

## Chapter Three

# THE PROPOSED DEVELOPMENT AND LAND USES

### INTRODUCTION

3.1 This chapter provides a detailed description of EWL's proposals. It explains both the physical nature of what EWL proposes to build and the operations that will take place once construction is completed. The chapter replaces chapter three of the 2008 ES.

3.2 The chapter begins with an explanation of the processes that would take place on the site, and then describes the individual buildings within which these processes would be accommodated.

### PROCESSES

3.3 The central objective of the proposed development is to recover the energy from the non-hazardous residues that remain after recyclable materials have been removed from the waste stream and to supply low carbon electricity to customers on and off site. To this end, the proposed development includes the following main processes and elements.

#### Waste management

3.4 Waste will be brought to the site by lorry in two forms for processing:

- **Refuse-derived fuel (RDF)** - comprising pre-processed waste that has already been sorted, shredded and prepared off-site. The RDF would be brought to the site in sealed bales or loose-loaded in specialist vehicles.
- **Commercial and industrial waste (C&I)** – sourced from other waste contractors and businesses in South Wales. This would also be brought to the site in sealed bales or loose-loaded in specialist vehicles.

3.5 No hazardous waste or untreated municipal solid waste will be processed on the site.

#### Waste reception

3.6 Waste delivery vehicles would enter the site from Ninth Avenue, and a waiting area is provided within the site boundary for lorries to park temporarily whilst undergoing the booking-in process. Having been weighed and booked in at the gatehouse, the imported waste would be delivered to the waste reception area in the existing Fuel Preparation Hall in the south-east part of the site. In an enclosed environment the waste will undergo a quality analysis to ensure it is of appropriate quality and consistency for further processing. The C&I will be shredded to a size no greater than 300 mm. As noted, RDF would arrive at the site already shredded. Both waste streams

would be sorted to remove remaining recyclables such as metals or unacceptable materials such as gas bottles, which will be taken to appropriate facilities off-site for recycling or safe disposal.

3.7 The remaining waste would be further processed using mechanical means and tested to ensure it meets the fuel specification required by the gasifier. Quality control testing would be carried out 'in-line' using computer-controlled optical and infra-red analysers to ensure that the fuel meets the standards required to be classed as a renewable fuel for the purpose of EWL's Contract for Difference' obligations (explained in paragraphs 4.15-4.15 of the next chapter).

### Fuel preparation

3.8 Fuel for gasification would finally be shredded to a sub 75mm particle size and conveyed to the Fuel Storage Hall on the Fifth Avenue frontage of the site. Any metals recovered from the waste stream would be separated and sent for recycling off-site, and any remaining inert waste such as grit would be extracted and disposed of at a suitably-licensed landfill site or as an aggregate for construction use. The remaining material is the fuel for the gasifiers and would be conveyed to fuel bunkers inside the consented **Fuel Storage Hall** on the Fifth Avenue frontage of the site. The bunkers provide a steady supply of fuel for the gasifiers with reserves available for times when fuel is not being prepared such as weekends and bank holidays.

### Gasification

3.9 There would be three gasification units in the proposed development, housed in a central **Gasification Hall**. These would use advanced conversion technology to convert refuse derived fuels into a combustible gas, known as 'syngas'.

3.10 The gasifiers would operate in the following manner.

- i). The fuel passes along a 'walking floor' system to ensure a consistent flow of fuel to the gasifier. It is then conveyed to a metered fuel feed hopper at the top of the gasifier, the rate of supply ensuring that the volume of fuel within the gasifier vessel remains constant.
- ii). The fuel enters the sealed gasifier vessel by means of a rotating auger. It is passed over an inclined moving grate and heated to over 1,000 degrees centigrade, initiating the gasification process. As the fuel heats up it undergoes a sequence of changes involving drying, chemical change caused by heating known as 'pyrolysis', and finally gasification, in which the syngas is liberated and the fuel reduced to an inert, non-combustible ash. Ash produced during the process would be sent off-site to a specialist company that further processes the ash converting it into building products. As such, nothing is wasted.
- iii). The syngas is piped to a large sealed chamber and combusted. The heat created passes through a superheater and boiler system to boil water efficiently, and the resulting steam from all three gasifiers would drive a single steam turbine, located in the **Turbine Hall**, that generates electricity. The electricity generated would be fed via an on-site HV Substation located towards the eastern end of the Fifth Avenue frontage to the local electricity distribution network operated by Western Power Distribution. The scheme would have a generation capacity of 11 megawatts (MW) and would generate electricity equivalent to the average demand from approximately 26,000 homes. Having driven the turbine, the steam

would be piped to air-cooled condensers in which the water is recovered for reuse, minimising the need for further inputs.

- iv). The exhaust gases from the superheater are passed through a boiler and 'economiser' system that recovers heat for use around the process. The exhaust gases would then be cleaned by the following combination of methods before being discharged under constantly monitored conditions through the stack at the centre of the site.
- On leaving the final secondary combustion chamber, the gases enter a reaction duct where chemical additions are made to the flue gases to abate pollutant emissions.
  - The addition of Hydrated Lime reduces concentrations of Hydrogen Chloride, Hydrogen Fluoride and Sulphur Dioxide from the flue gases, transforming them into Calcium Chloride, Calcium Sulphite, Calcium Sulphate and Calcium Fluoride. The resultant solid materials can then be captured by the bag filters.
  - Similarly, the application of Powdered Activated Carbon (PAC) into the duct just before the bag filter adsorbs Dioxins and 'Dioxin-like' compounds, VOCs and heavy metals from the gas stream, for subsequent collection in the filter.
  - Urea is added to abate oxides of nitrogen (NO<sub>x</sub>), reducing to nitrogen and water vapour.
  - the emissions are filtered to remove air pollution control residues and other particulates (small particles) and discharged under constantly-monitored conditions through the main stack at the centre of the site. Emissions would be controlled under an Environmental Permit issued by NRW.

3.11 Chapter nine of this ES addendum describes in detail the composition of the emission gases and the measures proposed to discharge them safely. These measures include an increase in stack height from 40 metres in the scheme approved in 2010 to 45 metres in the current proposal, the extra height being required principally to ensure effective dispersion of emissions over the taller buildings now proposed close to the stack – principally the Gasification Hall itself. The increased height of the stack also meets Natural Resources Wales' Best Available Techniques requirements. The stack diameter will also increase, from 2.5 metres in the approved scheme to 3.5 metres under the current proposal.

### High energy user

3.12 As noted, the Enviroparks concept seeks to recover as much material and energy resources as possible from the waste stream. The renewable energy produced on site can be made available on suitable commercial terms to future users of the consented High Energy User B1/B2 industrial unit. It is envisaged that the availability of renewable energy will be particularly attractive to inward investors.

## Estimate of inputs residues and emissions

3.13 Estimates of the inputs, residues and emissions from the proposed development are set out in table 3.1.

**Table 3.1: Enviroparks Hirwaun – estimated inputs, outputs and emissions**

<i>Inputs and outputs</i>	<i>Volume (annual unless specified)</i>
<b>Waste inputs</b>	
Refuse-derived fuel	83,000 tonnes
Commercial and industrial waste	155,000 tonnes
<b>Materials to support the gasification process</b>	
Lime	1,183 tonnes
Urea	473 tonnes
Activated carbon	47 tonnes
Process Water	35,083 cubic metres
<b>Outputs</b>	
Metals for recycling	6,346 tonnes
Additional recyclates and other materials removed during fuel preparation	61,654 tonnes
Effluent water	13,560 cubic metres
Ash from gasification	20,341 tonnes
Syngas from gasification	16.4 cubic metres per second
Emissions to air	47.7 cubic metres per second
Electricity	86,724 megawatt hours per year

## BUILDINGS

3.14 For completeness this section describes all of the buildings on the Enviroparks site to present a complete picture of the development. The section clarifies whether the individual buildings have been built, are covered by existing planning permissions or are the subject of the current planning applications that this ES addendum accompanies.

### Fuel Preparation Hall

3.15 This building formed a part of the proposals approved in 2010 and has been built, occupying land in the south-eastern part of the site. It measures 14 metres to ridge in height and 132 x 36 metres in plan with a short return on the Fifth Avenue frontage, giving a gross internal floorspace of 4,752 m<sup>2</sup>.

### Fuel Storage Hall

3.16 This building formed a part of the proposals approved in 2010 and 2015 but has not been built. The site is on the Fifth Avenue frontage and, under the current proposals, would be increased by two metres in height to accommodate an internal crane system. As now proposed this building would measure 16 metres to ridge in height and 99 x 36 metres in plan, giving a gross internal floorspace of 3,573 m<sup>2</sup>. Having regard to internal sub-divisions, the fuel storage element would account for 2,103 m<sup>2</sup> of this building, which would also accommodate the Turbine Hall and the southern part of the Gasification Hall (see below).

### Gasification Hall

3.17 The Gasification Hall is the principal new element in the current proposals. The Gasification Hall represents a consolidation of the consented Gasification Yard, Pyrolysis Building and Engine House in the 2010 scheme. It would contain three gasification lines, each with a bag filter unit used to treat gaseous emissions prior to discharge via the stack, which would be continuously monitored and inspected periodically both by EWL and NRW in accordance with legislation.

3.18 The building would occupy the central-southern area of the site and would measure 18.5 metres to ridge in height and 78 x 71 metres in plan, giving a gross internal floorspace of 5,538 m<sup>2</sup>. As noted above, the Gasification Hall would also include some space in the Fuel Storage Hall Building, giving a total floor area of 6,271 m<sup>2</sup>. The gasification hall would incorporate flush-fitted ventilation louvres in the walls and further vents on the roof, to allow a flow of air through the building.

### Stack

3.19 The stack would occupy the same central location on the site as it did in the approved 2010 proposals. To ensure effective dispersion to air, the stack in the current proposals would be 45 metres in height – five metres higher than currently consented. It would contain three flues – one for each gasifier – within a cylindrical external casing finished in a steel cladding of neutral grey colour. The stack would have an overall diameter of 3.5 metres, one metre more than the stack consented in 2010. Stack emissions would be monitored continuously by EWL and regulated by NRW, and the stack would also be the subject of periodic inspections by NRW.

### Turbine Hall

3.20 The steam turbine would be accommodated at the western end of the proposed Fuel Storage Hall building on the Fifth Avenue frontage. It would measure 25.0 x 15.12 metres in plan, giving a gross internal floor area of 378 m<sup>2</sup>. The electricity generated will be sent by underground cable to the proposed sub-station at the eastern end of the same building for onward transmission to Western Power Limited's local electricity distribution network.

### Service yard

3.21 The service yard in the south-western corner of the site previously housed the gasification plant located in the open air. Now that the gasifiers are located within a building and the anaerobic

digestion plant is no longer being developed, this would become a Balance of Plant Yard. The yard would contain the air-cooled condensers for the steam turbine, along with other ancillary structures including fire water tanks, process water storage tanks, a gas supply station, transformers and a standby generator. In its revised form the yard as now proposed measures 4,824 m<sup>2</sup> in area and would be screened from views from Fifth Avenue by a belt of trees and shrubs.

### On-site high energy user building

3.22 As explained earlier in this chapter, a use class B1 / B2 industrial unit is proposed on the part of the application site to make use of some of the renewable energy generated on the site. The building would occupy the north-western area of the wider Enviroparks site and would measure 14.2 metres to ridge in height and 152.2 m x 61.7 m in plan, giving a total floor area of 10,240 m<sup>2</sup>. This building was consented under the 2010 planning permissions and remains unimplemented and outside of the red line boundary for the current planning applications.

### Biomax building

3.23 This building was also consented under the 2010 planning permissions but remains unimplemented and outside of the red line boundary for the current planning applications. The Biomax building would occupy the north-east corner of the wider Enviroparks site and would be 10.95 m in height to the ridge 65.2 x 36.9 metres in plan with a floor area of 2,742 m<sup>2</sup>.

### Visitor centre and administration building

3.24 The Enviroparks proposal is intended to be a showcase development and a reference site to which waste authorities and contractors from the UK and beyond will be interested in visiting. Accordingly, the proposals that were granted planning permission in 2010 incorporate a combined administration building and visitor centre at the south-east corner of the site, visible from Fifth Avenue. The building would have a maximum height of 9.4 metres with an overall gross internal floorspace of 791 m<sup>2</sup> over two storeys, and is unaffected by the current proposals. It would accommodate the site's main reception, security, mess room and administration functions, along with an education and briefing area intended for use by commercial visitors and school and college parties of up to 40 in number. The adjacent car park thus includes space for a coach.

### Site access, circulation and parking

3.25 Vehicular access to the site would be from Fifth and Ninth Avenues. Internally, the site has been arranged to facilitate the safe and efficient movement of commercial vehicles around the site, and to ensure safe separation of operational and visitor traffic. The principal car park will be adjacent to the visitor centre and administration building in the south-east corner of the site. This will incorporate appropriate manoeuvring and parking spaces for cars and a visiting coach.

3.26 The development will incorporate covered bicycle parking and shower / changing facilities for cyclists. EWL has already made a financial contribution to cover the cost of a new bus shelter in front of the development in Fifth Avenue, and proposals to retain an existing section 106 planning requiring the approval and implementation of a green travel plan.

3.27 The visitor centre and administration building would incorporate provision for disabled access. Parking provision complies with the guidance issued by Rhondda Cynon Taf CBC.

### **Layout, landscape and design**

3.28 The buildings and structures described above would be laid out in a manner reflecting a range of planning and design considerations. These are considered in detail in the Design and Access Statement that accompanies EWL's planning application. Beyond operational efficiency, these considerations include a desire to present a coherent and attractive elevational appearance in external views of the site – particularly from Fifth and Ninth Avenues and from the Penderyn reservoir embankment on the northern site boundary. As far as possible, the design intention is to present a development that would not look out of place in a use class B1 business park.

3.29 As in the scheme approved in 2010, the buildings have been designed to what is an unusually high specification for this type of use. Structures of a more industrial appearance, such as the gasifiers, would be contained in a building to conceal them in external views. Building materials and colours have been selected to integrate the development into the local landscape in elevated views from the reservoir embankment and the slopes of Moel Penderyn to the north and from the slopes of Llethr Las, Twyn Canwylyr and Pistyll y Graig on Hirwaun Common to the south.

3.30 Extensive landscape and planting is proposed around the periphery of the site and within the car park. Plant species would be selected to reflect the aims of integrating new planting with that which already exists on the site boundaries, providing a suitable visual foil for the buildings and some ecological benefit.



## **THE SCHEME IN OPERATION**

### **Management**

3.31 The effective operation of the site will require a highly competent workforce. It is anticipated that the skills can be found locally. Overall control by EWL will reside with a competent management team experienced in the relevant procedures including operations and maintenance, environmental permitting, health and safety, quality assurance, site security, weighbridge, grid connection, electricity production and transmission. As required, compliance with Environmental Permit conditions for the whole site will be the responsibility of an EWL-appointed site director.

### **Environmental mitigation and monitoring**

3.32 The Enviroparks planning permissions granted in 2010 were the subject of comprehensive planning conditions and section 106 planning obligations. These have been discharged insofar as they are relevant to or triggered by the commencement of phase I of the development. To this end Enviroparks has already made financial contributions of £12,000 for construction monitoring and £205,031 to the conservation group Butterfly Conservation to enable the management of local grassland habitats.

3.33 The Applicant remains agreeable to all of the established planning conditions and section 106 obligations for the site, including those concerning the construction and operation of the plant and the safeguarding of Dŵr Cymru Welsh Water’s Penderyn Reservoir. The 2010 planning permissions thus provide an appropriate template for the consenting of the current applications. EWL requests / proposes that relevant planning conditions and obligations are applied to the current proposals in the event that they are approved.

### BREEAM compliance

3.34 BREEAM is a recognised sustainability assessment method for master-planning projects, infrastructure and buildings. It addresses a number of lifecycle stages such as *New Construction*, *Refurbishment* and *In-Use*. When EWL originally acquired land on Hirwaun Industrial Estate from the Welsh Government, a condition of sale was that any development should comply to a BREEAM ‘Excellent’ rating. The Welsh Government no longer applies this policy. However, the BREEAM requirement was reinforced by BBNPA through a planning condition attached to the planning permission granted for the Enviroparks project in 2010.

3.35 In October 2015 BBNPA approved a non-material amendment that had the effect of excluding the phase I development (the gatehouse and Fuel Preparation Hall) from the requirement to achieve a BREEAM ‘Excellent’ rating. The non-material amendment application was supported by a letter from EWL’S advisor, Waterman, explaining why the standard should not apply. In summary these were:

#### **Gatehouse**

*Previously, under Welsh Government policy, non-residential buildings with a floor space of 1000m<sup>2</sup> or more must meet the BREEAM ‘Very Good’ standard and achieve an ‘Excellent’ standard under Ene 1 reduction of CO<sub>2</sub> emissions. Considering this policy no longer applies and that the development is only 110m<sup>2</sup> we consider BREEAM ‘Excellent’ standard unrealistic with high financial cost with little return and a negligible reduction in environmental impact.*

#### **MRF (Fuel Preparation Area) Building**

*The building is unheated and does not require a Part L assessment under Building Regulations. BREEAM must be based on thermally conditioned building and therefore must be modelled under Part L assessment as a heated building to demonstrate compliance. The modelling must also take into account thermal efficiencies of elements which are not relevant due to the purpose of the building. Therefore the mandatory credits under ENE 01 reduction in CO<sub>2</sub> emissions are unattainable.*

*The BREEAM standards also require an appraisal of the building performance in relation to thermal performance, acoustic performance and testing; view out for office workers, humidification, energy consumption etc. which are not applicable given the purpose of the MRF building. Furthermore sites in remote locations with little opportunities for ecological enhancement are unable to achieve BREEAM’.*



3.36 Waterman's letter concludes:

*We conclude that based upon the pre-assessment of the development is unlikely to score highly in any other section of the BREEAM assessment due to the BREEAM energy standards, location of the site, end use and limited opportunities for ecological enhancement. Therefore we do not feel that achieving a BREEAM rating will provide any further reductions in environmental impact or benefit the development.*

3.37 Other than for heat generated by process equipment, the Fuel Storage Hall, Turbine Hall, and Gasification Hall that form the subject of the current planning application would be unheated and should be exempted from BREEAM requirements for the same reasons as the Fuel Preparation Hall. Similarly, the Visitor Centre, with a floor space of 791m<sup>2</sup>, should be exempt for the same reasons as the Gatehouse.

### **Community liaison**

3.38 EWL established Enviroparks (Community Liaison) C.I.C Limited in 2010 to distribute the predicted £600,000 that EWL would contribute over a ten-year period, principally to the local communities of Rhigos, Hirwaun and Penderyn. Working with the local communities and the Welsh Government it is hoped that this sum can be increased by attracting match-funding from other sources. The monies raised will be used to improve energy efficiency by paying for increased insulation in buildings, replacement windows, etc. but can also be used for any related purpose. Local residents have been invited to sit on the governing board to advise as to the best distribution of funds alongside two board members from EWL.