



THE BLACKBRIDGE BIOMASS GASIFICATION PROPOSAL IN MILFORD HAVEN: A HIGH-RISK, UNPROVEN TECHNOLOGY FOR BURNING CHEMICALLY TREATED WASTE WOOD AND ‘SUPER-TREES’

EGNEDOL'S PLANNING APPLICATION

Egnedol has submitted a planning application for a 49.9 MW biomass plant designed to burn, or rather gasify, 240,000 tonnes of virgin wood and 240,000 tonnes of waste a year. Over time they want to scale the plant up seven-fold to 350 MW. This would require 3.4 million tonnes of waste and wood and be larger than any dedicated biomass power plant in the world.

Egnedol's planning documents promise to create 474 full-time jobs through the power plant as well as a large variety of 'downstream activities'. These activities include a biofuel plant which would turn some of the gas from the gasifier into fuels for transport, a fish and prawn farming, a cheese factory, greenhouses, as well as the farming of algae, for biofuels and other markets.

The planning documents can be found at <https://acp.planninginspectorate.gov.uk/ViewCase.aspx?Caseid=3146073&CoID=0> and people have until 2nd February to object.

See <http://www.foepembrokeshire.co.uk/news.php?id=127> for details about how to object. Residents may wish to share concerns with their AMs, too.



Site of the proposed biomass gasifier. Richard Webb, CC BY-SA 2.0

HOW LIKELY IS EGNEDOL TO SUCCEED WITH THIS PROJECT?

If successful, this would be an unprecedented scheme:

No waste or biomass gasification plant for electricity generation has ever been successfully run in the UK, although there have been many failed attempts: [1] There are a small number of biomass gasifiers for electricity generation in other countries. They are almost always built and operated through partnerships between companies with different sets

of experience and often involve research institutes. Generally, such gasifiers have been beset with problems, requiring significant modifications to the plants. These have taken a year or longer to implement, as well as substantial long-term investments. However, Egnedol has no track-record of using gasifier technology. Three Egnedol director are

directors of another gasification company, Hudol Ltd, which tried to operate a small waste gasification plant in Rhymney. [2] That plant evidently failed, since it no longer holds an environmental permit and never generated enough electricity to qualify for renewable electricity subsidies. [3]

An unreliable heat supply from a technically challenging and vulnerable biomass gasification plant would make the proposed downstream activities and the jobs associated with it unviable: The proposed 'downstream activities', accounting for most of the jobs, would depend on waste heat from the gasification plant. In order to supply the heat, the gasification plant would need to operate more or less continuously and at (almost) full capacity development would almost entirely rely on successful waste and biomass gasification. Planning documents mention no backup system for supplying heat during a shutdown of the gasifier. Technical problems and unscheduled shutdowns would reduce or cut off the supply of waste heat needed for the greenhouses, and could for example kill the prawns and warm-water fish that Egnedol wants to farm.

As the experience documented from biomass gasification plants worldwide illustrates, [4] technical problems and frequent shut-downs are virtually guaranteed, assuming that the plant could ever be successfully operated at all.

Proposed transport biofuel production from algal oil, as well as the technology proposed for turning some of the gas from waste and biomass into biofuels, are without precedent worldwide: As part of the project, Egnedol proposes to industrially farm microalgae, including for biofuel production, and to turn some of the gas produced by the gasifier into advanced biofuels. Since the 1970s, billions of dollars of funding have been ploughed into researching biofuel production from algal oil worldwide. Despite this, no-one has successfully produced commercial

quantities of biofuels in this way. According to the International Energy Agency: "Realizing the strategic potential of algal feedstocks will require breakthroughs, not only in algal mass culture and downstream processing technologies, but also in the fundamental biology related to algal physiology and the regulation of algal biochemical pathways". [5] In short, the technology that Egnedol wants to use simply does not exist. Similarly, the technology which Egnedol wants to use for turning some of the gas produced by their gasifier into biofuels has never been applied successfully at a commercial scale. Several companies have built plants attempting to do so, but all such attempts have failed. [6]

Egnedol has no track record of delivering any projects at all, let alone ones involving unproven and challenging new technologies.

WHICH FEEDSTOCKS DOES EGNEDOL WANT TO USE?

Egnedol initially said during a public event that half of their biomass would be sourced from fast-growing hybrid 'super tough trees', grown in the Moroccan desert or Greece. [7] However, the company which has a patent on those trees, Anagenesis Trees Corporation, has confirmed to Biofuelwatch that they have no collaboration with Egnedol and have not allowed them to use Anagenesis' intellectual property rights. [8]

Their planning application now says that half the feedstock would be waste-derived fuel, and the other half would be virgin wood: "It is anticipated that the virgin biomass feedstock will be derived from several sources, namely;

- Sustainably managed plantations that will be operated by Egnedol
- Local supplies (NRW forestry brash

and private managed woodland and plantations)
• Non UK sustainable supplies."

They also claim: "Several viable plantation sites have been assessed and have been subject to due diligence to ensure compliance with sustainability criteria and commercial viability. Several viable sites have been identified in locations including Greece and Egypt."

There is no evidence that Egnedol has acquired plantations anywhere, nor that the "viable sites" in Greece or Egypt have even been planted yet. As a startup technology company, Egnedol has no experience with tree plantation management, and their international website [9] does not list this as part of their portfolio. And of course, tree

plantations would many years to mature, particularly outside the tropics.

Egnedol's Environmental Impact Assessment further states: "The facility will also utilise the biomass fraction of Waste Derived Fuel (WDF). Biomass feedstock recovered from WDF will comply with the requirements of the Classes 1, 2 or 3 of the WRAP Classification Scheme to Define the Quality of Waste Derived Fuels. This material is available both locally and across the UK."

Class 3 WDF can contain as little as 60% biomass [10] and we are not aware of any methods for separating the biomass from the non-biomass biomass waste.

PUBLIC HEALTH AND HEALTH & SAFETY CONCERNS

Technical problems with gasification plants can pose serious concerns for public health, through high levels of toxic air emissions, noise, fires, and explosions.

In Scotland, a company called Scotgen attempted to operate a waste gasifier from December 2009 until July 2013, without ever achieving a smooth, successful operation. During this period, there were hundreds of breaches of legal air emissions limits, dozens of noise complaints, and at least 88 “bypass stack activations”. These are incidents in which toxic gases are being vented straight into the atmosphere without any clean-up, in order to prevent an explosion. After an explosion and a fire at the plant, the company’s operating permit was finally withdrawn. [11]

Gasification plants elsewhere in the world have been beset with similar problems.

European Commission guidelines for Biomass Gasification warn: “During operation of a biomass gasification plant there is an increased hazard potential due to the fact that a potentially explosive, toxic and combustible gas mixture is produced and consumed. The producer gas and residues (ash, liquids, exhaust gases) may cause the following major hazards/risks: + an explosion and/or fire; + health damage to humans (poisoning, danger of suffocation, noise, hot surfaces, fire and explosion); and + pollution of the environment and plant vicinity.” [12]

Waste Derived Fuel (often called Refuse Derived Fuel or RDF) contains heavy metals, mercury, and cadmium [13] amongst many other pollutants. According to a report by the Global Alliance for Incinerator Alternatives,

“The truth is that the mechanical segregation technologies that are part of RDF production cannot eliminate common toxic substances like PVC

(polyvinyl chloride) plastic or other domestic hazardous wastes like CFL tube lights that contain mercury. Incineration releases these harmful chemicals into the environment.” [14]

For any power plant or gasifier, startup and shutdown phases are associated with much higher air emissions than smooth continuous operation. [15] This is true even if natural gas is used during the initial startup phase. Egnedol’s proposed gasifier appears likely to result in significant levels of toxic air emissions as a result of technical problems, shutdowns, and start-ups. This is particularly worrying because the gasifier would be overlooked by residential housing at least 40 metres above the plant, at most 20 metres lower than the top of the chimney.

Explosion risks are of serious concern at the Blackbrige site, which overlaps with two high risk “Control of Major Accident Hazards” sites, one an LNG terminal, the other an oil storage site.

WHAT WOULD A PROJECT LIKE THIS MEAN FOR FORESTS AND THE CLIMATE?

As discussed above, there are serious doubts as to whether Egnedol will be able to succeed in operating the proposed scheme at all. However, if the plant were to operate, it could create a very significant new demand for wood. Egnedol say that the first phase (50 out of 350 MW of capacity) will require 480,000 tonnes of waste and wood per year. This means that the full-scale project would require 3.4 million tonnes of feedstock. It is not clear how much would come from wood and how much from Municipal Solid Waste. However, if all of it was wood then the larger plant would require the equivalent of more than one third of the UK’s total annual wood production, which is 11 million tonnes. [16]

At the same time, another company, Orthios Group, is planning to build two large biomass power stations in Anglesey and Port Talbot which, between them, would burn another 4.8 million tonnes of wood a year.

Altogether, current industry plans for biomass electricity would see nearly 4 times the UK’s total annual wood production burned in power stations. [17] The bulk of the wood imported for UK power stations comes from North America, mostly from the southern US. There, coastal wetland forests that are amongst the world’s most biodiverse temperate forest and aquatic ecosystems are being clearcut, and wood from these clearcuts is being

turned into pellets. Huge quantities of these pellets are already being burned in the UK (mostly by Drax power station). [18] In Canada, at least a proportion of the pellets produced there is sourced from the clearcutting of oldgrowth forests. [19]

Many scientific studies show that cutting down trees and burning the wood in power stations can result in greater carbon emissions than burning coal (per unit of energy generated), when considered over a period of several decades. [20]

WASTE FOR ENERGY

Generating energy from Municipal Solid Waste has been shown to depress recycling rates, thus wasting finite resources. It also results in high upfront carbon emissions. [21] Welsh

Planning Policy requires all developers of Energy from Waste plants to demonstrate that they comply with the 'waste hierarchy principle', i.e. that they would not compete with recycling. [22]

Egnedol has provided no evidence to that effect.

WHO ARE EGNEDOL?

Egnedol describe themselves as “an amalgamation of six different existing companies and unique patented technologies to provide Green Efficient Energy Solutions and Value Recovery on existing everyday environmental issues”. [23] They have apparently never delivered any services or projects , even though Egnedol UK has been

incorporated since 2006. Egnedol's company structure appears complex and non-transparent with Egnedol directors sharing directorship of at least 12 other companies. [24]

Egnedol's head office appears to be in Cyprus, where they bid for a government contract to build a waste

gasifier in 2014. The government of Cyprus rejected their bid, with the Interior Minister cited in the media as saying: “These investors presented hot air...When we pressed them for specifics, they had no answers.” [25]

REFERENCES

- [1] See an in-depth report on biomass gasification and pyrolysis by Biofuelwatch, published in 2015: <http://www.biofuelwatch.org.uk/wp-content/uploads/Biomass-gasification-and-pyrolysis-formatted-full-report.pdf> and <http://www.letsrecycle.com/news/latest-news/is-large-scale-gasification-viable/> about the experience with waste gasification
- [2] See <http://ukwin.org.uk/2010/07/15/excessive-subsidies-for-waste-wood-incineration/>
- [3] See <http://lle.gov.wales/catalogue/item/WelshPermittedWasteOperations/?lang=en> for a list of all waste operations holding an environmental permit in Wales (no reference to the Hudol plant) and <http://www.ref.org.uk/energy-data/notes-on-the-renewable-obligation> for a list of all plants which have received Renewable Obligation Certificates. Any waste or biomass gasification plant that starts operating by March this year automatically qualifies for subsidies for each unit of electricity generated
- [4] See <http://www.biofuelwatch.org.uk/wp-content/uploads/Biomass-gasification-and-pyrolysis-formatted-full-report.pdf> and <http://ukwin.org.uk/2016/11/02/ukwin-publishes-briefing-on-gasification-failures/>
- [5] <http://task39.org/files/2013/05/IEA-Task-39-Current-Status-and-Potential-of-Algal-biofuels0.pdf>
- [6] The technology in question is called Fischer-Tropsch synthesis. See: <https://www.independentsciencenews.org/environment/biofuel-or-biofraud-the-vast-taxpayer-cost-of-failed-cellulosic-and-algal-biofuels/>
- [7] <http://www.ibtimes.com/super-tough-trees-will-grow-moroccan-desert-produce-green-energy-1562962>
- [8] Email to Biofuelwatch by Kyroakos Koutziz, CEO of Anagenesis Trees Corporation, 29th March 2016
- [9] <http://egnedol.com/>

- [10] http://www.wrap.org.uk/sites/files/wrap/WDF_Classification_6P%20pdf.pdf
- [11] <http://www.zerowasteurope.eu/downloads/air-pollution-from-waste-disposal-not-for-public-breath/>
- [12] https://ec.europa.eu/energy/intelligent/projects/sites/iee-projects/files/projects/documents/gasification_guide_final_guideline_for_safe_and_eco_friendly_biomass.pdf
- [13] http://www.wrap.org.uk/sites/files/wrap/WDF_Classification_6P%20pdf.pdf
- [14] www.no-burn.org/downloads/RDF%20Final.pdf
- [15] www.biofuelwatch.org.uk/2014/power-plant-startup-emissions/
- [16] www.forestry.gov.uk/forestry/infd-7aqdgc
- [17] Based on figures at www.biofuelwatch.org.uk/wp-content/maps/uk-biomass.html
- [18] www.dogwoodalliance.org
- [19] www.biofuelwatch.org.uk/2013/chain-of-destruction/
- [20] See studies listed at www.biofuelwatch.org.uk/biomass-resources/resources-on-biomass/
- [21] See ukwin.org.uk/oppose-incineration/
- [22] gov.wales/topics/planning/policy/tans/tan21/?lang=en
- [23] <http://egnedol.com/>
- [24] See Companies House records
- [25] www.redkitelaw.co.uk/site/library/legalnews/redkite_advises_Egnedol_multi_million_renewables_venture.html