biomass gasification; it is a proposal for extremely inefficient biomass gasification.

The Overarching National Policy Statement for Energy (which should be considered as guidance for applications below 50 MWe) highlights the need for 'good design' of energy projects which would require them to be "efficient in the use of natural resources and energy used in their construction and operation"<sup>10</sup>. We believe that this proposal is incompatible with this requirement.

Impacts on air quality and public health:

We believe that this proposed CHP plant would make it more difficult for Thurrock Council to ensure that European Air Quality Standards and UK Air Quality Objectives will be met across the local authority area. In this context, we would like to highlight the recent Supreme Court judgement that ruled that the UK is in breach of the EU Air Quality Directive and that urgent measures must be taken to ensure that this Directive is fully complied with as soon as possible<sup>11</sup>. Thurrock Council has declared 15 Air Quality Management Areas because of current or expected breaches of the legal air quality standard for nitrogen dioxide (NO<sub>2</sub>) and, in four areas, of small particulates (PM<sub>10</sub>), too. Given the existing problems with air quality in the area, as well as cumulative emissions

<sup>9</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/48337/5142-bioenergy-strategy-pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48337/5142-bioenergy-strategy-pdf)

<sup>10</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/37046/1938-overarchingnps-for-energy-en1.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/37046/1938-overarchingnps-for-energy-en1.pdf), 4.5.1

<sup>11</sup> [https://www.supremecourt.uk/decided-cases/docs/UKSC\\_2012\\_0179\\_Judgment.pdf](https://www.supremecourt.uk/decided-cases/docs/UKSC_2012_0179_Judgment.pdf)

from the Tilbury Green Power plant, we have serious concerns about the additional pollution that this development would cause.

Best regards,

Almuth Ernsting  
Biofuelwatch Co-Director