What is proposed?

Almondbank Power Ltd has submitted a scoping application for a 20 MW biomass power station at Inveralmond Industrial Estate in Perth. According to the developers, the plant will burn up to 200,000 tonnes of virgin wood a year, including wood from whole trees felled for this purpose. The wood is to be sourced from Central Scotland, transported by lorry along the A9 and chipped at the site. 60 daily lorry movements are forecast.

This would not be a conventional power plant. During a public exhibition, the developer described it as a pyrolysis plant which would produce electricity, heat for adjacent buildings on the industrial estate, and char. The technology to be used is patented by a company called Concorde Blue and described as 'steam thermolysis'.

What are problems with the proposal?

There are three areas of concerns:

1) *An unproven and risky technology*: Nobody has ever successfully used pyrolysis to produce electricity, heat, and char – several attempts to do so worldwide have failed. Serious questions have been raised elsewhere about the company (Concorde Blue) which is to provide the technology for the plant, suggesting that the technology may have failed and that not one of their plants has been operated successfully. Technical problems commonly translate into public health and safety problems.

2) *Bad for public health*: Burning virgin wood causes similar levels of air pollution as burning coal, with more of some pollutants and less of others being released. Because the technology is unproven it is impossible to reliably predict what the levels of emissions from this particular plant will be. However, the fact that this is an experimental technology makes high levels of air emissions much more likely. The second health concern relates to wood dust - Long-term wood dust exposure is carcinogenic and linked to a range of health problems.

3) *Bad for the climate*: Cutting down and burning trees for electricity emits more carbon dioxide than generating the same electricity from coal over a period of many decades.

Unproven and risky technology

According to Almond Park Power's public exhibition, the plant would use pyrolysis to generate electricity, heat, and biochar. However, no commercial biomass pyrolysis plant producing electricity and biochar (let alone heat as well) exists anywhere in the world.

Several companies have tried to build and operate such plants, without success. A survey by the International Energy Agency (IEA) showed that by the end of 2012, only ten industrial biomass pyrolysis plants had been built worldwide[1]. Of these, five were out of operation, in two cases it could not be ascertained whether the plants were operating, and only three plants were operational (two of them small pilot plants). The only operational commercial pyrolysis plant in the world (Ensyn, Canada), produces liquid fuels, not electricity and/or heat, so it is not really comparable.

There are further concerns about the particular technology proposed for this development, which is Concord Blue's steam thermolysis. An investigative journalist in the US, concerned about an application for a similar Concord Blue plant in Arizona, has raised serious questions about the company's claims[2]. Concord Blue state on their website that they have five plants in operation (in India and Japan) and two under construction (in Germany and India) – though only one of them uses woodchips (365 tonnes a year compared to the 200,000 tonnes proposed in Perth) to generate electricity. According to the journalist's findings, two of the supposedly operating plants were never built, another had broken down every 10-15 days before being closed down in May 2013, and a fourth was experimental and was also closed down due to technical problems. The plant in Germany is not actually under construction. Only one Concord Blue plant is operating in India, but has so far failed to generate any electricity at all[3]. A local NGO has pushed for it to be closed down because of air and water pollution and a state agency has complained about the discharge of untreated waste and foul odours.

If these findings are correct then the chance of the proposed Perth plant operating smoothly would appear to be very small.

Public health concerns

Burning virgin wood emits the same range of pollutants as burning coal, albeit less of some (mainly sulphur dioxide and mercury) and more of others (mainly Volatile Organic Compounds and fine particulates). Pollutants include oxides of nitrogen (NOx), carbon monoxide (CO), small particulates (PM10, including PM2.5) and sulphur dioxide (SO2) and, in smaller quantities, Antimony, Arsenic, Cadmium, Chromium, Copper, Dioxins and Furans, Lead, Manganese, Mercury, Nickel, Polycyclic Aromatic Hydrocarbons (PAHs), Selenium, Vanadium and Zinc.

Some of those are linked to respiratory and cardiac disease and to strokes, others to cancer, birth defects and hormone disruption. For more details about the public health impacts of biomass plants, see http://www.biofuelwatch.org.uk/2014/biomass-aq-briefing/ .

The proposed plant would burn 'syngas', i.e. wood gas rather than the wood itself. The levels of pollution depend on whether and to what extend the wood gas has been cleaned before burning, on the mitigation technology chosen, and on how smoothly the plant operates. At present no information about gas cleaning and mitigation is available. However, the most similar plants built in the UK have been waste gasifiers and those face many of the same technical problems.

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1 http://www.bioenergytrade.org/downloads/t40-large-industrial-biomass-users.pdf
2 http://www.hcn.org/issues/46.15/lost-in-the-woods
3 http://www.nagrikchetna.com/President's%20Closing%20Remarks%20AGM%202012-13-Ultimate%20Final.pdf

Wood gas is highly explosive and flammable and if pressure builds up inside the plant, it can become necessary to simply vent the polluted gas straight into the atmosphere, without any prior cleaning. In addition, dioxin emissions spike whenever plants are started up or shut down, i.e. whenever the temperature is less than optimal. So far, one waste gasifier has been built in Scotland, in Dargaval. In this case there were hundreds of breaches of air emission limits, dozens of noise complaints, and at least 88 bypass stack activations, i.e. incidents in which polluted gases were vented straight into the atmosphere, bypassing the scrubbers/filters, in order to prevent an explosion. The plant was shut down after the permit was withdrawn following an explosion and a major fire[4].

Wood dust – Another health hazard

Chipping wood and storing woodchip is associated with wood dust exposure of residents. It is not yet known how and where Almond Park Power would store the woodchips and what exactly the wood dust risk would be. However, in Cardenden and Methil in Fife (the sites of woodchip production and storage for RWE's biomass power station in Markinch), residents are complaining about high levels of wood dust.

Wood dust exposure is associated with skin disease, allergic and non-allergic respiratory problems such as increased incidents of asthma attacks and chronic bronchitis, as well as nasal problems[5]. The World Health Organisation's International Agency for Research on Cancer classes wood dust as a known carcinogen[6]. Unfortunately, there are no regulations in Scotland or the UK designed to protect residents' health from wood dust exposure – only guidelines for establishing whether levels of any type of dust constitute a nuisance, which are not based on any medical evidence[7].

Climate impacts

Almond Park Power admitted in their exhibition that they would be burning wood from whole trees from Central Scotland felled for this purpose.

The UK Bioenergy Strategy states: "*The use of the entire tree for bioenergy is undesirable as it is generally associated with sub-optimal carbon scenarios and can result in increased greenhouse gas emissions*"[8]. Its figures show that the climate impact of burning wood from whole UK conifers for electricity will be worse than that of burning natural gas, when considered over a period of a century, and 80% worse than that of burning coal when considered over a period of 20 years[9]. This is not surprising: Conifers in Scotland take 40-60 years to grow and very little time to cut down and burn. And because biomass plants are less efficient than coal power stations, they emit up to 50% more CO_2 per unit of energy. This carbon will remain in the atmosphere for as long as it takes for new trees, undergrowth and forest soils to absorb all of the carbon emitted during logging.

Yet climate science shows that we must bring global carbon dioxide emissions down rapidly if we are to have any hope of avoiding the worst impacts of climate change.

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4 http://www.sepa.org.uk/waste/waste_regulation/energy_from_waste/efw_sites_in_scotland.aspx
5 https://www.osha.gov/SLTC/etools/sawmills/dust.html
6 http://monographs.iarc.fr/ENG/Classification/ClassificationsAlphaOrder.pdf
7 Discussed in Chapter 3 http://biofuelwatch.org.uk/wp-content/uploads/Chain-of-Destruction-online.pdf
8 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48337/5142-bioenergy-strategy-.pdf
9 http://www.rspb.org.uk/Images/Searchinger_comments_on_bioenergy_strategy_SEPT_2012_tcm9-329780.pdf

And direct emissions are not the only concern. The UK already imports 80% of all wood used in the country, so creating a new market for wood means that others will have to import even more wood. This may be linked to forest destruction elsewhere in the world and, as a result, to even greater climate impacts.

Who are Almond Park Power?

Almond Park Power Ltd are a fully-owned subsidiary of a company called Carbonarius3 Ltd. No accounts or shareholder details have been published by that company so far. However, the directors are also directors of a significant number of start-up bioenergy and waste incineration companies, all of them planning to use different non-established technologies. None of their plants are operational so far.

What is the status of the application?

A Scoping Application involves the developer submitting initial details of their plans and requesting instructions (called a 'scoping opinion') from the local authority as to whether they will need an Environmental Impact Assessment (EIA) and what information needs to be contained in an EIA or in a simpler Environmental Statement. Once they have commissioned and obtained all those documents, they will submit a full planning application, probably in early 2015. There will then be a public consultation period before Perth and Kinross reach a decision.