Dear Sir/Madam,

Re: Carbon Sole Ltd. planning application Ref. 20705

I am writing on behalf of Biofuelwatch to object to Carbon Sole Ltd.'s planning application for a biomass gasification and BioSNG plant at Stonehall, next to Shannon Airport. ***We believe that the Environmental Report does not adequately reflect the impacts of this development and that the application must not be approved on the basis of such an inadequate assessment.***

Biofuelwatch (biofuelwatch.org.uk) is a non-profit organisation that provides information, advocacy and campaigning in relation to the climate, environmental, human rights and public health impacts of large-scale industrial bioenergy. We published a report on biomass gasification and pyrolysis based on extensive desktop research in 2015,[1] and we have studied and responded to different biomass gasifier proposals across the UK. In 2018, we published a report about cellulosic biofuels (including any biofuels made from wood), again based on extensive desktop research.[2] Carbon Sole's proposal includes the production of cellulosic biofuels produced via gasification and syngas methanation.

Before setting out our grounds for objection, we would like to share some general observations about the technologies which Carbon Sole proposes to apply in this development:

BioSNG production from wood:

According to a 2019 report by the European Commission's Joint Research Centre, the technology is highly challenging because it requires eliminating tar formation during gasification, and "*the composition of biomass syngas, in terms of CO, CO2 and H2 ratios, is typically not suitable for the process, and thus the use of steam gasification is required*".[3] A small number of pilot plants have, in the past, succeeded in producing very limited amounts of BioSNG from wood, but they have been closed down. Two small pilot plants are under construction, one in the Netherlands and the UK, each of them smaller than ones previously abandoned.[4] No developer has thus achieved what Carbon Sole proposes to do and, furthermore, they propose to make BioSNG without steam gasification, something that the JRC states would not be possible.

Biomass gasification for electricity and heat generation:

The gasifier technology which Carbon Sole proposes to use is one developed by EQTEQ. The first development of EQTEQ, under its previous names (Kedco, then REACT Energy), was a biomass gasification plant in Newry, County Down. It has never successfully generated electricity. EQTEQ delivered a 6 MW biomass

[1] biofuelwatch.org.uk/2015/biomass-gasification-and-pyrolysis/
[2] biofuelwatch.org.uk/2018/cellulosic-biofuels-report-pr/
[3] publications.jrc.ec.europa.eu/repository/bitstream/JRC118317/jrc118317_1.pdf
[4] platformduurzamebiobrandstoffen.nl/wp-content/uploads/2020/02/JRC_Final_Report_Public.pdf

gasifier to a combined heat and power plant in Movialsa, Ciudad Real, Spain.[5] However, the operators of that plant have announced that they are converting to natural gas on the grounds that it is more economic and cleaner.[6] Although EQTEQ's website refers to a number of other projects in different European countries, we can find no independent information to indicate whether those plants are successfully operating using this technology.

We appreciate that the serious questions regarding the viability of the technologies proposed may not be a material planning issue, however we would urge the planning authority to require evidence from Carbon Sole to back up claims made in the environmental assessment, for example with actual air emissions and efficiencies data from other plants using the same technologies they propose to use.

Our grounds for objection are as follows:

1. Environmental Report fails to acknowledge and assess energy generation to operate the biomass dryer:

The Environmental Report states that 133,000 tonnes of green/wet wood, mostly virgin woodchips a year will be taken to the processing unit where they will be dried using a dryer operating providing low temperature heat.

Yet no information is given about the energy requirement for operating the dryer, nor how that energy will be sourced.

It is stated that all of the wood will be dried and gasified to produce BioSNG, heat for export to a future district heat network, and electricity to be supplied to the grid.

It is further stated that "the Proposed Development does not contain any element, which will produce greenhouse gaseous emissions or odorous emissions" – a claim based on the assumption that all bioenergy ('biogenic carbon) is carbon-neutral. This rules out fossil-fuel energy inputs, e.g. from the grid.

No specifications of the biomass dryer are given. According to a report by the UK Forestry Commission, [7] the most efficient dryers require an energy input of 950 kWh per tonne of water they evaporate.

Carbon Sole plans to evaporate enough water to reduce the moisture content from around 50%[8] to 5-10%, i.e. a minimum of 400 litres of water per tonne of woodchips. Our calculations show that (based on the Forestry Commission report), a minimum of 50,540 MWh of energy is required for the drying process, which is equivalent to 14.4% of the total energy input contained in the 133,000

[5] eqtecplc.com/projects/movialsa/
[6] nedgia.es/conocenos/en/nedgia-castile-la-mancha-to-convert-the-movialsa-high-efficiency-cogeneration-power-plant-to-natural-gas/
[7] forestresearch.gov.uk/research/publications-on-woodfuel/, Woodchip Drying, Report 45
[8] eubia.org/cms/wiki-biomass/biomass-characteristics-2/

tonnes of green wood.[9] Either more wood is required or less BioSNG, heat or electricity can be exported. Furthermore, depending on how the energy for the dryer is generated, air pollutants may be emitted from this process, and there may be noise impacts.

2. Some of the wood is to be chipped on site, yet wood chipping is excluded from the scope of the environmental assessment:

The planning documents state:

"The biomass required will be sourced from two supply streams:

- directly from plantations as round pulp logs, chips, or harvest residues, or
- as sawmill residues in the form of chips."

This means that an unspecified proportion of the wood will be chipped onsite. This will have some implications for the greenhouse gas balance (since most wood chippers run on diesel). Above all, it will have implications for noise impacts. We note with concern that no noise impact assessment for the operational phase of the project has been carried out.

3. No adequate noise assessment for the operational phase:

The Environmental Report simply states that noise will be compliant with BS EN ISO 3746 and 3747. These are methods for assessing sound energy or sound power levels.[10] They are not standards which set out how much noise can be emitted. Furthermore, the report says that "a warranty will be sought from the manufacturer" to confirm that noise levels would be "less than or equal to the noise limits set out in this section". However, no noise limits have been set out. In short, there is no assessment of noise impacts form the operation of the proposed plants at all. Yet noise is a serious concern for residents living close to many other biomass plants. And, in Scotland, the environmental regulators (SEPA) recorded 45 noise complaints between December and 2009 and April 2011, when that plant shut down.

According to the Guideline for Safe and Eco-friendly Biomass Gasification by Intelligent Energy – Europe (IEE), published by the European Commission,[11] noise from equipment (gas engines, blowers, coolers), from material handling, and from vehicles can cause serious environmental impacts and must be mitigated. Furthermore, as seen above, there may be additional noise from wood chipping in the case of this development.

We therefore believe that a full noise impact assessment should be required for such a planning proposal.

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[9] According to eubia.org/cms/wiki-biomass/biomass-characteristics-2/, green forest woodchips with a 50% moisture content have a lower heating value of 9.5 GJ per tonne. A conversion of GJ to MWh shows that 133,000 tonnes of such woodchips contain 350,972 MWh of energy.

[10] iso.org/standard/46426.html and en-standard.eu/bs-en-iso-3746-2010-acoustics.-determination-of-sound-power-levels-and-sound-energy-levels-of-noise-sources-using-sound-pressure.-survey-method-using-an-enveloping-measurement-surface-over-a-reflecting-plane/.

[11] ec.europa.eu/energy/intelligent/projects/sites/iee-projects/files/projects/documents/gasification_guide_final_guideline_for_safe_and_eco_friendly_biomass.pdf

4. The developer claims greenhouse gas and air quality benefits from the distribution of heat, without proposing any infrastructure to distribute heat:

The Environment Report claims that heat will be distributed to heat customers in Shannon Town via a district heating network, and it claims greenhouse gas emission reductions based on such heat supplies.

However, no such district heating network exists, and this application includes no proposal to build such infrastructure. As far as we know, there is no existing planning consent for such a district heating network, and nobody has proposed investing in this.

We therefore cannot see any reason why Carbon Sole should be permitted to claim positive environmental impacts from such a fictitious heating network. At best, they can argue that their development would be technically capable of supplying heat should another developer later get planning consent and was to build a district heating supply from their plant to Shannon Town.

4. Lack of any health and safety assessment:

We note that the Health and Safety Authority has requested an assessment under Schedule 1 of the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015. We are very concerned that no health & safety assessment has been provided prior to the deadline for planning objections.

As the Final Guideline for Safe and Eco-friendly Biomass Gasification highlights, risk assessments are vital to assess "the hazards specific to the gasification process, such as: fire, explosion/deflagration, toxic substances, etc." There are numerous reports of serious accidents at different gasification plants,[12] and we believe that no planning consent must be granted without a careful assessment of those risks and any mitigation measures proposed.

We assume that BioSNG would meet the definition of "upgraded biogas" which falls under the 2014 Chemicals Act Regulations, and should be treated as equivalent to Liquified Natural Gas in so far as major accident hazards are concerned.

5. Lack of any impact assessment related to Shannon Airport:

We note that the Irish Aviation Authority has asked the Planning Authority to require an assessment of potential impacts on Shannon Airport. Biofuelwatch has no expertise in aviation safety, however, we are very aware that those considerations may impact on the maximum stack height that can be permitted for the proposed plant. And stack height will determine how air emissions disperse and affect residents at different locations.

[12] See zerowasteoz.org.au/wp-content/uploads/2018/05/Fire-explosion-and-chemical-toxicity-hazards-of-gasification-energy-from-waste.pdf

6. Lack of any air quality model for the operational phase of the project, coupled with claims about very low flue gas emissions:

The Environmental Report claims that expected flue gas emissions will be 1.3 mg/Nm^3 of SO_2, 45 mg/Nm^3 of NOx, 130 mg/Nm^3 of CO, and less than 5 mg/Nm^3 of dust (PM10).

On this basis, no actual air quality modelling of emissions has been conducted.

We believe that those emission figures should not be accepted in the absence of actual data from an EQTEQ biomass gasification plant. As mentioned above, there are reports of one of their gasifiers, in Spain, being replaced with natural gas, partly to reduce flue gas emissions which, if true, strongly contradicts claims made in this Environmental Report.

We also note that the plant would come under the Medium Combustion Plant Directive, which sets emission limits of 170 mg/Nm^3 of SO_2 for biogas, and 250 mg/Nm^3 for NOx – far higher than figures cited in Carbon Sole's Environmental Report.

We would further suggest that an air quality assessment should take account of air quality concentrations measured closer to the site than those in Kilkenny. We note that Shannon Airport monitors air quality at three locations every six months.[13] We can find no public record of those figures. However, we believe they should be requested and taken into account for the purpose of this air quality assessment.

7. Misleading claim that the project would result in a reduction in air emissions:

The Environment Report claims that the project will lower net air emissions by reducing demand for fossil fuels. As stated above, we do not believe that heat supply to Shannon Town can be considered because of the absence of a district heating network. The great majority of fossil fuel-derived electricity in Ireland is from natural gas. Natural gas is the cleanest burning fuel. It is not possible for any biomass syngas, regardless of the cleaning process, to result in less emissions of air pollutants than natural gas. Please note that Biofuelwatch does not support fossil fuel burning, we are simply highlighting the misleading claim made about reduced air emissions here. Finally, within Ireland's renewable energy target, biomass energy competes directly with wind and solar power, which are zero-emissive types of renewable energy.

Low efficiency of the proposed electricity generation from biomass generation:

Carbon Sole proposes to generate 5 MW of electricity per hour from gasifying 30,000 tonnes of dry woodchips from 57,000 tonnes of green wood. As stated above, we do not consider it valid to take account of any proposed heat supplies,

[13] shannonairport.ie/corporate/about/community-and-sustainability/

given the absence of a district heating network. Our calculation shows that the net electrical efficiency of such a plant would be around 26.6%.[14]

Plants that come under the Medium Combustion Plant Directive should meet Best Available Technique standards as set out by the European Commission (See Article 12 of the Directive). Those standards treat syngas in the same way as natural gas (unless a gasifier feeds into a boiler rather than a gas engine, or is part of an IGCC plant). They state that new plants with a gas engine should achieve a minimum of 39.5% net electrical efficiency.[15] Clearly, 26.6% net efficiency is very low.

Yours faithfully,

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Biofuelwatch

[14] Green woodchips with a 50% moisture content have a lower heating value of 9.5 GJ/t (eubia.org/cms/wiki-biomass/biomass-characteristics-2/). Multiplied by 57,000 tonnes, this converts to an energy input of 150,277 MWh per year. Assuming a maximum 8,000 hours of annual operations, the energy input is thus 18.78 MW per hour.

[15] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017D1442&from=EN