RoseEnergy

PROPOSED BIOMASS FUELLED POWER PLANT

LAND OFF BALLYVANNON ROAD, NEAR GLENAVY,
COUNTY ANTRIM

REVIEW OF POTENTIAL SITES FOR A BIOMASS POWER PLANT

MAY 2008

the
GRAHAM BOLTON PLANNING
partnership limited

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PREFACE

The Graham Bolton Planning Partnership Ltd, is a Town Planning and Environmental Consultancy based in Manchester, England, established in 1986. The Practice primarily handles commercial projects including hospital and mental health developments, waste recovery and handling proposals, industrial and residential schemes. The Practice has expertise in projects which require separate Licensing or Permitting under Environmental Legislation and specialises in dealing with development proposals where both planning and environmental licensing is required.

The Practice includes amongst its specialisms projects involving the handling and treatment of agricultural wastes including animal by-products, and acts for a large proportion of the UK's rendering industry, a number of abattoirs and other businesses involved in animal by-products. Developments involving the handling, treatment and disposal of other waste streams are also an area of work covered by the Practice.

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1. INTRODUCTION

1.1 The Graham Bolton Planning Partnership Ltd (GBPP) was originally commissioned by Glenfarm Holdings Ltd to advise on the development of a biomass fuelled power plant utilising poultry bedding and meat and bone meal as fuels. Glenfarm Holdings is one of three firms which established Rose Energy Ltd, the applicant and promoter of the proposed power plant at Ballyvannon Road, near Glenavy.

1.2 Poultry bedding, a mixture of litter and bedding which, for example, may be straw or wood shavings, has been traditionally spread to land as a fertiliser but restrictions under the Nitrates Action Programme Regulations, pursuant to the Nitrates Directive, intended to protect water resources now require an alternative outlet or disposal route for large amounts of this material. Meat and bone meal (MBM) is a product of rendering animal by-products and is a material which is produced by Glenfarm Holdings' wholly owned subsidiary, Ulster Farm By-Products Ltd (UFBP), which has a rendering plant off Ballyvannon Road, near Glenavy. The MBM from this plant is currently exported to England, Scotland and Wales primarily for use as a fuel in power plants and cement kilns.

1.3 The initial work undertaken by GBPP was to understand the nature of the project and the technology involved in order to appreciate what specific technical requirements there are which might influence the choice of site. Discussions were held with the technical advisor to the three companies of Moy Park, O'Kane Poultry and Glenfarm Holdings, the companies which were later to come together and form the joint venture company of Rose Energy Ltd.

2. PLANT AND OTHER REQUIREMENTS

2.1 The technical specification issued to prospective suppliers was not completed until March, 2007. However, on the basis of initial discussions the following process description and salient features were ascertained:

- 27 MW electrical output power plant
- biomass fuelled, using poultry bedding and meat and bone meal
- fluidised bed technology
- closed loop water cooling
- a developed site of approximately 2.6 hectares
- a boiler house of a minimum height of 42m
- material intake hall and bunker storage facility sufficient for four days supply
- operational time 7,700 hours per year
- operational time for accepting deliveries of fuel – five and a half days per week
- fuels – 220, 000 Te of poultry bedding and 40,000 Te of MBM
- need to be in a locality where a connection can be made to the grid and where there is either a shortfall of supply or additional supply is required

2.2 The further, primarily non-technical requirements of the prospective owners and operators of the plant were also noted:

- urgency of delivery
- viability
- bio-security
- proximity to fuel feedstocks

Urgency of Delivery

2.3 The need to address the problem of alternative uses or disposal routes for poultry bedding is immediate. Since the introduction of the Nitrates Action Programme on 1st January, 2007, restrictions have been placed upon the extent of spreading and storage. A derogation was negotiated with the EU Commission for temporary field storage which has alleviated the situation to a degree. This expires at the end of 2008 and any negotiation for an extension of the derogation or other temporary arrangement to

forestall the full implementation of the Nitrates Action Programme pursuant to the Directive requires progress to have been made to find a solution to the disposal problem.

2.4 This urgency was highlighted in the response of the Director of Policy and Economics of the Department of Agriculture and Rural Affairs to an enquiry by GBPP concerning the policy background to the potential for a development of an agricultural waste fuelled power plant. The Director's letter of 15 February, 2007, which is attached to the Consultation Statement, concludes:

> *"If progress has not been made on alternatives to land spreading of manures by the end of 2008, further Action Programme restrictions on organic phosphorus and investment in storage facilities for poultry litter may be necessary. This would have major cost implications, with a consequent impact on economic viability and employment. A poultry litter fired generator could, therefore, make a major contribution to ensuring Northern Ireland's compliance with the Nitrates Directive and a sustainable agriculture industry".*

2.5 The issue of urgency was required to be reflected in the identification of potential sites for the proposed power plant. In brief, a site must be truly available so that the project can be delivered as soon as possible.

Viability

2.6 The poultry producing industry is highly competitive, working on small margins and subject to considerable pressure from imported produce. Any increase in costs would impact upon the economic viability of the industry and consequentially adversely affect employment, as noted in the letter from the Director of Policy and Economics of DARD, referred to above.

2.7 The industry is not in a position to bear additional costs. Consequently, the proposal is a plant where the energy derived from the combustion of the fuels is harvested and turned into exportable electricity which will defray the costs of the scheme. The aim is to have a development which does not impose additional costs upon the poultry industry.

2.8 In site selection terms, this means that a site which is costly to acquire, or located where a connection to the grid would incur excessive costs or where potential additional costs may result because of the location, such as new road works, would undermine viability. The nature of the proposed development with a lengthy lead time and a two and a half year construction period is such that it will be a number of years before income I derived on this £100million project.

Bio-security

2.9 Bio-security is a very important consideration for the poultry industry and it takes considerable precautions. However, combustion of poultry bedding will destroy any pathogens present in the material which does not occur with the current practice of land spreading.

2.10 The threat of Avian Influenza and Newcastle Disease to the industry has grown. Regulatory restrictions are now in place when such notifiable diseases occur and control of movements to and from sites within 10km of the location of an outbreak or suspected outbreak passes to DARD's veterinary service; within 3km there is stringent control of movements of livestock and vehicles visiting livestock premises. The incidence of Avian Influenza in Norfolk during 2007 illustrated the considerable disruption to movement of livestock, animal by-products and poultry bedding which can occur in such events.

2.11 These controls on movements could interrupt supplies of feedstock to the proposed power plant. Locating the power plant at least 10km away from any cluster of poultry sheds or production plants or minimising the number within a 10km radius, and more than 3km from any single poultry producer or shed would reduce the risk of disruption to the supply of material to the plant, or off-site removal of poultry bedding from sites outside a restricted zone, while minimising the potential spread of disease.

2.12 A plan illustrating the location of poultry producers associated with Moy Park and O'Kane Poultry across Northern Ireland is Appendix A.

Fuel Feedstock

2.13 Transporting 260,000 Te of fuel in approximately 25 Te loads will incur considerable running costs. Proximity to supplies would minimise the need for transporting the material, the costs involved and emissions arising from transportation. Delays arising from congestion are also a noted feature of modern life and could not only result in unnecessary additional costs but also could disrupt the flow of fuels to the plant. Sites need to be selected having regard to the closeness of fuel supplies and potential delay on the road network.

2.14 It is also a sound principle to locate the renewable energy plant at or close to where the energy source arises this is a principle expounded in the consultation draft PPS 18: Renewable Energy. Additionally, in terms of dealing with poultry bedding as an agricultural waste in the absence of its use as a fertiliser by land spreading, then the means of disposal or re-use should be at or as close as possible to the arising – this accords with the proximity principle referred to in the Waste Management Strategy for Northern Ireland and PPS 11:Planning and Waste Management, and regional/sub-regional self sufficiency.

Definitions

2.15 A glossary of definitions of the site selection criteria referred to above (where relevant) and in the following sections is in Appendix B.

3. METHODOLOGY

3.1 A decision was made at the outset that having regard to the location of the overwhelming majority of poultry sheds and production sites and the rendering plant of UFBP and the road network, the site search exercise would be restricted to the area west of the centre of Belfast.

Site Trawl

3.2 Two initial criteria for site search were established:

- minimum site size – 2.6 ha
- allocated sites within the development plan

Allocated sites was adopted as a search criteria as a means of identifying sites which had already been through an investigatory procedure by the planning authorities and stakeholders and where there would be a reasonable prospect of obtaining planning permission. It was also used as an initial proxy that the site may be readily available.

3.3 After an initial trawl for sites identified in the development plan, a few further sites were identified via agents.

Site Selection

3.4 Primary selection criteria were established:

- availability
- minimum site size – 2.6 ha, which was later increased to 5ha
- cost
- bio-security
- proximity to poultry bedding fuel feedstock
- proximity to MBM fuel feedstock
- water availability
- accessibility and traffic
- development plan allocation
- construction
- grid connection

3.5 The above selection criteria operate either as "yes/no" or a scoring on the scale 1-5 was applied, 1 being the lowest score and 5 the highest in terms of meeting the specific criteria. The Glossary provides the detail of this approach and scoring.

3.6 Of the above primary selection criteria, three were exclusionary. A site must:

- meet the minimum site size
- water must be available and means of disposal
- be available

While applying the other criteria to each of the sites was undertaken as part of the exercise, which included a visit to each site, if a site did not meet these three requirements it could not be considered further as a realistic location for the plant.

Minimum site size

3.7 The initial minimum site size was established from the early discussions with the technical advisors to the consortium and later from the bid specification document issued to potential suppliers and builders of the plant. This was set at 2.6ha as the minimum size to accommodate the envisaged plant. Three matters later resulted in a review of the minimum site size –

1. need for sufficient construction space
2. potential need for a Sustainable Urban Drainage Scheme (SuDS) and/or method of attenuating heated water used in cooling the plant, and
3. sufficient land to provide landscaping and ancillary office and parking provision

3.8 The construction period will last for in excess of 2.5 years and the areas required by the construction teams, civil engineers, mechanical and electrical engineers and the main suppliers of the proposed power plant equipment, are substantial for laying out of materials, equipment, plant and machinery. Over the period of construction up to 80 portacabins/containers, inclusive of site offices, will need to be located adjoining the construction area as well as the laying out areas for materials, etc, and some on-site fabrication/assembly. The original minimum size of site would not allow for this and construction of the proposed development on a site of just 2.6ha would require

dependence upon an adjoining site to facilitate construction. Temporary occupation of an adjoining site, assuming one were to be available, would add to the cost.

3.9 Surface water run-off from a developed site area of 2.6ha is potentially very considerable and requires attenuation – less so if the site is previously developed as drainage should already be in place and to a greater extent if the site is previously undeveloped. Attenuation via a SuDS may be achieved by constructing physical retention areas for excessive water or using land within landscape areas as a means of retention and possible soak-away. Additionally, it became clear that there would be a need to attenuate the temperature of heated water before discharge into the receiving medium. This could be achieved by using a lagoon or series of them. There is the potential for joint use of a lagoon or series of them as a SuDS and for temperature attenuation of water.

3.10 The original scheme included a control room for the plant, and ancillary facilities for staff, but no office space or car parking for staff or visitors. The intended scheme now includes these facilities. Also, the original minimum size did not account for the need or desirability of landscaping around the site which would be an inherent part of planning permission.

3.11 In conclusion, the minimum size required for the development was increased to 5ha. This is the minimum net built form size of the proposed power plant plus the areas of layout and storage for a construction compound, which is also coincident with a developed site accommodating reasonable facilities (such as offices and car parking) with appropriate landscaping. The combined Glenavy and construction compound sites extend to approximately 7.4ha.

Water Availability

3.12 A pre-requisite of a suitable or appropriate site is the availability of water. To achieve greatest energy efficiency and thus value which would help in ensuring that the project is viable, and not imposing an additional cost upon the poultry industry in particular, the need for water cooling was identified as a design requirement of the plant.

3.13 There are three potential forms of cooling:

- air cooling
- evaporative cooling (which requires cooling towers), and
- water cooling by extracting a substantial amount of water from a large body of water for cooling and returning it to a large "sink" to absorb the heated water.

Air cooling involves a substantial financial penalty in comparison with water cooling, in that there is less exportable electricity and during warm times of the year the efficiency of the plant drops. Evaporative cooling requires additional capital expenditure for the installation of cooling towers and potentially can have a visual impact due to the presence of steam rising from them.

3.14 Closed loop water cooling of the proposed plant requires between 4000 m^3 and 6000 m^3 of water per hour to be abstracted, used to condense and cool the superheated steam within the closed loop of water/steam which drives the turbine to generate electricity, and is then returned to the water body from which it was abstracted. A large body of water is required for abstraction and to act as a "sink". This necessitates a site in an accessible position to either the sea or a large lake such as Lough Neagh. The availability of large amounts of water means that this requirement is an exclusionary site search and selection criteria.

3.15 Late on in the process of working up the EIA application and accompanying Environmental Statement for the identified site at Glenavy, it became clear that it would not yet be possible to demonstrate that the proposed closed loop water cooling system, which would involve abstracting water from Lough Neagh and returning heated water to it, represents Best Available Technique which will be required for an Integrated Pollution and Prevention Permit to be obtained. Further studies on the potential impact of abstracting a large amount of water and returning a similar but heated (by up to 8^oC) amount of water to the Lough are required to demonstrate no adverse impact or harm upon the ecology and habitat of that body of water which is designated as an ASSI, Special Protection Area under the Habitats Directive and a RAMSAR site of international wetland importance. Studies continue to determine what impact, if any, there may be.

3.16 A substantial amount of water is still required for the power plant development which is now to use evaporative cooling. Approximately 160m^3 per hour of water is needed, to be abstracted primarily from groundwater, with 65m^3 per hour of waste water and treated effluent returned to an appropriate receiving medium, such as a river. The requirement for a substantial amount of water to be available at a site, and a means of disposing of it, remains.

Environmental Impacts

3.17 Following the trawl of sites and initial assessment against the primary criteria, the remaining sites were assessed against the following environmental criteria:

- proximity to residential property
- proximity to environmental habitats
- landscape and visual impacts
- odour and dust
- noise
- air emissions

3.18 A scoring system of 1 to 5 was again adopted, 1 being the highest adverse impact and 5 being the lowest. This exercise was subjective as detailed investigatory work on the potential impacts on sensitive receptors and environmental media was not conducted until after site selection. Some of the environmental criteria are also subject to manipulation in that noise can be attenuated and items such as odour, dust and air emissions controlled – these initial environmental criteria led assessments could not, therefore, carry significant weight in site selection.

4. ASSESSMENT

4.1 An initial review of sites of at least 2.6ha allocated within development plans was undertaken, and 42 sites identified in addition to a site at Glenavy.

4.2 Following an extensive telephone search of estate agents in Northern Ireland to establish those that deal with industrial and commercial sites, a number of agents (6 leading agents) were contacted seeking details of sites of at least 2.5ha located within the area of search to the west of central Belfast, that is the districts of Antrim, Armagh, Ballymena, Belfast, Carrickfergus, Cookstown, Craigavon, Dungannon, Lisburn, Magherafelt and Newtownabbey.

4.3 The response was poor in that only six sites were identified by four of the agents contacted. Of these, four were allocated sites in development plans which had already been identified in the initial trawl. The two additional sites were assessed similarly to the sites identified in the development plan trawl against the primary criteria and where relevant the environmental criteria. The full list of sites is given in Appendix C. A plan identifying the locations of each site is at Appendix D.

4.4 The results of the assessment of all the identified sites are presented in Table 1 (Appendix E). The results of the environmental criteria assessment are presented in Table 2 (Appendix F).

4.5 There are just two sites which are of sufficient size, available and with potential access to water and potential means of disposal. These are:

- Site 36 Ardboe
- Site 13 Ballyvannon Road, Glenavy – the application site

4.6 **Site 36** is a vacant and flat area of land adjoining an industrial estate on the east side of the village of Ardboe. The existing industrial estate contains a concrete batching plant. Access is poor and requires all vehicles to pass through part of the village. It is roughly equidistant from the main areas of poultry bedding production but remote from the single largest source of material, MBM from Ulster Farm. In terms of bio-security, there is just one farm within 3 km increasing to 17 within the 10 km zone. It is remote from a

likely grid connection point in a rural area where additional supply may not be a priority. The site is close to Lough Neagh but access would be required to a suitable point to effect abstraction and return of heated water. A power plant here would be visually dominant in the flat landscape.

4.7 **Site 13** is at the location of the application site at Ballyvannon Road, near Glenavy. The site identified is adjacent to the rendering plant of Ulster Farm By Products, the largest single source of fuel for the proposed plant. Ulster Farm is the site of an extant planning permission (reference S/1998/0162, granted in June 2001) for the development of an "incinerator for the incineration of meat and bone meal and tallow with energy recovery plant"; the principle of an EfW plant at this location is therefore established. Water can be obtained and there is a means of disposal for treated waste waters and effluent. The site is immediately available. In terms of bio-security is scores well. The site is set in a visually attractive and designated landscape.

5. CONCLUSION

5.1 The Ardboe site is rejected as a suitable location for the proposed power plant development. The primary reason is that in common with the Glenavy site, it is not possible at this point in time to demonstrate that large scale abstraction and return of heated water can be undertaken without harm to the sensitive habitat of Lough Neagh and therefore be Best Available Technique which is required to obtain an IPPC permit. However, unlike the Glenavy site there is no obvious alternative of a reasonably large supply of water for evaporative cooling and disposal of waste water and effluent. Additionally, the site is not as suitable in bio-security terms with a poultry farm within 3 km and many more within 10 km. Though the site is equidistant from the main clusters of poultry producers it is remote from the largest single source of fuel at Ulster Farm. Nor is it well located for connecting into the grid and providing power where it is needed. Access is poor being through the village and a residential area.

5.2 It is concluded that the site adjacent to Ulster Farm is the only site which currently meets the requirements for the proposed biomass fuelled power plant. The site is

- available – and has now been purchased by Rose Energy Ltd
- can obtain water for cooling and a means of disposal
- is in a position which scores well for bio-security with no poultry producers within 3 km and 10 within 10 km
- is accessible
- has immediate access to the largest single supplier of fuel

5.3 Having regard to the foregoing, the site at Glenavy is considered to be the optimum available site for the proposed development.