Almuth Ernsting
Co-Director, Biofuelwatch

Dear Sir/Madam,

Re: Consent Application for Renewable Energy Plant at the Port of Grangemouth by Forth Energy

On behalf of Biofuelwatch, I write to object to Forth Energy's planning application for a biomass power station at Grangemouth Port.

Our grounds for objection are:

1. The wider impacts which the development will have on climate change, biodiversity and communities affected by plantations from which Forth Energy will source the wood which we understand to be material planning issues;
2. Air quality impacts on local residents and local ecosystems in and around Grangemouth;
3. Impacts on marine ecology in the Forth Estuary SSSI, SPA and Ramsar Site, related to cooling water intake and discharge.
4. Other local impacts, including ash disposal, noise and odour.

<u>Wider impacts on climate change, biodiversity and communities:</u>

The Scottish Planning Policy on Renewable Energy (SPP6), states the following about biomass:

"*Planning authorities should consider the extent to which there are opportunities through development plan policies to identify sites appropriate for new biomass plants in those areas where there are either existing long-term secure resources or new opportunities available to harness local resources. However, such policies should recognise that the identification of sites should not exclude development outwith these areas so long as they satisfactorily address specified broad criteria. This criteria is likely to include impacts on the natural heritage, landscape, built and cultural heritage, amenity (including public health and safety), environmental and transportation issues.*"

SPP6 thus makes it clear that wider environmental impacts of biomass proposals must be considered. In the case of Forth Energy, 70-90% of the biomass will be imported wood and, as we discuss below, the environmental as well as climate and social impacts of those wood imports are likely to be strongly negative.

"Choosing our Future: Scotland's sustainable development strategy" strongly emphasises the need to take the wider impacts of all developments into account. Here are two of the relevant statements:

"*2.6 These priorities for Scotland and across the UK are our response to these challenges:*

- *Sustainable consumption and production: achieving more with less. This includes reducing the inefficient use of resources, looking at the impact of products and materials across their whole lifecycle and encouraging people to think about the social and environmental consequences of their purchasing choices.*
- *Climate change and energy: securing a profound change in the way we generate and use energy, and reducing greenhouse gas emissions.*

- *Natural resource protection and environmental enhancement: protecting our natural resources, building a better understanding of environmental limits, and improving the quality of the environment...”*

“*8.1 This strategy is based upon the principles of environmental justice. The ultimate goal is to secure a fairer world and a fairer future, enabling all people throughout the world to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life of future generations.*”

We believe, as discussed below, that Forth Energy's plans will have serious adverse impacts on climate change, the environment and the communities in countries which will be affected by the tree plantation expansion and possibly increased logging that would result from the development.

Finally, the second National Planning Framework for Scotland explicitly states: "*Biomass plants should be sited where they can make best use of locally available resources and will not encourage inappropriate planting.*"
(http://www.scotland.gov.uk/Publications/2009/01/12110011/7)

Up to 90% of Forth Energy's biomass intake would be imported and environmentally and socially damaging eucalyptus and other tree plantations are a very likely result.

In summary, Scottish planning policy makes it clear that wider impacts of developments should be considered and does not in any way preclude biomass sourcing from this requirement.

Forth Energy state that up to 90% of the biomass will be imported woodchips and pellets. Their sourcing information appears contradictory: Under 'Frequently Asked Questions' on their website, they refer to wood from 'the Americas', which implies North America as well as Latin America. The 'Sustainability Statement' for the Grangemouth Consent application claims that all imports will come from Scandinavia, Eastern Europe, North America and Canada. The scenarios in Table 1 are based on Table 1 in the Sustainability Statement are based on all wood imports coming from Florida, SE US (75%), Scandinavia and the Baltic States, i.e. not from Canada. The Sustainability Statement also says that much of the wood will be eucalyptus, which is not commercially grown in any of the regions they list. There are large-scale eucalyptus plantations in South America, as well as other regions, however.

Meantime, Forth Energy's Dundee application refers only to Florida/SE US, Scandinavia and the Baltic States as countries from which wood would be imported, not Canada and it appears unlikely to us that they would use different sources for different biomass power stations in Scotland.

We would point out that so far biomass and biofuel power stations approved in the UK have been approved without any sourcing restrictions in the planning conditions. Companies are not bound by claims they make about 'planning intentions'. Last year, DECC approved MGT Power's application to build a 295 MW biomass power station at Teesside Port. MGT claimed that all or most of the wood would come from North America where there was no 'net deforestation' (even though significant recent losses of forest cover in North America have been well documented) (tinyurl.com/37upmz5 and tinyurl.com/36t3s36). Shortly after winning planning consent they signed a Memorandum of Understanding with Suzano Papel e Celulose for most of the wood to come from Brazilian eucalyptus plantations (tinyurl.com/3yukqn7).

Even if the wood was to be imported only from the regions listed by Forth Energy, we believe that the direct as well as indirect impacts on forests, climate and people would be very serious. In the Southern US, including Florida, large-sale pine plantations continue to displace large areas of

biodiverse native forests and they deplete groundwater and aggravate droughts which are already becoming more frequent and severe due to climate change. More demand for wood from Florida and elsewhere in the SE US will thus lead to more deforestation and biodiversity losses in the region. At the same time, the growing demand for biomass from that region, much of it for export, is leading to large-scale market displacement, since the southern US supplies much of North America's demand for paper at present. Diverting wood to power stations, such as those proposed by Forth Energy, means that more US paper will have to come from monoculture tree plantations in the global South, causing more tropical forest and grassland destruction and thus more climate change, human rights abuses and land-grabbing.

In many parts of Scandinavia, old growth forest logging and other highly destructive logging have been documented and appear to be accelerating, due to attempts to 'harvest' ever more wood, not least for bioenergy. A letter signed by over 200 scientists worldwide as well as by thousands of individuals and many groups warns against the destruction of the last of Sweden's old growth forests and states: "*The Swedish Government and the Swedish Forest Industries Federation advocate further forestry intensification, with methods such as stump extraction, increased use of non-native tree species, restoration of ditches, and fertilization, which threaten the biodiversity even more.*" (http://protecttheforest.se/upprop/en). In 2007, and Open Letter against the destruction of oldgrowth forests in Northern Finland was signed by 257 researchers who said: *" ...it can be reasonably stated that logging of natural forests causes irreversible change of habitat, and destroys an important part of our national heritage as well as genetic and species diversity. As a result, present and intended loggings in forested Lapland...are unsustainable and in obvious conflict with the biological diversity conservation agreements to which Finland is committed.*" The letter also warned that logging practices are seriously affecting the livelihood of the indigenous Sami people in Lapland (tinyurl.com/2veoj9b).

Certification, as proposed by Forth Energy, cannot prevent serious negative direct impacts, let alone indirect ones. None of the schemes include any greenhouse gas criteria. All of them certify industrial tree plantations as 'sustainable', despite their well-documented serious impacts on biodiversity, ecosystem destruction, land-grabbing and poverty, disruption of the freshwater cycle, and the high use of polluting, fossil-fuel based agro-chemicals on tree plantations.

Forth Energy's four proposed Scottish biomass power stations will require at least 5.3 million tonnes of biomass a year, which is nearly two-thirds of the UK's entire annual wood production. Forth Energy claim that 10-30% of the biomass will come from the UK (mainly Scotland) and that miscanthus will play an important role. However, with current yields of around 8 odt/ha, nearly 80% of Scotland's entire arable land would need to be converted to miscanthus monocultures, solely to feed those four proposed power stations. This illustrates the inherent unsustainability of the scale of Forth Energy's biomass plans.

For a more detailed discussion of the environmental and social impacts of large-scale wood-based bioenergy, please see
http://www.globalforestcoalition.org/img/userpics/File/briefing%20paper%20bioenergy_final_1.pdf
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Serious climate impacts result from direct and indirect land-conversion as well as increased logging for biomass. Furthermore, two 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 (tinyurl.com/2whmldj)**.** 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).

It is important to note that many of the assumptions made in the Manomet study are highly optimistic ones (as acknowledged by the authors), some of them contradicted by scientific evidence and by the realities of bioenergy markets and the forestry industry. For example, the authors assume that no additional forests would be logged as a result of bioenergy (something which would make the carbon footprint even worse), yet in the UK, EU and elsewhere, opening up more natural forests to logging for this purpose is being actively encouraged. The authors further assume that there will be no carbon emissions from removing residues from forest flaws, yet it has been shown that large-scale 'residue removal' significantly reduced forest carbon stocks and also diminish future tree growth and thus carbon sequestration. A detailed review of the Manomet study can be found at www.catf.us/resources/whitepapers/files/201007-Review_of_the_Manomet_Biomass_Sustainability_and_Carbon_Policy_Study.pdf .

Another scientific study which looks at the carbon debt from wood-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.

The 'carbon savings' claimed by Forth Energy are thus very much contrary to scientific findings.

Finally, we would like to point out that, although a CHP Feasibility Study suggests a potential for up to 200 MWe heat capacity, this is stated as a potential, not a commitment. The CHP Feasibility Study states that detailed studies will only be done if consent was granted and that "the economic viability of a CHP relies on a market for the heat output". It goes on to suggest that heat supply to residential housing in Grangemouth would be very expensive and 'challenging' because of 'low density housing' in the area. Greater efficiency and heat distribution, however, would not alleviate our other serious concerns about the impacts of the power station.

Air quality impacts on local residents and local ecosystems in Grangemouth:

We have serious concerns about several of the assumptions and claims contained in Forth Energy's Air Quality Assessment and about the impacts which the power station would have on air quality, including legal limits, and on people's health. There appear several serious flaws in the Assessment which we believe make the findings highly unreliable. We also note that Forth Energy has not provided a full Health Impact assessment, but solely their assessment of likely breaches of legal air

quality emission limits.

Grangemouth has been declared an Air Quality Management Area (AQMA) because of repeated and regular breaches of the legal limit for 15-minute SO2 levels at different sites. According to monitoring data collected by Falkirk Council, the number of SO2 exceedances has been increasing in recent years. We believe that the high background pollution levels and the fact that the proposal is within an AQMA are strong planning reasons against a large additional source of pollution. After all, Falkirk Council has a legal obligation to reduce SO2 levels in the city due to the existence of the AQMA.

We would like to point out the following concerns regarding the Air Quality Assessment:

- According to Forth Energy's own data, the process contribution from the power station would add another 7.2% to the legal 15-minute SO2 level. Forth Energy claim that this is 'not significant', a claim which is incompatible with air quality guidance. In England, the Environment Agency and Natural England use 1% as a threshold for 'imperceptible' increases of air pollution – not 10%. The current, 2010, "Updated guidance from Environmental Protection UK on dealing with air quality concerns within the development control process" (www.environmental-protection.org.uk/assets/library/documents/Air_Quality_Guidance_2010_(final2).pdf) does not use terms such grades impacts according to severity, using NO2 and PM10 as examples. An increase of 5-10% in "ambient pollutant concentrations as percentage of objective/limit value/environmental assessment level' falls into their 'medium' category of change, which is far from the 'insignificant' claim made by Forth Energy. The guidance classes 'medium' increases in pollution concentrations in situations where levels are already exceeded prior to a development as 'substantial[ly] adverse' (Table 11). The same definition is used by the Institute of Air Quality Management, which also uses the 1% threshold for 'imperceptible' changes (www.iaqm.co.uk/text/news/2009/iaqm_significance_nov09.pdf).
- Forth Energy also claim that the emissions will not contribute to exceedances because they hold Ineos responsible for most of those and the Ineos petrochemical complex does not lie in the same wind direction from Grangemouth as the site proposed by Forth Energy. However, this is not in line with findings in Falkirk Council's Air Quality Progress Report 2010, which identifies not only the Ineos complex but also the Longannet Power Station and BP as major sources of SO2. The report states: "Under certain meteorological conditions, the added contribution of emissions from Longannet, can contribute to total SO2 emissions within the AQMA." (www.falkirk.gov.uk/services/development/environmental_protection/air_quality/2010_progress_report.pdf) The Longannet Power Station is to the north of the proposed Forth Energy site and in the same wind direction towards Grangemouth, which strongly suggests that the additional SO2 would worsen breaches of legal limits depending on the wind direction. This further confirms the risk of 'significantly adverse' air quality impacts inside an AQMA.
- Forth Energy's air quality modelling is based on two scenarios: One includes 100% virgin wood, the other 30% 'waste wood'. This is contrary to the information which Forth Energy give about sourcing intentions and which includes agricultural residues and miscanthus from the UK, too. Importantly, no information is given about the types of 'waste wood' considered for the model and it is therefore impossible to see whether the Assessment looks at 'worst case scenarios' as it should. Furthermore, mercury, heavy metal and other pollution from burning virgin wood have been ignored and it has been wrongly assumed that woodchips and pellets from virgin wood have not been chemically treated and contain no toxic chemical residues – see below for more details.
- According to a Standardised Toolkit for Identification and Quantification of Dioxins and Furans, developed by the UN Environment Programme, dioxin and furan emissions from

burning virgin wood will be lower than those from burning chemically treated wood, but they are still very relevant. Dioxins and furans are also emitted from burning straw, which falls within the scope of Forth Energy's Consent Application. (http://chm.pops.int/Portals/0/Repository/toolkit1/UNEP-POPS-TOOLKIT.1-3.English.PDF). According to this evidence, Forth Energy is wrong to assume zero dioxin and furan emissions for burning virgin biomass. This suggests that all the relevant figures provided by Forth Energy are unreliable.

- Similarly, Forth Energy's Air Quality model is based on the assumption that no heavy metals will be emitted from the combustion of virgin wood and agricultural residues. Their Air Quality Assessment claims: "Virgin wood contains no metals." This is contrary to clear evidence that heavy metals from 'background air pollution' and from soils become concentrated in wood. See for example the following studies and articles: www.springerlink.com/content/jjulpq2ktlel3912/ , www.jstor.org/pss/4312359 , www.jstor.org/pss/4312359 . The European Commission has called for the use of 'wood ash' as a fertiliser to be regulated because of levels of heavy metals found in ash from virgin wood from Norway, which were found to be so high that the ash qualified as 'toxic waste'. Forth Energy's decision to ignore heavy metal emissions from virgin wood combustion just cannot be justified and renders all of their related emission figures entirely unreliable.
- Forth Energy assessed levels of dioxins and furans, PAHs, ammonia, hydrogen chloride and trace metals without having done any research into background levels in Grangemouth. Instead, average UK levels from different monitoring sites were used. However, background pollution levels, including of dioxins and furans, are likely to be far higher in Grangemouth than the UK average, given the proximity to the Ineos oil refinery, the Longannet coal power station and other sources of pollution.
- Agro-chemicals used on tree plantations as well as chemical treatment of 'virgin' woodchips and wood pellets have been ignored by Forth Energy. The 'Sustainability Statement' makes it clear that much of the wood will come from monoculture tree plantations. Such plantations generally require large-scale applications of pesticides and other toxic agrochemicals. Furthermore, chemical treatment of woodchips and pellets before shipping is common and this is particularly the case for woodchips and pellets from eucalyptus, which are routinely treated with methyl bromide and/or other pesticides for shipping. Methyl bromide is highly toxic: It is linked to cancer and also an ozone destroying substance and is therefore banned in the UK. In the US, pre-shipment use of methyl bromide is still permitted and eucalyptus wood is routinely treated that way before shipment (www.aphis.usda.gov/plant_health/ea/downloads/eucalpf.pdf). Eucalyptus woodchips and pellets from other regions, such as South America, are also fumigated with pesticides and in particular with methyl bromide. Compatibility of eucalyptus imports with the UK ban on methyl bromide may need to be investigated. The Air Quality impacts of burning large quantities of wood with such residues should be fully assessed rather than being ignored, as Forth Energy has done.
- Sea haar conditions do not appear to have been properly assessed, even though they have the potential to reduce air circulation and increase local pollution levels.
- The air quality impacts of wood dust and dust from fly ash on and near the site do not appear to have been assessed even though both are serious problems reported by residents near existing biomass power stations.

We note with concern that Forth Energy seek to rely entirely on fabric bag filters for reducing particulate emissions, yet such filters allow the smaller particulates, the particularly harmful PM 2.5, to pass through. According to the 2008 EU Directive on Ambient Air Quality: "Fine particulate matter (PM2,5) is responsible for significant negative impacts on human health. Further, there is as yet no identifiable threshold below which PM2,5 would not pose a risk. As such, this pollutant should not be regulated in the same way as other air pollutants. The approach should aim at a

general reduction of concentrations in the urban background to ensure that large sections of the population benefit from improved air quality. However, to ensure a minimum degree of health protection everywhere, that approach should be combined with a limit value, which is to be preceded in a first stage by a target value. “ This EU Directive will be introduced into UK law from next year. The power station will constitute a significant new source of PM 2.5 emissions which will not be mitigated by fabric bag filters, even though under EU rules, urban PM 2.5 concentrations should be reduced.

We are also concerned about the impacts of the development on protected nature sites. We note that Forth Energy's Assessment shows that acid levels in the Bo'ness area of the Firth of Forth SPA as well as at the Blawthorn Moss and Black Loch Moss SACs already exceed legal limits and Forth Energy's process contribution will be over 1% of the critical load at those sites.

Impacts on marine ecology in the Firth of Forth, including the River Carron estuary, related to cooling water intake and discharge

We have serious concerns about the impacts of cooling water intake and discharge, including thermal pollution and biocide pollution, particularly in view of the Firth Estuary, including the River Carron estuary, being a highly protected area (SPA, SAC, Ramsar Site and SSSI). The potential for accidental chemical and oil spills/runoffs is acknowledged and while Forth Energy believe it can be minimised, it seems particularly relevant given the proximity of the power station to marine sites designated as SAC, SPA, Ramsar and SSSI and to areas of great importance to endangered and migrant fish as well as dolphins, porpoises, waterfowl and sea birds. Forth Energy also state that biocides will be discharged into the Tay Estuary, which seems of particular concern in such an area.

Cooling water is to be discharged into the River Carron, an important tidal river habitat for migrant and endangered fish, at a temperature up to 12 degrees C warmer than surrounding waters. River lamprey, sea lamprey, Atlantic salmon, sea trout and eels migrate between River Carron and the Forth Estuary and the first four of those species are a main reason for the River Teith/Firth of Forth area having been designated as an SAC. Eels have more recently come to be of major conservation concerns because of steep declines. Cooling water will be discharged across 200 metres of the River Carron estuary, which is inside the key migration route for fish, including for spawning. According to Forth Energy, the average temperature rise in the discharge area will be 8^{o}C above ambient water temperature. Sudden temperature changes on this scale are known to be lethal to fish and other marine life, causing 'thermal shock'. Forth Energy speaks about “giving time over each tidal cycle for fish and other aquatic life to pass the discharge point in peace”, but that simply means that there will be periods each day when fish will not be exposed to potentially lethal or otherwise harmful temperature rises, it does not minimise the harm caused to those which pass through the River Carron estuary and happen to be caught by the discharge plume and might be killed instantly as a result or suffer longer term harmful impacts.
Those are caused by warm water discharges reducing oxygen levels and thus affecting breathing, encouraging local algal growth (which can further reduce oxygen levels), disrupting the breeding cycle of fish and making fish more susceptible to disease (see: tinyurl.com/37hbu73, tinyurl.com/36coeor, tinyurl.com/3yx2u55), even at 1-2 degrees centigrade temperature differences. Those impacts will be of particular concern given the importance of the River Carron Estuary for the conservation of endangered and migrant fish species.

We note that Forth Energy's assessment appears to focus on whether maximum summer temperatures may be lethal to fish, however they do not appear to look at thermal shock at all, i.e. at lethal or harmful impacts of abrupt temperature changes, regardless of whether the maximum temperature reached may otherwise be safe for fish. We note that in their Dundee application they

acknowledge that sudden temperature changes of 3^{o}C or more can be lethal to marine life (though they do not acknowledge the proven longer-term impacts of smaller temperature rises in that application), but they do not appear to do so in the Grangemouth application.

With regards to the entrapment during cooling water impact, Forth Energy reproduce a long list of fish and other marine species which have been entrapped and killed by similar equipment used by the Longannet Power Station, including endangered species.

Other local impacts:

We have serious concerns over ash disposal. Forth Energy do not acknowledge the toxic nature of wood ash. Wood ash from virgin wood, as shown above, can already contain such high levels of heavy metals and other toxins that it should be treated as toxic waste and in this case, it is likely to be mixed with wood ash from chemically treated wood, which will contain yet more toxins. Forth Energy's suggestion that it could be used as a fertiliser or by the construction industry therefore seems highly alarming. No measures are proposed to safely dispose of toxic ash and to prevent it from getting into the environment and thus causing serious health risks to people as well as to wildlife.

Finally, we are aware that both odour and noise problems have been reported by local residents living close to much smaller biomass power stations both in the UK and US. We are very concerned to see that Forth Energy claim that there will be no significant impacts on local residents of this type when experience elsewhere suggests otherwise.

Please acknowledge receipt of this planning objection – thanks.

Best regards,

Almuth Ernsting
Biofuelwatch