

# Bridgend Local Development Plan

2006-2021

Cyngor Bwrdeistref Sirol



## Renewable Energy Assessment & Energy Opportunities Plan

Updated November 2011

## **Bridgend Local Development Plan 2006 – 2021**

### **Renewable Energy Assessment and Energy Opportunities Plan**

**Updated November 2011**

**Development Planning  
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**The text of this document draws largely on the *Pilot Study – Pembrokeshire County Council Renewable Energy Assessment*, July 2010, which was produced by AECOM for the Welsh Assembly Government as part of the *Planning for Renewable and Low Carbon Energy – A Toolkit for Planners* project.**

**This contribution is acknowledged; however all evidence, data sources and target information, for the REA are relevant to Bridgend County Borough and have been produced by Bridgend County Borough Council in this regard to inform the Bridgend Local Development Plan and the Development Control process.**

**This document has been updated from its original (published in February 2011) to take in to account recent planning permissions for renewable energy generation and to incorporate the Energy Opportunities Plan for Bridgend County Borough.**

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## Executive Summary

The Welsh Government has a commitment to tackle climate change which includes achieving annual carbon reduction-equivalent emissions reductions of 3% per year by 2011 in areas of devolved competence. The Assembly Government resolves that all will play the fullest part in reducing CO2 emissions and is committed to developing a comprehensive energy strategy and a renewable energy route map to ensure understanding of what “playing a full part” will mean.

Considerable responsibility for delivery of a low carbon Bridgend County Borough rests with the various departments within the County Borough Council, with key roles in planning, waste management, land-ownership and energy procurement. Acknowledging this responsibility, a county borough-wide Renewable Energy Assessment (REA) has been prepared to assess the potential of the Bridgend County Borough area to contribute to national greenhouse gas emission reduction targets.

Bridgend County Borough Council is currently preparing its Local Development Plan (LDP). Changes to legislation require all local planning authorities to produce REAs as part of their wider evidence base in support of LDPs.

Renewable Energy Assessments will vary between local authorities dependent upon issues such as geography, land availability and also the priorities given by councils and communities to various policy objectives. This REA provides the results of a robust exercise, following the Welsh Government's Renewable Energy Assessment Toolkit for Planners, to establish the potential for renewable energy in the County Borough that would support a selection of policy objectives: many of which could also be addressed through corporate action.

The methodology used in the report follows the step-by-step guide contained in the ‘toolkit’ and calculates the potential renewable energy resource from the following sources: wind; wood fuel and energy crops (biomass); energy from waste; anaerobic digestion – (animal manure, food waste, poultry litter and sewage sludge); and hydropower. It also estimates Buildings Integrated Renewables (BIR) uptake.

It is noted that for Bridgend, the percentage of renewable electricity generation greatly exceeds the UK-wide target. However heat demand potentially met by renewable energy sources is substantially below the 12% target. LDP policies could therefore be formulated to encourage investigation and implementation of renewable energy generation by prospective developers on future development sites. This will need to be balanced against the cost of implementing such schemes and the impact on development viability this will bring.

Delivering some of the potential identified in this REA is likely to require considerable cooperation between the Council and other public sector bodies, and between public and private sector. The greatest challenge to this cooperation may arise in attempting to reduce the carbon emissions of existing

building stock, potentially though linking to Heat Networks or larger scale renewable electricity generating technologies.

The public sector, tasked with a leadership role, should be pro-active in identifying cost effective approaches to contributing to meeting targets and facilitating the success of others. Bridgend County Borough Council, through this REA, is fulfilling this role in identifying some of these potential opportunities within its area.

## 1. Introduction

### Background and Purpose of the Renewable Energy Assessment

- 1.1 The Welsh Government, through its Climate Change Strategy has resolved that all will play the fullest possible part in meeting statutory UK and EU targets on greenhouse gas emission reduction.
- 1.2 Climate change and energy security are key priorities of both the UK and Welsh Governments. The use of fossil fuels is seen as a major contributor to greenhouse gas emissions, a major cause of global climate change and moving towards a low carbon energy based economy to tackle the causes of climate change and improve energy security are a Government priority. The generation and use of renewable and low carbon energy sources has a key role to play in this and the UK Government is committed to meeting the EU target of 15 percent of energy from renewable sources by 2020. Modelling undertaken by the UK Department for Energy and Climate Change (DECC) suggests that by 2020, this could mean:
- More than 30% electricity generated to come from renewable energy sources
  - 12% of our heat generated from renewable energy sources
  - 10% of transport energy from renewable energy sources

The Climate Change Act 2008 introduces a legally binding target of at least a 34 percent cut in greenhouse gas emissions by 2020, and at least an 80 percent cut by 2050, against a 1990 baseline.

- 1.3 In terms of the land use planning system the Welsh Government has produced policy guidance in Planning Policy Wales and the associated Technical Advice Note 8 on renewable energy. In its “One Wales” commitments the Assembly Government has stated that “following the production of the Energy Route Map and an Energy Strategy, it will review TAN 8, revising upwards the targets from renewable energy, drawn from a variety of sources”.
- 1.4 Local Authorities have several key roles to play that can facilitate the use and generation of renewable and low carbon energy. These include:
1. Developing Planning – preparing planning policies (including Supplementary Planning Guidance) and allocating land in their Local Development Plans (LDPs)
  2. Development management – taking decisions on planning applications submitted to the local planning authority for development; as well as preparing Local Impact Assessments for schemes which are determined by the Infrastructure Planning Commission
  3. Corporate – taking action at a council wide level to achieve a low carbon economy.



4. Leadership – taking forward wider community action and communicating the need to increase the uptake of renewable energy.
- 1.5 This REA has been prepared by Bridgend County Borough to inform the first of these. This REA constitutes an evidence base to underpin LDP policies that can support and facilitate the deployment of renewable and low carbon energy systems.
- 1.6 **The REA consists of an assessment of the potential for renewable and low carbon energy generation at the County Borough scale. It does not assess the potential for generation for individual sites.**
- 1.7 In terms of development management, this REA, in the case of wind developments, can assist officers in understanding why a developer has chosen a particular location to develop a scheme.
- 1.8 However, as well as supporting the Council with the LDP, the intention is that the renewable energy opportunities identified will also be useful in assisting local authorities to fulfil the third and fourth roles identified above.

#### *Planning Policy*

- 1.9 This Renewable Energy Assessment can assist Bridgend County Borough Council to deliver national planning policy expectations as set out in Planning Policy Wales, namely the requirement that “*local planning authorities [LPA’s] should undertake an assessment of the potential for all renewable energy resources, renewable energy technologies, energy efficiency, and conservation measures, and to include appropriate policies in LDPs*”.
- 1.10 In order to achieve higher standards, it is highly likely that at some point some form of renewable or low carbon energy generation will be required: this REA has employed the method detailed in ‘Renewable Energy: A Toolkit for Planners’ for identifying and assessing potential.

#### *Wider Corporate Role*

- 1.11 In terms of wider roles, all local authorities including Bridgend County Borough Council have objectives or requirements in relation to tackling climate change that they need to meet. This REA enables the Council to identify specific opportunities for taking forward renewable and low carbon energy generation.

### **Scope of the Renewable Energy Assessment**

#### *Planning*

- 1.12 The REA focuses on planning policy, rather than development management. As explained above, this assessment has been developed

primarily for Bridgend County Borough Council, as an evidence base to support renewable and low carbon energy policies in the LDP.

- 1.13 The spatial elements of this REA are not intended for use by development management officers to assess individual planning applications for either strategic new development sites that are incorporating renewable energy, or for stand-alone renewable energy generating systems. However it may be used to inform an assessment of need for these facilities.

#### *Technology*

- 1.14 This Assessment is not meant to be an exhaustive guide to the different renewable and low carbon energy technologies that are available. Technical Advice Note 8 provides an introduction to a range of renewable and low carbon technologies and should be first point of reference. Others include the Department for Energy and Climate Change and the Energy Saving Trust

#### *Energy Hierarchy*

- 1.15 The REA focuses on renewable and low carbon energy generation, and the opportunities for promoting this through the Local Development Plan (LDP), rather than on improving energy efficiency in new or existing buildings. It is not covered in this REA, partly to keep the document to a manageable size, but also because there is only a limited amount, if anything, that planning policy for new developments can contribute in this area, over and above the existing sustainable buildings standards in Wales, and future changes to part L of the Building Regulations.

#### *Transport*

- 1.16 The REA covers the potential for generating renewable electricity or heat (for use in buildings or processes) but does not include an assessment of the potential for renewable or low carbon fuels for transport.

#### *On-shore*

- 1.17 Potential has only been assessed for on-shore renewable energy. It does not cover the potential for offshore renewable energy, such as wave, offshore wind and tidal. This is because, apart from the cable footfall onshore, offshore renewable energy schemes / projects are not within the planning jurisdiction of local planning authorities, but are the responsibility of the Crown Estate.

#### *Large Scale On-shore Wind*

- 1.18 The REA is not intended to duplicate the analysis carried out in TAN 8, which identified Strategic Search Areas (SSAs) for large scale on-shore wind power, nor the subsequent refinement exercise carried out by Arup. Rather, in the case of wind power, it has identified smaller scale

opportunities. The relationship between these is outlined further in the appropriate section.

### *Policy Wording*

- 1.19 The REA provides an evidence base to support relevant policies for inclusion in the LDP, rather than giving detailed guidance on how policies should be worded. The latter is the role of the *Planning Policy Wales* and supporting guidance in TAN 8.

## **Defining Renewable Energy and Low Carbon Energy**

### *Renewable Energy*

- 1.20 There are many definitions of renewable energy. The definition employed in paragraph 12.8.7 of *Planning Policy Wales* is as follows:

*“Renewable energy is the term used to cover those sources of energy, other than fossil fuels or nuclear fuel, which are continuously and sustainably available in our environment. This includes wind, water, solar, geothermal energy and plant material often referred to as biomass.”*

- 1.21 Important characteristic of renewable energy, which will be explained in more detail below, is that unlike fossil fuels, it produces little or no **net** carbon dioxide [CO<sub>2</sub>] – which is one of the main greenhouse gases.
- 1.22 Most forms of renewable energy stem directly or indirectly from the sun. The direct ones include, obviously, solar water heating, and photovoltaic. This also includes ground source and air source heat pumps, which make use of solar energy stored in the ground. The indirect forms are: wind power, as wind is caused by differential warming of the earth’s surface by the sun; hydropower, as rainfall is driven by the sun causing evaporation of the oceans; and biomass energy [from burning organic matter], as all plants photosynthesise sunlight in order to fix carbon and grow.
- 1.23 The combustion of biomass fuel is carbon neutral, because although the combustion releases CO<sub>2</sub>, the same amount of CO<sub>2</sub> was taken out of the atmosphere when the biomass was growing. Research informing *Planning Policy Wales* confirms *“Biomass is generally regarded as fuel [other than fossil fuel], at least 98 per cent of the energy content of which is derived organically from plant or animal matter. This includes agricultural, forestry or wood waste or residues, sewage and energy crops”*.
- 1.24 The other two forms of renewable energy are tidal power, which relies on the gravitational pull of both the sun and the moon, and geothermal energy, which taps into the heat generated in the Earth’s core.
- 1.25 Of all these, perhaps the most complex and multi-faceted is biomass energy, as it can take so many forms. It can include: burning of forestry residues and crops (especially miscanthus) ; anaerobic digestion of animal

manures and food wastes; combustion of straw and other agricultural residues and products. It also includes the methane produced from the anaerobic digestion of biodegradable matter in landfill sites [i.e. landfill gas], as well as any energy generated from the biodegradable element of waste going into an energy from waste plant.

- 1.26 This REA does not cover the resource for all renewable energy options. It is focused on onshore renewable energy options only. It also does not cover renewable energy options that are unlikely to be generally accessible at a local authority level such as geothermal energy, or tidal barrages. It covers the renewable energy technologies [considering both electricity and heat] outlined in Table 1.1 below.

<p><b>Wind energy</b> On-shore wind and community scale development</p>
<p><b>Biomass energy</b> Forestry residues, bio-crops (miscanthus), short rotation coppice and straw</p>
<p><b>Energy from Waste</b> Waste wood; municipal waste; and industrial and commercial waste</p>
<p><b>Centralised Anaerobic Digestion</b> Food waste; agricultural wastes; and sewage sludge</p>
<p><b>Hydropower energy</b></p>
<p><b>Building Integrated Renewables [BIR],</b> Biomass boilers; air and ground source heat pumps, solar power (photovoltaics); small and micro wind power.</p>

**Table 1.1: Renewable energy technologies covered by the REA**

### *Low Carbon Energy Options*

- 1.27 Low carbon energy options cover a range of energy sources that are not renewable (and therefore not covered by this assessment), but can still produce less carbon than use of the conventional electricity grid or gas network, and are therefore considered an important part of decarbonising the energy supply. These options include:

- Waste heat, e.g. from power stations, or industrial processes;
- Gas engine or gas turbine Combined Heat and Power [CHP], or fuel cell CHP, where the heat is usefully used; and
- The non-biodegradable fraction of the output from energy from waste plants

## Explanation of Energy Terms

### *Power vs. Energy Output*

- 1.28 In the context of this Renewable Energy Assessment, power is measured in either kiloWatts [kW], or MegaWatts [MW], which is a thousand kW, or gigaWatts [GW], which is a thousand MW. A terawatt (TW) is a thousand GW. It is a measure of the electricity or heat output being generated [or used] at any given moment in time. The maximum output of a generator, when it is running at full power, is referred to as its installed capacity or rated power output.
- 1.29 Energy, on the other hand, is the product of power and time. It has the units of kWh [the h stands for “hour”] or MWh, or GWh. As an example, if a 2MW wind turbine ran at full power for 1 hour, it would have generated  $2 \times 1 = 2\text{MWh}$  of energy. If it ran at full power for one day [24 hours], it would have generated  $2 \times 24 = 48\text{MWh}$ .
- 1.30 This distinction is important, because in carrying out the renewable energy resource assessment, certain assumptions have been made to calculate both the potential installed capacity [or maximum power output] of different technologies, as well as the potential annual energy output.

### *Electricity vs. Heat Output*

- 1.31 In terms of the units used, to avoid confusion, it can be important to distinguish between whether a generator is producing electricity or heat. This is because some renewable energy fuels [i.e. biomass] can be used to produce either heat only, or power and heat simultaneously when used in a Combined Heat & Power [CHP] plant.
- 1.32 It is also important to be able to distinguish between renewable electricity targets and renewable heat targets. To do this, the suffix “e” is added in this toolkit to denote electricity power or energy output, e.g. MWe, or MWhe, whilst for heat, the suffix “t” is used [for “thermal”], to denote heat output, e.g. MWt, or MWht

## 2. Policy context and drivers for renewable energy

### Introduction

2.1 The Welsh Government has a commitment to reduce greenhouse gas emissions in Wales, with an aim to achieve annual carbon reduction-equivalent emission reductions of 3% per year by 2011 in areas of devolved competence, including actions on diversified renewable energy generation. The Welsh Government has reiterated the recognition that climate change is the greatest threat facing humanity and is committed to ensuring that Wales plays a full part in meeting the challenges which this presents.

2.2 The Welsh Government has a legal obligation to promote Sustainable Development and has embarked on an ambitious and long-term programme of cross cutting policy initiatives to address these issues. This is contained in *One Wales: One Planet* [2009] which sets out a vision where within the lifetime of a generation we want to see Wales using only its fair share of the earth's resources. Renewable energy plays an integral part in achieving this vision. The Climate Change Strategy set out a vision for Wales in 2050. Within this vision it states

*“The energy intensity of society has decreased significantly. There has been a consistent drop in energy and water demand. There has been a major increase in renewable energy generation, offshore and onshore”*

2.3 Moving towards a low carbon energy based economy is a national priority. The UK Government is committed to meeting the EU target of 15 percent of energy from renewable sources by 2020, and the Welsh Government will deliver its fair share towards these targets as set out in the Climate Change Strategy.

### UK and European Policy Context

2.4 EU Renewable Energy Directive: The UK has signed up to the Directive, agreeing to legally binding targets of 15% of energy from renewable sources by 2020. Modelling undertaken on behalf of the Department for Energy and Climate Change suggests that by 2020, this could mean:

- More than 30% of our electricity generated from renewable energy sources
- 12% of our heat generated from renewable energy sources
- 10% of transport energy from renewable energy sources

2.5 The UK Renewable Energy Strategy [2009] sets out how the UK will increase the use of renewable electricity, heat and transport to meet this target and address the urgent challenges of climate change and national security of energy supply

## **Wales Policy Context for Planning and Renewable Energy**

- 2.6 Planning's wider role in shaping places with lower carbon emissions and resilience to climate change is set out in Planning Policy Wales. The Assembly Government has revised Planning Policy Wales and Technical Advice Note [TAN] 8 on renewable energy. In its "One Wales" commitments the Welsh Government has stated that "following the production of the Energy Route Map and an Energy Strategy it will review TAN 8, revising upwards the targets from renewable energy, drawn from a variety of sources".
- 2.7 In September 2009 changes were made to 'permitted development' rights to make provision for the installation of certain types of micro-generation by householders without the need for planning permission, namely solar photovoltaic and solar thermal panels, ground and water source heat pumps and flues for biomass heating.
- 2.8 The Welsh Government will be consulting on further proposals on the appropriate extension of the permitted development rights in relation to micro-generation, which should encourage greater domestic and non-domestic take-up of these technologies.
- 2.9 The Planning and Energy Act, 2008, enables local planning authorities in Wales to set reasonable requirements in the LDP for the generation of energy from local renewable sources and low carbon energy and for energy efficiency. The Act is complemented by the policies contained in PPW that cover such issues and provides a legal basis for the implementation of LDP policies against the national framework.

## **Wales Wider Policy Context**

### *The Renewable Energy Route Map for Wales*

- 2.10 The Renewable Energy Route Map for Wales sets out proposals for moving Wales towards self-sufficiency in renewable electricity in a generation whilst at the same time driving towards increased energy efficiency and a greater level of heating requirements being supplied from renewable sources. The route map envisages that micro-generation and other small scale technologies can play a significant role in delivering these proposals, as supported by the Micro-generation Action Plan for Wales [2007]. This is supported by the actions in One Wales: One Planet and the Climate Change Strategy to remove barriers to the installation of micro-generation.

### *Wales Low Carbon Energy Statement*

- 2.11 In March 2010, the Welsh Government published a low carbon energy policy statement that provides the sustainable development framework for the acceleration, in Wales, of the transition to an efficient low carbon

energy based economy. The successful delivery of this will depend on the facilitation of all forms of renewable energy across Wales.

#### *National Energy Efficiency Savings Plan*

- 2.12 This proposes practical short term actions that aim to reduce greenhouse gas emissions, tackle fuel poverty in Wales with a particular emphasis on improving the energy efficiency of the most inefficient homes in Wales, and support 'green' jobs and development of the supply chain for energy efficiency and micro-generation technologies. The Plan will sit below the Energy Statement which will provide the overall framework for energy policy in Wales.

#### *The Bioenergy Action Plan*

- 2.13 This proposes targets of 5TWh of electricity and 2.5TWh of usable heat energy from renewable biomass by 2020.

### **Other UK Drivers for Renewable Energy**

#### *Building Regulations and Zero Carbon*

- 2.14 Changes to the Building Regulations in 2010, 2013 and 2016 are expected to bring in challenging dwelling [CO<sub>2</sub>] emissions rate targets for residential development and for commercial development by 2019. By 2016, new homes will need to achieve a 70% reduction in CO<sub>2</sub> emissions on or near site from energy efficiency and the use of Low and Zero Carbon [LZC] energy options. For large sites, district heating [DH] from a low carbon source is likely to be one of the most cost-effective ways of achieving this.
- 2.15 Developers will then have to deal with their residual carbon emissions through the use of Allowable Solutions [AS]. One AS proposed would allow credit for carbon emissions where heat is exported from the site to nearby existing buildings via a District Heat Network. The power to make Building Regulations for buildings in Wales will be transferred to the Welsh Ministers on 31<sup>st</sup> December, 2011.

#### *Feed in Tariffs [FITs]*

- 2.16 The 2008 Energy Act contains powers for the introduction of FITs in Great Britain to incentivise renewable electricity installations up to a maximum capacity of 5 MW. The impact of FITs will be to significantly increase revenue for small-scale generators of renewable electricity, such as photovoltaic systems or small wind turbines. The FITs may also make it easier to obtain finance for such projects as it provides a guaranteed price for the electricity generated.



### *Renewable Heat Incentive [RHI]*

- 2.17 The Energy Act 2008 also allows for the setting up of a Renewable Heat Incentive [RHI], which would provide financial assistance to generators of renewable heat and to some producers of renewable heat, such as producers of biomethane. The Government aims to have this in place by April 2011. The incentive payments will be funded by a levy on suppliers of fossil fuels for heat. The proposal is that the RHI will cover a wide range of technologies including biomass, solar hot water, air and ground source heat pumps, biomass CHP, biogas produced from anaerobic digestion and injection of biomethane into the gas grid.
- 2.18 The impact of the RHI is that it will make generation of renewable heat more financially viable than it is currently.

### *The Renewables Obligation [RO]*

- 2.19 The RO is the main current financial support scheme for renewable electricity in the UK, and is administered by Ofgem. It obliges electricity suppliers in the UK to source a proportion of their electricity from renewable supplies. They demonstrate this has been achieved by showing they have the required quantity of Renewable Obligation Certificates [ROCs], which renewable electricity generators are awarded for their output.
- 2.20 If suppliers fail to meet their target, they have to pay a fine and also the value of the fine “pot” is, on an annual basis, split among those suppliers who do meet their targets. This creates a market for the ROCs and means that generators of renewable electricity can sell the ROCs that they receive for significantly more than they receive for their electricity output.
- 2.21 The intention is that RO will continue to incentivise electricity generation from larger scale renewable energy installations, whilst the FIT will be aimed at smaller generators.

### **Welsh Government’s Community Scale Renewable Energy Generation Programme**

- 2.22 The Welsh Government’s Community Scale Renewable Energy Generation Programme uses European Structural Funds to provide advice and grants to support the development of community-sized renewable energy schemes, through the Energy Saving Trust.
- 2.23 This support is available to social enterprises across Wales and consists of three different elements:

### *Technical Development Officers*

- 2.24 A network of locally-based technical development officers is in place across Wales to help community groups develop projects and access the

funding streams. The development officers can also help to develop the technical capacity of social enterprises and provide locally based advice on renewable energy.

#### *Preparatory stage grants*

- 2.25 Grant funding is available towards feasibility studies and other preparatory costs. Up to £30,000 is available to fund non-capital aspects of a project. These should be early stage activities without which the installations would not be able to go ahead, such as environmental surveys, planning applications and community engagement activity.

#### *Capital grants*

- 2.26 A grant of up to £300,000 is available towards the capital costs of a renewable energy project.

### **Wood Energy Business Scheme (WEBS)**

- 2.27 Grants for Welsh SME businesses and community groups installing wood fuelled heating systems; plus support for setting up clean wood fuel supply businesses in Wales.
- 2.28 The Wood Energy Business Scheme (WEBS) is a £17 million pound capital grant scheme. It draws down its funding from European ERDF funds via the Welsh European Funding Office (WEFO), and will run until 2013. The funding is made up of £7.9 million pounds of ERDF funding; the remainder will be from various match funding sources.
- 2.29 This is a pan Wales project, although different levels of support apply in the Convergence and Competitiveness areas of Wales. Its prime aim is to provide capital grant support to micro-businesses, SMEs and social enterprises to further develop the sustainable and renewable wood heat market across Wales.
- 2.30 Three types of project are eligible for grant support:
- Wood fuel heating systems
  - Small scale electricity generation using wood - Combined Heat and Power (CHP)
  - Wood fuel supply businesses – Enabling high quality equipment and fuel supply chains to be developed

### **3. How to use this Renewable Energy Assessment**

#### **Structure of the Renewable Energy Assessment (REA)**

- 3.1 This REA has primarily been developed to undertake an area wide assessment of the potential for renewable energy generation in Bridgend County Borough.
- 3.2 In developing each element of the assessment, a series of tasks have been completed as set out in “Renewable Energy: A Toolkit for Planners”. The start of this REA indicates the questions about the renewable or low carbon energy potential in the Bridgend County Borough that have been addressed by each element of the evidence base.

#### **Who has developed this REA?**

- 3.3 This REA has been developed by Bridgend County Borough Council based upon the pilot study for Pembrokeshire undertaken by AECOM as part of the Welsh Government’s ‘Renewable Energy: A toolkit for Planners’ project. The REA has been compiled using a Geographical Information Systems (GIS) approach and methods as set out in the above mentioned ‘toolkit’.
- 3.4 The identification of opportunities and the total potential resource have been informed by a wider officer stakeholder group. Further, any decision about the setting of enhanced development requirements for specific sites will require engagement with the wider public sector and community, and potentially developers and the private sector. It is envisaged that this element will be undertaken as part of the wider consultation on the deposit LDP.

#### **4. Bridgend County Borough Area Wide Renewable Energy Assessment**

4.1 This section details the 'accessible' renewable energy resources in Bridgend County Borough, the variation in technologies that may need to be employed to utilise such resources and the different outputs (electricity and / or heat) of each technology.

4.2 Issues and questions addressed by this element of the REA include:

##### *Calculating existing and future energy baseline*

- What is the current energy demand in Bridgend County Borough?
- What will be the energy demand in Bridgend County Borough in 2020?

##### *Existing and proposed LZC energy technologies*

- What is the existing capacity of low and zero carbon energy technologies in Bridgend County Borough?
- Are any low and zero carbon energy technology installations being proposed in Bridgend County Borough?

##### *Wind energy resource*

- What is the potential for medium and large scale wind in Bridgend County Borough?
- What are the potential sites for stand-alone renewable energy development in Bridgend County Borough?

##### *Biomass energy resource*

- What is the potential energy from biomass in the Bridgend County Borough?

##### *Energy from Waste*

- What is the potential energy from municipal solid waste in Bridgend County Borough?
- What is the potential energy from commercial and industrial waste in Bridgend County Borough?
- What is the potential energy from energy from food waste in Bridgend County Borough?

- What is the potential energy from energy from animal manure and poultry litter in Bridgend County Borough?
- What is the potential energy from digestion of sewage sludge in Bridgend County Borough?

#### *Hydropower Energy Resource*

- What is the potential energy from hydropower in Bridgend County Borough?

### **Calculating Existing and Future Energy Baseline**

- 4.3 The method employed for base-lining the Bridgend County Borough energy consumption was as detailed in 'Renewable energy: A toolkit for planners'.
- 4.4 The method relies upon:
- Predicted future energy demand as indicated in the UK Renewable Energy Strategy
  - WAG derived data and statistics currently published by DECC.
- 4.5 Table 4.1 below shows the split between electricity and heat for the UK, Wales and for Bridgend County Borough for 2006. Table 4.2 below shows the predicted electricity and heat demand for Bridgend County Borough for 2020. The decrease in demand is due to increased energy efficiency through improved public awareness and insulation projects etc.

<b>Total Energy 2006 (GWh)</b>			
<b>Sector</b>	<b>UK</b>	<b>Wales</b>	<b>Bridgend</b>
Electricity	328,393	17,394	693
Heat	898,287	55,489	2,515

**Table 4.1 Total DECC Energy (GWh) data reported by UK RES energy sector for Bridgend**

<b>Sector</b>	<b>Total Energy 2006 (GWh)</b>	<b>Predicted % change to 2020</b>	<b>Total energy 2020 (GWh)</b>
Electricity	693	-0.3	691
Heat	2,515	-15.8	2,118

**Table 4.2 Total DECC Energy (GWh) data reported by UK RES energy sector for Bridgend**

## Existing and Proposed LZC Energy Technologies

- 4.6 To demonstrate the progress being made and establish a baseline of installed capacity to inform future potential and target setting, the capacity of Low and Zero Carbon [LZC] technologies already installed in Bridgend County Borough has been established. Where LZC energy technologies already exist, the installed capacities [measured in MW] were recorded and incorporated as a contribution to overall final targets.
- 4.7 This assessment of existing capacity covers electricity and heat generation, and large scale as well as 'Building Integrated Renewables' (BIR) generation. For larger schemes, it also includes those that have received planning consent, but are not yet built.

### *Identifying existing smaller scale and micro-generation capacity.*

- 4.8 Data has been collected at the local authority level on installed renewable heating capacity, and small scale electricity generation.
- 4.9 Table 4.3 outlines existing renewable electricity capacity in the County Borough. Table 4.4 outlines existing renewable heat capacity in the County Borough.

Name of Scheme	Technology	Capacity (MWe)	Status	Source
Llynfi Biomass	Biomass	10.00	Consented	REStats
Tythegston Landfill	Landfill Gas	1.17	Consented	REStats
Tythegston Landfill	Energy from Waste	4.00	Consented	BCBC
Cenin (Stormy Down)	Biogas / AD	1.00	Consented	BCBC
Fforch Nest Wind Farm	Onshore Wind	10.00	Consented (s106)	REStats
Pant-y-Wal	Onshore Wind	25.00	Consented (s106)	REStats
Penybont CHP WTW	Sewage Gas	0.35	Operational	Ofgem
Photovoltaic (Household)	Solar	0.006	Grant Supported	DECC
Archbishop McGrath	Solar	0.01152	Operational	BCBC
Bridgend Bus Station	Solar	0.0158	Operational	BCBC
Bridgend Civic Centre	Solar	0.00987	Proposed	BCBC
Ravens Court, Bridgend	Solar	0.00987	Proposed	BCBC
Ogmore Vale Primary	Solar	0.00987	Proposed	BCBC
Pontycymmer Nursery	Solar	0.002	Operational	BCBC
Gateway to the Valleys	Solar	0.01152	Proposed	BCBC
<b>TOTAL</b>		<b>51.6</b>		

**Table 4.3 Existing renewable electricity capacity**

Name of Scheme	Technology	Capacity (MWh)	Status	Source
Pencoed Comprehensive	Biomass	0.8	Operational	BCBC
Caerau Primary School	Biomass	0.15	Operational	BCBC
Penyfai Primary	Biomass	0.15	Operational	BCBC
Kenfig NNR	Ground Source	0.024	Operational	BCBC
<b>TOTAL</b>		<b>1.124</b>		

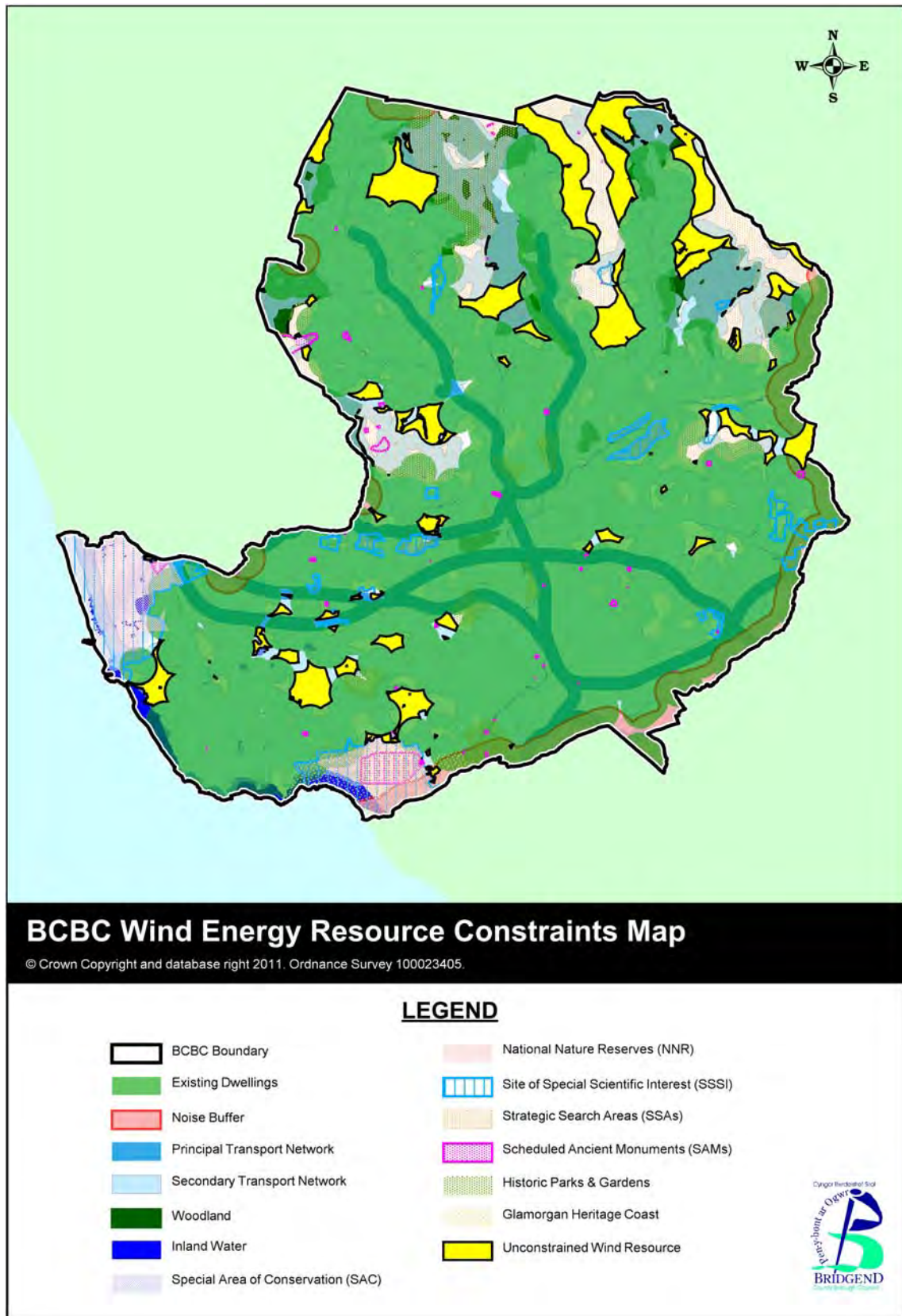
**Table 4.4 Existing renewable heat capacity**

## Wind Energy Resource

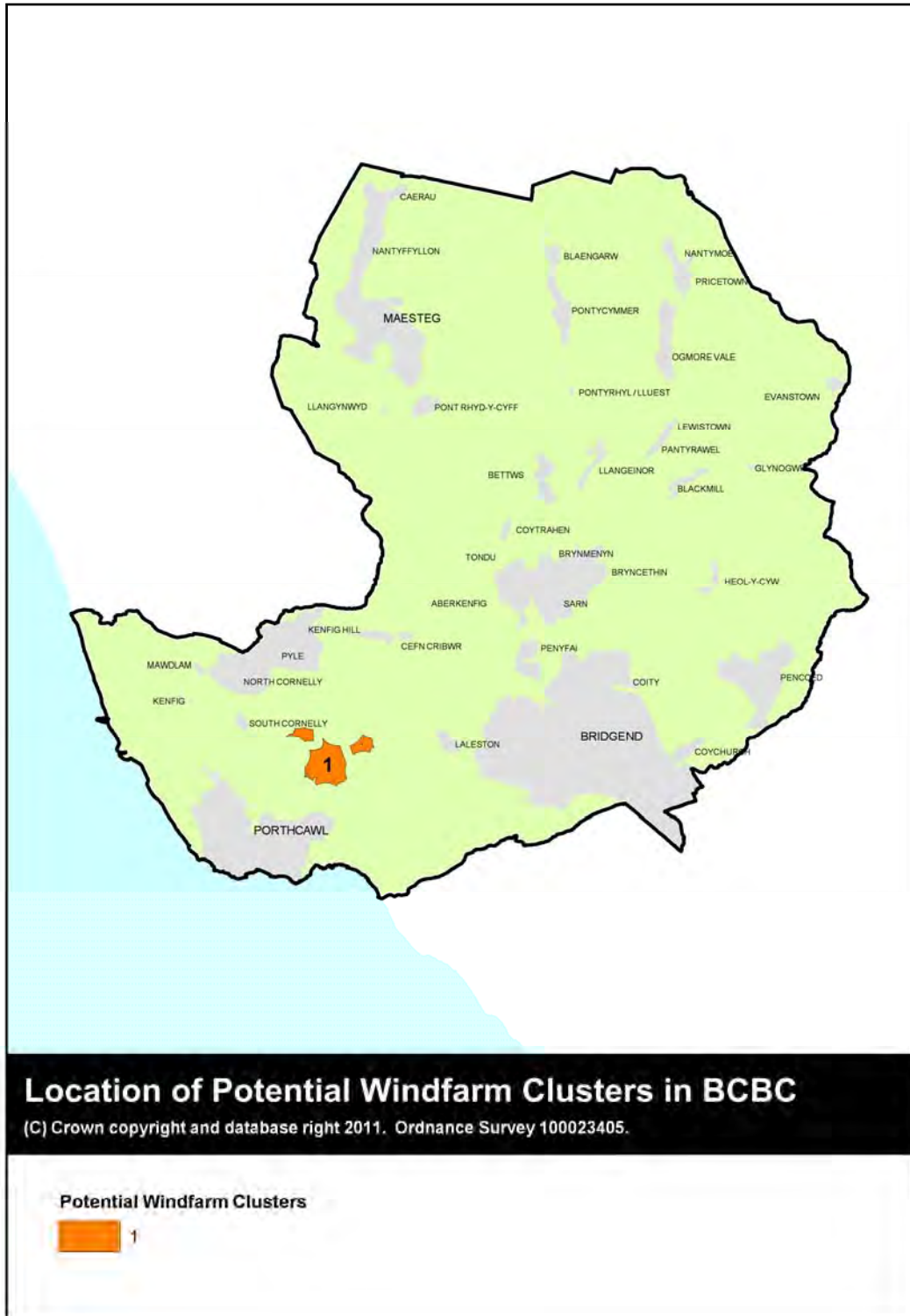
- 4.10 The focus of this REA is on establishing the potential wind resource and therefore this exercise has not therefore been constrained by current TAN8 guidance (see below).
- 4.11 For the purposes of planning policy in Wales large scale wind power has been defined in TAN 8 as wind farms of between 25MW and 50MW. Those above 50MW are the responsibility of the Independent Planning Commission under the Electricity Act. TAN8 provides details of 'Strategic Search Areas', [SSAs] sites identified as suitable and potential locations for large scale wind. These have not been investigated as part of this evidence base. TAN8 states that 'outside of SSAs wind farms are allowed up to 25MW capacity on urban brown field sites and less than 5MW elsewhere'.
- 4.12 Further constraints to onshore wind development not considered within this REA include (and this is not meant to be an exhaustive list) the practical access to sites required for development, landowner willingness for development to go ahead, political will, the time to complete planning procedures and an economic distance to the nearest appropriate electricity grid connection.
- 4.13 Wind farms, by nature, are most usually situated in rural settings away from residential development and where the wind resource is least constrained. This can mean that there is often no opportunity to utilise on-site the outputs from wind farms leaving export of electricity to grid as the only option. This REA has not utilised national grid data but the local authority may wish to investigate overlaying GIS layers of the energy networks data available to them. Also, the impact of wind farms on landscape character was not taken into account.
- 4.14 Onshore wind capacity is derived from wind speed data across the County Borough. Areas experiencing averages of 6 metres a second or more are deemed the most suitable. From these areas a number of constraints are excluded from further assessment. These are national environmental and heritage constraints; transport infrastructure; dwellings and noise and aviation and radar constraints.

- 4.15 The result of the GIS-based mapping exercise gives areas of the County Borough that could be seen as acceptable (in power generation terms) for wind turbine developments (although individual schemes would need to take into account other factors such as landscape protection etc.). From these areas a potential generation from wind power can be calculated.
- 4.16 In undertaking the assessment the following wind turbine dimensions are assumed:
- |                  |                                   |
|------------------|-----------------------------------|
| Rated Output:    | 500kw                             |
| Hub Height:      | 40m                               |
| Rotor Diameter:  | 40m                               |
| Tip Height:      | 65m                               |
| Turbine Density: | 16 turbines into 1km <sup>2</sup> |
- 4.17 Once this initial constraints assessment had been carried out Map 1 below was produced. The yellow areas highlighted indicate the unconstrained areas suitable for wind energy generation taking into account the constraints listed above.
- 4.18 Subsequent to this, the toolkit advocates taking into account cumulative visual impact with existing or consented wind farms. It recommends a 7km minimum separation buffer be applied to these developments. The outcome of this is that many unconstrained areas in the east and north of the County Borough are excluded from further assessment due to the operational Taff-Ely and Ffynnon Oer wind farms and the consented Pant-y-Wal scheme.
- 4.19 Once this additional factor is taken into account, the unconstrained areas are then grouped together in terms of their proximity. From this 1 'potential wind energy area clusters area has been identified to carry out the final wind energy assessment. This is displayed in Map 2.
- 4.20 This cluster is then classified into one of 6 priority areas characterised by the wind speed and potential disruption to National Air Traffic Service. The identified cluster in Bridgend County Borough is classed as a vPriority 1 area as it has high wind speed (>6.5 m/s) and low impact on the air traffic service.





Map 1 Wind Energy Resource Constraints Map



Map 2 Potential Wind Farm Clusters – priority areas of least constraint

Wind Resource Priority	Unconstrained Area Sq Km	Pontential Energy Generated (MWh)	Potential Capacity (MW)
Priority 1	1.3	24,599	10.4

Table 4.5 Unconstrained wind resource output for Bridgend County Borough

Potential Wind Energy Area	Area Sq Km	Pontential Energy Generated (MWh)	Potential Capacity (MW)
<b>TOTAL</b>	<b>1.3</b>	<b>24,599</b>	<b>10.4</b>

**Table 4.6 Potential wind farms across Bridgend County Borough**

## Wind Energy Potential and SSAs

- 4.21 It is acknowledged that parts of Bridgend County Borough lie within the Strategic Search Area (SSA) F for large scale wind energy projects outlined in TAN8. As part of a consortium, Bridgend County Borough Council carried out a refinement exercise of these areas in 2006.
- 4.23 The refinement, carried out by Ove Arup and Partners, calculated the generation capacity of parcels of land included in the SSA. For those areas of the SSA in Bridgend County Borough the capacity was calculated as follows:

Zone 20	North East of Maesteg	19MW
Zones 31 – 34	North of Evanstown	31MW

In Zones 31 – 34 Bridgend County Borough Council has consented the Pant Y Wal and Ffoch Nest wind farms totalling 35MW, thereby exceeding this capacity. Zone 20 has been excluded from the assessment on the basis of the operational Ffynon Oer wind farm in Neath Port Talbot County Borough.

## Biomass Energy Resource

- 4.26 The focus of this REA is on establishing the potential biomass resource. The resource is defined as:
- Wood fuel resource
  - Energy crops
- 4.27 Although areas of land have been indicated as having potential for the growing of energy crops, further detailed studies are required prior to action. Furthermore, market demand is likely to play a key role in what, and how much is planted.
- 4.28 Even where there is local demand for a biomass supply, constraints, not considered within this REA, include (and this is not meant to be an exhaustive list) the proximity of plant / technology and practical access to sites required for preparation and delivery of fuel.
- 4.29 In terms of plant / technology, landowner willingness, political will, the time to complete planning procedures and an economic distance to the nearest appropriate electricity grid connection will all be key considerations but are not included within this assessment.

- 4.30 Biomass energy generation (whether generating heat, power or both), by nature, is most usually situated a small distance away from residential development (though close enough to supply heat), where there is room for the development including fuel storage and access for large delivery vehicles.
- 4.31 Unlike wind farms, biomass can be utilised for the generation of both electricity and heat. The use of energy crops, forestry residues and recycled wood waste for energy generation can have a number of advantages:
- Provide opportunities for agricultural diversification
  - Encourage increased management of woodland
  - Can have positive effects on biodiversity
  - Remove biodegradable elements from the waste stream
  - CO2 savings if replanting occurs and long distance transportation is avoided
- 4.32 There is no consideration of the utilisation of straw as an energy source as Wales is a net importer.
- 4.33 Wood fuel and energy crop resource is calculated using agricultural land quality (for growing energy crops) and forestry plantation land areas (for wood fuel). More specifically, this concerns the resource that is available from the management of existing woodland, by the extraction of “thinnings” and the residues produced from the extraction of timber trees, the so-called “lop and top” (i.e. tips and branches).

Outputs	Energy Crops	Woodland	Total
Available Area (Ha)	8,421	3,577	<b>11,998</b>
Percentage of area that can be used	10%	n/a	-
Usable area (Ha)	842	3,557	<b>4,399</b>
Yield (oven dried tonnes (odt) per Ha)	12	0.6	-
Yield (odt)	10,104	2,134	<b>12,238</b>
<b>Electricity</b>			
Required odt per MWe	6,000	n/a	-
<b>Potential installed capacity (MWe)</b>	<b>1.68</b>	<b>n/a</b>	<b>1.68</b>
<b>Heat from CHP</b>			
Required odt per 1MWt	3000	n/a	-
<b>Potential installed capacity (MWt)</b>	<b>3.36</b>	<b>n/a</b>	<b>3.36</b>
<b>Heat-only option</b>			
Required odt per MWt	n/a	660	-
<b>Potential installed capacity (MWt) from boilers</b>	<b>n/a</b>	<b>3.23</b>	<b>3.23</b>

**Table 4.7 Potential available biomass resource for Bridgend County Borough**

## Energy from Waste

- 4.34 Bridgend County Borough Council has signed a partnership agreement with Neath Port Talbot Borough Council to process landfill waste at a waste treatment plant, known as a Materials Recovery and Energy Centre (MREC). The MREC at Crymlyn Burrows near Swansea is a waste management facility that assists Bridgend and Neath Port Talbot Councils in diverting a large percentage of waste away from landfill.
- 4.35 All of the landfill black bag waste collected from the kerbside in Bridgend is taken to the MREC. At this facility metals are removed mechanically for recycling and some of the remaining waste is processed to produce refuse derived fuel that generates energy for use by the facility. Any surplus energy is exported to the National Grid. Other waste from the black bags is used in cement kilns as a substitute for non renewable natural resources such as fossil fuel (coal, oil and natural gas). As a result of these processes the amount of waste going to landfill is significantly reduced.
- 4.36 Less is known about the plans of commercial waste operators to treat commercial and industrial waste streams. Organisations involved in such activity should be fully engaged to ensure that opportunities to utilise energy are not lost.
- 4.37 Further guidance should be sought from the Welsh Assembly Government in relation to whether energy from waste (EfW) from some or all EfW technologies is, or will be, considered to be 'renewable' energy and, where it is confirmed to be 'renewable', for what proportion of the residual waste stream (the proportion usually refers to the proportion of residual waste deemed to be the biodegradable [BD] element).
- 4.38 In order to comply with Welsh Assembly Government requirements contained in the National Waste Strategy: *Towards Zero Waste*, at least 70% of all main waste streams should be recycled by 2025. Landfilling of all wastes will be phased out as far as possible by this time.
- 4.39 Other targets for consideration include a maximum level of 30% energy being created from waste by 2024/25; a maximum of 150 kilograms (kg) of residual household waste collected per person per annum by 2025; and that Wales should achieve zero waste by 2050.
- 4.40 The energy from waste potential is calculated using data on Municipal, Commercial and Industrial waste arisings. Data used in these calculations has been collected from Bridgend County Borough Council's Street Scene department and the Environment Agency Wales. Growth projections to 2021 have been calculated assuming the levels predicted in the South West Wales Regional Waste Plan (1<sup>st</sup> Review),

<b>Outputs</b>	<b>Municipal Solid Waste</b>	<b>Commercial &amp; Industrial Waste</b>	<b>Total</b>
Total Waste (tonnes)	72,403	127,472	199,875
Total residual (30%)	21,721	38,242	59,963
Total Biodegradable (renewable) element (35%)	7,602	13,385	20,987
<b>Electricity</b>			
Required wet tonnes per MWe	10,320	10,320	-
<b>Potential installed capacity (MWe)</b>	0.74	1.30	2.04
<b>Heat</b>			
Required wet tonnes per MWt	1,790	1,790	-
<b>Potential installed capacity (MWt)</b>	4.25	7.48	11.73

Table 4.8 Potential energy from waste resource for Bridgend County Borough

## Anaerobic Digestion

4.41 Additional potential energy sources derived from waste as reported on in the Bioenergy Action Plan for Wales include:

- Food waste
- Agricultural wastes
- Animal manure
- Poultry litter
- Sewage sludge

4.42 There is no output table for Bridgend County Borough for landfill gas as no capacity, additional to what is already installed, has been identified. With policy in place to prevent further biodegradable material being sent for landfill, no further opportunities for energy from landfill gas are anticipated.

4.43 Data has been obtained from: WAGs Small Area Agricultural Statistics; Bridgend County Borough Council's Street Scene department; Environment Agency Wales and the Bioenergy Action Plan for Wales.

### Food Waste

4.44 Municipal food waste projections for 2020 have been calculated using the projection for 2011 supplied by the Street Scene department. A calculation per household in 2011 was derived and this was applied to the 2021 household projection to give an approximate figure.

<b>Municipal Food Waste</b>	<b>Predicted tonnes per annum (2020)</b>
Total Waste (tonnes)	6,635
<b>Electricity</b>	
Required tonnes per MW	32,000
<b>Potential installed capacity (MW)</b>	<b>0.2</b>
<b>Heat</b>	
<b>Potential installed capacity (MWt)</b>	<b>0.3</b>

Table 4.9 Potential energy from food waste in Bridgend County Borough

*Animal Manure*

- 4.45 Animal manure resource is calculated using current agricultural statistics supplied by WAG. Figures assume that 50% of farms in Bridgend use a slurry based systems.

<b>Livestock</b>	<b>Number</b>	<b>Available resource per head/yr (t)</b>
Cattle	6,865	1.5
Pigs	60	0.15
<b>Electricity</b>		
Required wet tonnes per MWe		225,000
<b>Potential installed capacity (MWe)</b>		<b>0.05</b>
<b>Heat from CHP</b>		
Required wet tonnes per MWt		150,000
<b>Potential installed capacity (MWt)</b>		<b>0.07</b>

**Table 4.10 Potential energy from livestock manure in Bridgend County Borough**

*Poultry Litter*

- 4.46 No farms in Bridgend County Borough accommodate birds exceeding 10,000 and therefore it is considered that the resource generated from this resource would be minimal and certainly not sufficient enough to support a dedicated litter energy plant. It is therefore not considered relevant to include this data in the assessment.

*Sewage Sludge*

- 4.47 Data from the sewage sludge resource is derived from data in the Bioenergy Action Plan for Wales.

<b>Sewage Sludge</b>	<b>Predicted tonnes per annum</b>
Total sewage sludge	4,503
<b>Electricity</b>	
Required dry sold (tonnes) per MWe	13,000
<b>Potential installed capacity (MWe)</b>	<b>0.35</b>
<b>Heat</b>	
Required tonnes per MWt	8,667
<b>Potential installed capacity (MWt)</b>	<b>0.52</b>

**Table 4.11 Potential energy from sewage sludge in Bridgend County Borough**

- 4.48 Interestingly, the assessed installed capacity for electricity generation matches that already being generated from the Penybont CHP Waste Treatment Works. Therefore the potential for further generation from this resource will be limited.

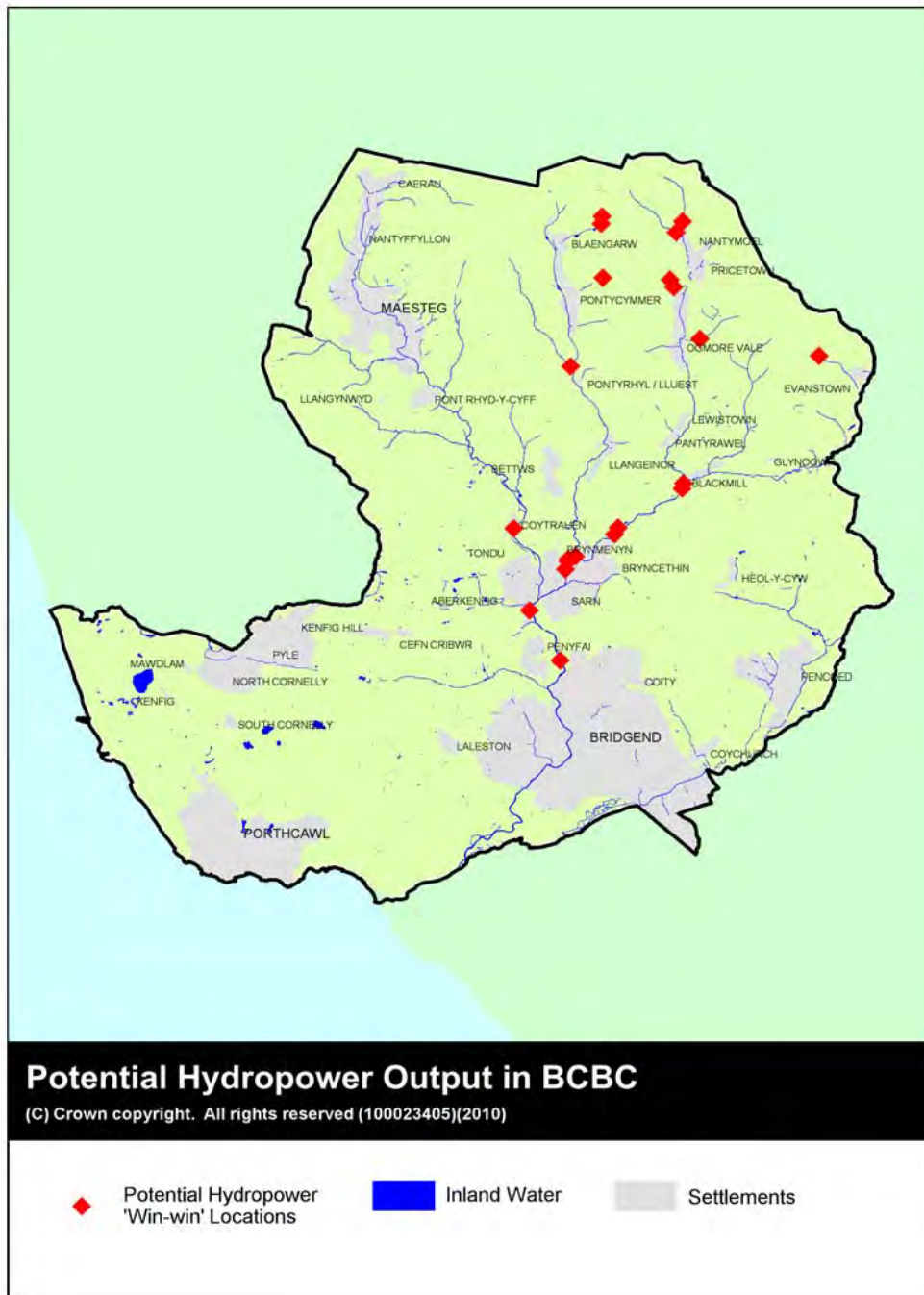
## Hydropower Energy Resource

- 4.49 This REA has sought to assess the accessible resource of hydro sites [under 10MW] and potential micro-hydro schemes, through the identification of existing feasibility studies.
- 4.50 This REA does not provide guidance in relation to wave power, tidal stream or tidal barrage. Constraints upon the use of sites for hydropower schemes include the seasonality of water flows, financial viability of projects, the willingness of landowners and riparian rights of owners to advance projects. However, the major constraint is environmental issues and the need for Environment Agency acceptance and permitting.
- 4.51 Hydropower resource opportunities have been identified by the Environment Agency in “*Opportunity and environmental sensitivity mapping for hydropower in England and Wales*”. The results for Bridgend County Borough are shown below. 62 ‘barriers’ were identified in the area, these are structures within rivers that could provide a hydropower opportunity but are also barriers to fish movement
- 4.52 Removing a barrier is usually the best thing to do to improve the ability of fish to move around a river and fulfill their lifecycle, but this is not always possible. The next best option is to introduce a fish pass. ‘Win-win’ opportunities are schemes that provide both a good hydropower opportunity, and could, through incorporation of a fish pass, improve the ecological status of the associated fish population.
- 4.53 Those areas defined by the Environment Agency as ‘Win-Win’ locations are sites with the potential to generate over 10Kw that is designated as heavily modified under the Water Framework Directive. 22 such sites were identified in Bridgend County Borough with the potential to generate 0.9MW.

Authority	Number of barriers	Total power potential /MW	% of power potential classified as high sensitivity	% of power potential classified as potential win-win	Total power potential classified as potential win-win / MW
Bridgend	62	1.86Mw	95%	48%	0.9

Table 4.12 Potential energy from hydropower in Bridgend County Borough





Map 3 Potential Hydropower 'Win-Win' locations

## 5 Building Integrated Renewables (BIR) Uptake Assessment

5.1 This section provides a summary assessment of the potential building integrated renewable [BIR] energy technology uptake in Bridgend County Borough. The assessment is based on the method detailed in 'Renewable Energy: A Toolkit for Planners'. The following indicates the issues, research and questions associated with this element of the evidence base.

### *Issues*

- What is the role of micro-generation in the energy mix of Wales?
- How is 'micro-generation' defined in this REA?
- What is the difference between 'micro-generation' and 'building integrated renewables'?
- How much energy is generated from BIR currently installed in Bridgend County Borough?
- What is the potential energy generated by building integrated renewable energy technologies in Bridgend County Borough in 2020?

### **Introduction to BIR**

5.2 The Welsh Assembly Government has set out its Renewable Energy Route Map which envisages a significant role for micro-generation in the energy mix of Wales. There is likely to be an increasing emphasis on the uptake of Micro-generation technologies. Micro-generation in Bridgend County Borough could play an important part in any area wide renewable energy assessment. It is considered that micro-generation technologies, for the most part, can be installed on a variety of buildings, but unlike the other renewable energy technology types highlighted in this report it is demand led, rather than supply led. Therefore predictions have been made on the take-up of micro-generation technologies in Bridgend County Borough.

5.3 The official definition of micro-generation is given in the Energy Act 2004 as electricity generating capacity of 50kW or less, and heat generating capacity of 45kW or less. However, for the purposes of this REA, and the uptake modelling, we are using the broader term Building Integrated Renewables [BIR]. BIR can include systems that are larger than micro-generation, such as biomass boilers for schools, which can be up to 500kW of heat output or more. However, BIR technologies are still linking to existing or new buildings and are therefore distinct, in terms of how their potential can be modelled, from the larger scale stand alone technologies that are covered elsewhere in this REA.

5.4 The term BIR also excludes those micro-generation technologies that are not renewable, such as fuel cells [where the hydrogen is produced from mains gas] and small scale CHP, using mains gas as the fuel source. This is because, for the potential purpose of assessing renewable energy potential, we are only interested in the potential uptake of those micro-generation technologies that are renewable.

5.5 BIR are taken to cover the following technologies:

- Solar photovoltaic [PV] panels
- Solar hot water panels
- Micro building-mounted wind turbines
- Small free standing wind turbines
- Micro scale biomass heating [i.e. wood chip or pellet boilers or stoves]
- Ground source heat pumps
- Air source heat pumps

### **Modelling BIR Uptake – Overview**

5.6 Two key sectors have been considered in modelling the uptake of BIR technologies, and each, through necessity has been modelled differently owing to different factors influencing the level of uptake.

5.7 The first sector is that of future new buildings, both residential and non-residential. For this sector, uptake is likely to be predominantly driven by future Building Regulations and planning policies, requiring new buildings to reduce carbon dioxide emissions. In particular, and until Assembly Government consults on unilateral changes to devolved Welsh Building Regulations, this will be driven by the UK trajectory towards zero carbon dwellings by 2016 and for zero carbon non-domestic buildings by 2019. The key factors affecting uptake of any particular technology for this sector are likely to be the combination of technical viability, carbon savings, and the level of capital cost to a developer.

5.8 The second sector is that of existing buildings, both residential and non-residential. For this sector, the uptake is likely to be driven more by how financially attractive installing a system would be to a building owner or occupier and how easy they perceive it would be to install such a system, i.e. it has a significant dependence on consumer attitudes and willingness to adopt new technology.

5.9 Informing ‘Renewable Energy: A Toolkit for Planners’ and therefore also the Pembrokeshire County Council Renewable Energy Assessment pilot study, AECOM developed its own discrete choice model based on the survey coefficients from Element Energy’s 2008 report.

5.10 For Bridgend, the Simplified Method for modelling Building Integrated Renewable uptake has been used. The method is based on simply scaling the uptake results for Pembrokeshire for renewable energy BIR for heat and electricity, on a pro-rata basis depending on the level of existing and projected new build development in Bridgend County Borough compared to that assumed for Pembrokeshire.

Row No.			Units
1	<b>Existing dwellings and non-residential buildings</b>		
2	No. of existing dwellings in Pembrokeshire	55,942	
3	No. of existing dwellings in Bridgend CB	58,629	
4	Calculate EDR (divide row 3 by row 2)	1.05	
5	Predicted RE electricity capacity for Pembrokeshire by 2020	2.2	MWe
6	Predicted RE electricity capacity for Bridgend CB by 2020 (multiple row 5 by row 4)	2.3	MWe
7	<b>Future Dwellings</b>		
8	No. of average net annual completions assumed for Pembrokeshire	585	
9	No. of average net annual completions planned for Bridgend CB	600	
10	Calculate NDR (divide row 9 by row 8)	1.03	
11	Predicted RE electricity capacity for Pembrokeshire by 2020	4.3	MWe
12	Predicted RE electricity capacity for Bridgend CB by 2020 (multiple row 11 by row 10)	4.4	MWe
13	<b>Future non-residential buildings</b>		
14	Future new non-residential average annual new floor area assumed for Pembrokeshire by 2020	56,000	m2 GIFA
15	Future new non-residential average annual new floor area assumed for Bridgend CB by 2020	33,200	m2 GIFA
16	Calculate FNR (divide row 15 by row 14)	0.59	
17	Predicted RE electricity capacity for Pembrokeshire by 2020	6.32	MWe
18	Predicted RE electricity capacity for Bridgend CB by 2020 (multiply row 17 by row 16)	3.73	MWe
	<b>TOTALS</b>		
19	<b>Total predicted new BIR RE electricity capacity for Bridgend CB by 2020 (sum of rows 6, 12, 18)</b>	<b>10.43</b>	MWe
20	Existing BIR electricity capacity in Bridgend CB (see table 1 above)	<b>0.006</b>	MWe
21	<b>Total predicted new and existing BIR RE electricity capacity for Bridgend CB by 2020 (sum of rows 6, 12, 18)</b>	<b>10.436</b>	MWe

**Table 5.1 Potential energy from BIR renewable electricity sources in Bridgend County Borough**

5.11 Data from the LDP has been considered against WAG household estimates for BIR contributions from domestic sources. For new non-residential development, a total requirement of approximately 332,000 sq m until the end of the Plan period has been derived using the estimates in table 5.2.

Development	Floorspace sq m	Assumptions	Source
Comparison Retailing	26,000	Comparison Retailing Need (Ratio 65:100 – Net: Gross)	CACI Retail Need Report
Bulky Comparison Retailing	18,000	Comparison Retailing Need (Ratio 90:100 – Net: Gross)	CACI Retail Need Report
Convenience Retailing	6,000	Porthcawl Supermarket	Porthcawl Regeneration Development Framework
Employment Development	252,000	10 years of 6.3ha pa at ratio of 4,000 sq m of development to ha	Employment Land Review
Community Facilities Development	30,000	Assumes 4 x Primary Schools at 3000 sq m Assumes 6 x Community Centres at 300 sq m Assumes 5 x Health Centres at 600 sq m Assumes 2 x Senior Schools at 6,500 sq m	Potential LDP allocations
<b>TOTAL</b>	<b>332,000</b>	<b>Annual Requirement over 10 years:</b>	<b>33,200 sq m</b>

Table 5.2 Data used for future non-residential development

Row No.			Units
1	<b>Existing dwellings and non-residential buildings</b>		
2	No. of existing dwellings in Pembrokeshire	55,592	
3	No. of existing dwellings in Bridgend CB	58,629	
4	Calculate EDR (divide row 3 by row 2)	1.05	
5	Predicted RE heat capacity for Pembrokeshire by 2020	3.7	MWt
6	Predicted RE heat capacity for Bridgend CB by 2020 (multiple row 5 by row 4)	3.9	MWt
7	<b>Future Dwellings</b>		
8	No. of average net annual completions assumed for Pembrokeshire	585	
9	No. of average net annual completions planned for Bridgend CB	600	
10	Calculate NDR (divide row 9 by row 8)	1.03	
11	Predicted RE heat capacity for Pembrokeshire by 2020	4.3	MWt
12	Predicted RE heat capacity for Bridgend CB by 2020 (multiple row 11 by row 10)	4.4	MWt
13	<b>Future non-residential buildings</b>		
14	Future new non-residential average annual new floor area assumed for Pembrokeshire by 2020	56,200	m2 GIFA
15	Future new non-residential average annual new floor area assumed for Bridgend CB by 2020	32,200	m2 GIFA
16	Calculate FNR (divide row 15 by row 14)	0.59	
17	Predicted RE heat capacity for Pembrokeshire by 2020	1.23	MWt
18	Predicted RE heat capacity for Bridgend CB by 2020 (multiply row 17 by row 16)	0.73	MWt
19	<b>Total predicted new BIR RE heat capacity for Bridgend CB by 2020 (sum of rows 6, 12, 18)</b>	<b>9.03</b>	MWt
20	Existing BIR heat capacity in Bridgend CB (see paragraph 4.9 above)	Unknown	MWt
21	<b>Total predicted new and existing BIR RE heatcapacity for Bridgend CB by 2020 (sum of rows 6, 12, 18)</b>	<b>9.03</b>	MWt

Table 5.3 Potential energy from BIR renewable heat sources in Bridgend County Borough

## 6. Assessment Summary

6.1 For each renewable energy technology, the extent to which the maximum accessible resource can be delivered by a target date [e.g. 2020] is likely to be determined by a combination of the following:

- Technical maturity, covering both the extent to which new technologies prove to be viable, as well as the extent to which capital costs are expected to fall over time
- Commercial viability, driven by future energy prices, and levels of Government subsidy and financial incentives, and other Government support
- Extent of institutional and infrastructural support, covering the likelihood of securing planning consent [i.e. issues of political and social acceptability], as well as the availability of suitable grid infrastructure, transport infrastructure and so on

6.2 Clearly, trying to predict the impact of these different variables is not a precise science, and trying to make such predictions will involve a combination of expert knowledge of the technologies and the policy context they operate in, together with detailed local knowledge of the local politics, infrastructure and projects in the pipeline.

6.3 Two sets of summary tables have been produced, one for renewable heat and the other for renewable electricity.

### Resource Summary Tables

Energy Technology	Capacity Factor	Accessible Resource		Current installed capacity		Total (Accessible + Current)		
		MWe	GWh/yr	MWe	GWh/yr	MWe	GWh/yr	
Onshore wind	0.27	10.4	24.6	35	82.8	45.4	107.4	
Energy crops	0.9	1.68	13.2	10	78.8	11.68	92	
Energy from Waste	0.9	2.04	16.1	4	31.5	6.04	47.6	
Landfill gas	0.6	-	-	1.17	6.1	1.17	6.1	
AD (animal/food)	0.9	0.25	2.0	1	7.9	1.25	9.9	
Sewage	0.42	0.35	1.3	0.35	1.3	0.7	2.6	
Hydropower	0.37	0.9	2.9	0	0.0	0.9	2.9	
BIR	0.1	10.43	9.1	0.035	0.031	10.47	9.13	
<b>TOTAL</b>	<b>-</b>	<b>26.05</b>	<b>69.2</b>	<b>51.55</b>	<b>208.43</b>	<b>77.61</b>	<b>277.6</b>	
Local authority projected electricity demand in 2020								691
<b>Percentage electricity demand in 2020 potentially met by renewable energy resource</b>								<b>40%</b>

Table 6.1 Resource summary for potential renewable electricity in Bridgend County Borough

Energy Technology	Capacity Factor	Accessible Resource		Current installed capacity		Total (Accessible + Current)		
		MWt	GWh/yr	MWt	GWh/yr	MWt	GWh/yr	
Biomass CHP or large scale heat only(energy from crops)	0.5	3.36	14.7	1.1	4.81	4.46	19.51	
Heat from energy from waste (CHP or heat only)	0.5	11.73	51.4	0	0	11.73	51.4	
BIR	0.2	9.03	15.8	0.024	0.042	9.054	15.84	
<b>TOTAL</b>	-	<b>24.12</b>	<b>81.9</b>	<b>1.124</b>	<b>4.852</b>	<b>25.24</b>	<b>86.75</b>	
Local authority projected heat demand in 2020							2,118	
<b>Percentage heat demand in 2020 potentially met by renewable energy resource</b>							<b>4.1%</b>	

**Table 6.2 Resource summary for potential renewable heat in Bridgend County Borough**

6.10 In order to assist in the calculation of a realistic assessment of potential energy generation, an internal officer workshop was held on the 11<sup>th</sup> January 2011, notes of this meeting are included at Appendix 1. The workshop contributed to the development of the Renewable Energy Assessment in the following ways:

- Additional existing and consented schemes were added to Table 4.3
- Clarification was given on the relationship between the REA and the planning process. Namely that the spatial areas identified as being potentially suitable for developments did not change policy. The development control process would include other material considerations which would need to be taken into account.
- Further information was requested on the assumptions used in calculating the biomass potential. Particularly the fact that woodland potential only assumes thinning and “lopping and topping” of existing areas and not commercial intensive cultivation.
- Information on the County Borough’s current municipal waste contract with the MREC facility at Crymlyn Burrows, which extends beyond 2020/21, means the potential from this resource would be zero.
- Similarly, a new Anaerobic Digestion Facility is being planned in conjunction with neighbouring authorities which may be located outside of the County Borough. Given this, assessment from food waste would be zero.
- Food waste projections have been revised to assume 2kg per house per week. Table 4.9 has been updated.
- More qualitative information be included in the REA and subsequent monitoring on the contribution that initiatives and

organisations in Bridgend County Borough make towards renewable energy generation and energy efficiency. This is included below.

- The potential for corporate use of the REA and the subsequent proposed Energy Opportunities Plan.

6.10 Following the stakeholder engagement, which has also included an opportunity for comment on the REA as a whole. The following preferred targets have been chosen:

	Accessible Resource		Current installed capacity		Preferred Target	
	MWe	GWh/yr	MWe	GWh/yr	MWe	GWh/yr
<b>TOTAL</b>	<b>24.01</b>	<b>53.1</b>	<b>51.55</b>	<b>208.43</b>	<b>75.57</b>	<b>261.53</b>
Local authority projected electricity demand in 2020						691
<b>Percentage electricity demand in 2020 potentially met by renewable energy resource</b>						<b>37.8</b>
	MWt	GWh/yr	MWt	GWh/yr	MWt	GWh/yr
<b>TOTAL</b>	<b>12.39</b>	<b>30.5</b>	<b>1.124</b>	<b>4.852</b>	<b>13.51</b>	<b>44.01</b>
Local authority projected heat demand in 2020						2,118
<b>Percentage heat demand in 2020 potentially met by renewable energy resource</b>						<b>2.1%</b>

Table 6.3 Preferred targets for renewable energy in Bridgend County Borough

## LDP Policy Formulation

6.11 A comparison between the energy generation potential identified in tables 6.1 and 6.2 against the UK Renewable Energy Strategy scenario (paragraph 1.2 above refers) to meet the EU Renewable Energy Directive is contained in table 6.4 below.

	Bridgend Energy Generation Potential (%)	UK Scenario to meet EU Directive (%)
<b>Electricity</b>	37.8	>30
<b>Heat</b>	2.1	12.0

Table 6.4 Bridgend energy potential and UK preferred scenario

6.12 It is noted that for Bridgend, the percentage of renewable electricity generation greatly exceeds the UK-wide target. However heat demand potentially met by renewable energy sources is substantially below the 12% target. LDP policies could therefore be formulated to encourage investigation and implementation of renewable energy generation by prospective developers on future development sites. This will need to be balanced against the cost of implementing such schemes and the impact on development viability this will bring.



- 6.15 Consideration can now also be given to the formulation of an Energy Opportunities Plan as supplementary guidance to the LDP. This would identify potential sources for renewable energy generation, and would also highlight possible receptors (particularly public sector buildings) of heat energy generation.

### **Additional Contributions from Bridgend County Borough**

- 6.16 Stakeholders were concerned to note that initiatives in Bridgend County Borough which contributed towards energy efficiency and / or the generation of renewable energy outside of the County Borough were not taken into account in the REA.
- 6.17 However for the purposes of monitoring the renewable energy uptake, the following qualitative issues should also be noted:
- That the current municipal waste contract Bridgend County Borough Council holds with the MREC facility at Crymlyn Burrows contributes towards the generation of renewable energy.
  - That the future proposed Anaerobic Digestion facility will use food waste from Bridgend County Borough and will contribute towards the generation of renewable energy.
  - Rockwool Limited is based in Bridgend County Borough and is the UK's leading supplier of mineral wool insulation. This significantly reduces the energy consumption of buildings across the country.
  - Bridgend County Borough Council has become one of the first local authorities in Wales to achieve the highest level of the Green Dragon environmental standard. Level five, the highest, is equivalent to the international standard ISO 14001 and the European standard EMAS. It has been presented to Bridgend County Borough Council for its latest efforts to reduce the amount of energy that the authority uses.

## 7. Energy Opportunities Plan

7.1 This component of the REA considers some of the issues associated with mapping opportunities for the utilisation of renewable and low carbon heat. The analysis of the extent to which the utilisation of heat is viable, or likely to be viable, comprises a number of levels of complexity ranging from:

- Heat opportunities mapping
- Developing an energy opportunities plan for DHNs
- Assessing the technical and financial viability of DHNs

7.2 The reason for the different levels of complexity relates to the timing of when each level of analysis should be employed. For instance, heat opportunities mapping provides sufficient levels of detail for sieving candidate sites whereas, to set specific CO<sub>2</sub> reduction targets for an identified strategic site or to set a policy requiring a developer to connect to a DHN, requires in addition to the heat opportunities map, more detailed economic and technical appraisal.

7.3 The issues, research and questions associated with this element of the evidence base are as follows:

### *Background*

Why is it important to understand the nature of existing and future energy demand and infrastructure?

### *Identifying the location of strategic new development sites*

Where are the proposed strategic development sites in Bridgend County Borough?

### *Identifying anchor heat loads [AHLs]*

What and where are the key anchor 'heat' loads in Bridgend County Borough?

### *Identifying off gas areas [OGAs]*

Where are the areas not served by the gas mains network in the Bridgend County Borough?

### *Mapping residential heat demand and density*

What is the residential heat demand and density for Bridgend County Borough?

### *Identifying areas of high fuel poverty*

Where are the areas of fuel poverty in Bridgend County Borough?

### *Identifying existing DH & CHP schemes and sources of waste heat*

Where are the existing district heating and combined heat and power schemes and sources of waste heat in Bridgend County Borough?

*Developing an Energy Opportunities Plan for DHNs*

What is the nature of new development on proposed strategic sites in Bridgend County Borough?

What is the energy opportunities plan for an area / site in Bridgend County Borough?

**Background**

7.4 There are a number of reasons for identifying and understanding the nature of existing and future energy demand and infrastructure:

- Identification of public sector buildings to act as anchor 'heat' loads [AHLs]
- To know the energy densities of particular areas. New CHP/District Heating technology installations are more likely to be economically viable in areas of high density energy demand but can be more complex to install. This data assists with the identification of sites with significant potential.
- The proportions of the relative demand for electricity and heat are also useful indicators as to what type of LDC technology might be appropriate in a particular area.
- Areas of high density energy demand may not always present the greatest opportunities. Energy density data needs to be combined with other data, such as the nature of energy demand, the composition of building types and uses, the accessible renewable energy resource, land and building ownership, existing infrastructure and any proposed development in order to isolate the greatest opportunity: These opportunities should also be reviewed against community priorities to align delivery to local requirements.
- Energy demand can be estimated from the types of proposed buildings, the quantity of development and the energy efficiency level. Energy efficiency can reduce the energy consumption, so it is important to estimate the future requirements in this regard.
- The locations of new development will be needed for assessments of strategic opportunities.

**Identifying the location of strategic new development sites**

7.5 This element of the evidence base involved establishing the location 'strategic sites'. For the purposes of this study 'strategic' has been defined as the Regeneration and Mixed Use Development Schemes defined by Policy PLA3 of the deposit Bridgend Local Development Plan. These sites generally contain a mix of residential, employment and commercial uses and are therefore considered to offer the best starting point for consideration of District Heat Networks.

7.6 It is acknowledged that there are other housing and employment sites defined in the deposit LDP which are not contained within the PLA3 sites (not least the Strategic Employment Sites); however consideration of the potential contribution of these other sites can be undertaken when

assessing the viability / deliverability of schemes within the PLA3 allocations.

- 7.7 Using benchmark data, and information contained in the LDP, the potential heat demand from these sites has been calculated and is shown on the Energy Opportunities Plan.

### **Identifying anchor “heat” loads [AHLs]**

- 7.8 ‘Anchor heat loads’ or ‘point loads’ [PLs] pertain to existing buildings with an energy demand that could provide economically viable and practical opportunities for utilising heat. It is known as an ‘anchor’ load because further opportunities [e.g. from nearby buildings] may arise for connecting nearby buildings to the original anchor load.

- 7.9 A ‘point load’ therefore refers to a non-residential energy demand that can act as a base for a District Heating [DH] schemes Buildings that are located near to a point load [such as social housing, etc] and which may benefit from and contribute to the viability of DH schemes are known as a ‘cluster’. A ‘cluster’ usually refers to a mix of social housing and non-residential buildings which, together, represent opportunities due to their:

- Complementary energy demand profile
- Planned development programme
- Commitment to reduce CO<sub>2</sub> emissions

- 7.10 The identification of PLs and clusters requires the mapping of:

- Buildings owned by organisations with corporate climate change mitigation policies and an active commitment to reducing their carbon footprint, and;
- Planned new development / refurbishment by the ‘anchor heat load’ organisation. New development is likely to be the catalyst for such change. CHP / DH schemes are most cost-effective when installed as part of new development rather than retro-fitting [this is covered under “energy demand from proposed development and infrastructure].
- Social housing schemes. These organisations are often tasked with achieving greater than the minimum environmental performance standards. The inclusion of such developments in DH/CHP schemes often enhance the energy profile to provide further evening, weekend and night time energy demands. AHLs can help a CHP/DH schemes to become a realistic prospect and there are usually particular conditions that need to be in place, such as planned new development and / or a commercial building / group of buildings with a significant demand for heat and / or with an energy profile suitable for the installation of a CHP unit.

- 7.11 Given the responsibilities placed upon LA’s and the public sector in general for driving the climate change mitigation agenda, AHL’s are often

provided by buildings such as council administration centres, leisure buildings [particularly those with swimming pools] and hospitals; although shopping arcades and precincts have also been utilised in this way.

- 7.12 When it is proposed that private commercial buildings provide an 'AHL' the issue of 'ownership' is not as significant as when residential units are proposed for this role. The reason for this is that it is often impractical for developers to have to negotiate with many individual private householders whereas social landlords can more readily act on behalf of their tenants.
- 7.13 Investment interest of ESCOs may be secured through the identification of an anchor 'heat' load with the intention of development into a DH scheme. For this reason information on potential anchor heat loads (including, where possible their existing energy use figures) as well as social housing developments, are included on the Energy Opportunities Plan. Using the Council's retail and employment land survey information and benchmark energy use data, the heat energy requirements of commercial buildings throughout the County Borough is included on the Energy Opportunities Plan.
- 7.14 Table 7.1 below indicates key AHL associated with each PLA3 site (which does not have the benefit of a planning permission) and the opportunities presented with each site.

Site Opportunities	Assumed Connection Amount of Development	Assumed Connection Gas Heat Load (kWh)
<b>North East Brackla Regeneration Area – PLA3(2)</b>		
Residential Development	350 dwellings	2,957,192
Employment / Community / Commercial Development	60,500 sq m	8,249,812
Anchor Loads	Ysgol Gymraeg Bro Ogwr Archdeacon John Lewis CIW Primary School Princess of Wales Hospital	261,068 266,166 71,768*
Additional Information	*Princess of Wales Hospital has an existing CHP Social housing element of site already has the benefit of planning permission. Close to CESP area Development Brief explores potential for DHN. Close proximity to PLA3(3)	
<b>Coity Road Sidings, Bridgend – PLA3(3)</b>		
Residential Development	140 dwellings	1,182,877
Employment / Community / Commercial Development	0 sq m	0
Anchor Loads etc?	Litchard Primary School	836,419
Additional Information	Close proximity to PLA3(2) Close to Wildmill and Litchard areas with high residential heat density	

Site Opportunities	Assumed Connection Amount of Development	Assumed Connection Gas Heat Load (kWh)
<b>Parc Afon Ewenni, Bridgend – PLA3(4)</b>		
Residential Development	550 dwellings	4,647,016
Employment / Community / Commercial Development	9,000 sq m	1,307,307
Anchor Loads	South Wales Police HQ	2,533,819
	Waterton Industrial Estate	
Additional Information	Ford Motor Co identified as Large Heat Load (5858kw) on DECC CHP Development Map	
<b>Former Maesteg Washery Site, Maesteg – PLA3(5)</b>		
Residential Development	135 dwellings	1,140,631
Employment / Community / Commercial Development	0 sq m	0
Anchor Loads	Maesteg Comprehensive School	648,917
	Plasnewydd Primary School	264,067
Additional Information	Existing CHP at Tesco, Maesteg Close to existing areas (to the south) with high residential heat density. Fuel Poverty Area	
<b>Coegnant Reclamation Site, Caerau and Nantyllyllon – PLA3(6)</b>		
Residential Development	100 dwellings	844,912
Employment / Community / Commercial Development	3,800 sq m	586,659
Anchor Loads	Maesteg Ambulance Station	TBC
	Maesteg Fire Station	TBC
Additional Information	Fuel Poverty Area	
<b>Ewenny Road, Maesteg – PLA3(7)</b>		
Residential Development	125 dwellings	1,056,140
Employment / Community / Commercial Development	8,700 sq m	347,237
Anchor Loads	Garth Primary School	419,987
	Hyfrydol Home	472,440
Additional Information	Close to existing areas with high residential heat density.	
<b>Porthcawl Waterfront Regeneration Area – PLA3(8)</b>		
Residential Development	1,350 dwellings	8,533,782
Employment / Community / Commercial Development	7,500 sq m	192,514
Anchor Loads	Grand Pavillion	208,103
	Porthcawl Police Station	170,295
	Awel y Mor	112,010
	Newton Primary School	107,303
	Porthcawl Fire Station	TBC
	Porthcawl Ambulance Station	TBC

Site Opportunities	Assumed Connection Amount of Development	Assumed Connection Gas Heat Load (kWh)
Additional Information	Close to PLA3(9) Close to existing areas with high residential heat density. Development brief explores potential for DHN.	
<b>Pyll-y-Waun, Porthcawl – PLA3(9)</b>		
Residential Development	40 dwellings	337,965
Employment / Community / Commercial Development	280 sq m	36,102
Anchor Loads	Pant Morfa Home Porthcawl Primary School	69,030 177,873
Additional Information	Close to PLA3(8) Close to existing areas with high residential heat density.	
<b>Land West of Maesteg Road, Tondy – PLA3(10)</b>		
Residential Development	436 dwellings	3,683,816
Employment / Community / Commercial Development	3,800 sq m	586,659
Anchor Loads	Tondy Primary School	131,800
Additional Information		
<b>Ogmore Comprehensive School, Brynmenyn – PLA3(11)</b>		
Residential Development	130 dwellings	1,098,386
Employment / Community / Commercial Development	100 sq m	0
Anchor Loads	Ogmore Comprehensive School	835,256*
Additional Information	*Nature of building use likely to change in future. Close to PLA3(11) and PLA3(14) Close to Industrial areas	
<b>Gateway to the Valleys, Tondy – PLA3(13)</b>		
Residential Development	100 dwellings	844,912
Employment / Community / Commercial Development	100 sq m	0
Anchor Loads	Brynmenyn Primary	184, 938
Additional Information	Close to PLA3(15) and PLA3(11) Close to existing areas with high residential heat density. Potential hydropower resource nearby CHP system between Ynysawdre Pool and Gateway to the Valleys school. Close to Industrial areas	
<b>Bryncethin Depot, Bryncethin – PLA3(14)</b>		
Residential Development	50 dwellings	422,456
Employment / Community / Commercial Development	2,050 sq m	70,915
Additional Information	Close to PLA3(12) Close to existing area with high residential heat density.	

Site Opportunities	Assumed Connection Amount of Development	Assumed Connection Gas Heat Load (kWh)
<b>South West of City Road, Bettws – PLA3(15)</b>		
Residential Development	80 dwellings	675,930
Employment / Community / Commercial Development	0 sq m	0
Anchor Loads	Trem y Mor Home Bettws Primary School	144,734 436,616
Additional Information		

**Table 7.1 Key Anchor Heat Loads at PLA3 Mixed Use Sites**

### Identifying off gas areas

7.15 For the purposes of this study it has been assumed that there are no 'off-gas' areas within Bridgend County Borough.

### Mapping residential heat demand and density

7.16 A report for DECC suggests that DHNs are not feasible unless a heat demand is present of at least 3MW/km<sup>2</sup>. 'Density' of heat demand refers to kiloWatt hour [kWh] / square kilometre [km<sup>2</sup>] of heat energy consumed in dwellings. Information relating to heat densities can be used to inform:

- The identification of AHLs by providing, or adding to, a viable opportunity for the introduction of renewable heat
- A mix of buildings and energy uses which, together, represent a potential complementary energy demand profile [dwellings providing evening, weekend and night time energy demands as opposed to the normal weekday energy demands of commercial organisations]
- The identification of opportunities relating to social housing providers who are often tasked with achieving greater than the minimum environmental performance standards.

7.17 When allocating quantities of energy to dwellings or other types of buildings it is a useful check to look at national sources of data to ensure figures are broadly supported and to check whether annual energy consumptions are above or below national average. Above national average consumption may indicate lack of energy saving education or a higher proportion of poorly insulated buildings, etc.

7.18 When allocating energy consumptions to buildings utilising Valuation Office Agency [VOA] or Technical Memorandum [TM] 46 conversions used are average figures for particular buildings assuming particular fuels are employed [e.g. natural gas is used for heating]. Outputs from this REA achieve greater accuracy and add considerable value to functionality due to the age and type of buildings, particularly dwellings, being identified.



7.19 The importance of identifying residential heat demand and density pertains to:

- The potential demand for heat in any one particular area
- Contributing to the identification of AHLs
- Feeding into the analysis of potential LZC solutions

7.20 The results of analysis of space heating and domestic hot water demand by dwelling type in Bridgend County Borough are shown in Table 7.2 below. This data has been modelled using the *BRE Standard House Set* data as contained in Annex 2 of *Renewable Heat Incentive: Consultation on the proposed RHI financial support scheme* as well as the Planning for Renewable and Low Carbon Energy – A Toolkit for Planners.

House Type	Solid Wall	Cavity Wall (No Insulation)	Cavity Wall (Filled)	Post 2002
Detached	30,466	26,464	19,516	13,037
Semi-Detached	20,132	19,654	13,416	9,566
Terrace	12,656	9,004	7,743	3,988
Flat	11,267	11,006	8,183	7,692

**Table 7.2 Space Heating and Hot Water Demand by dwelling type (kWh)**

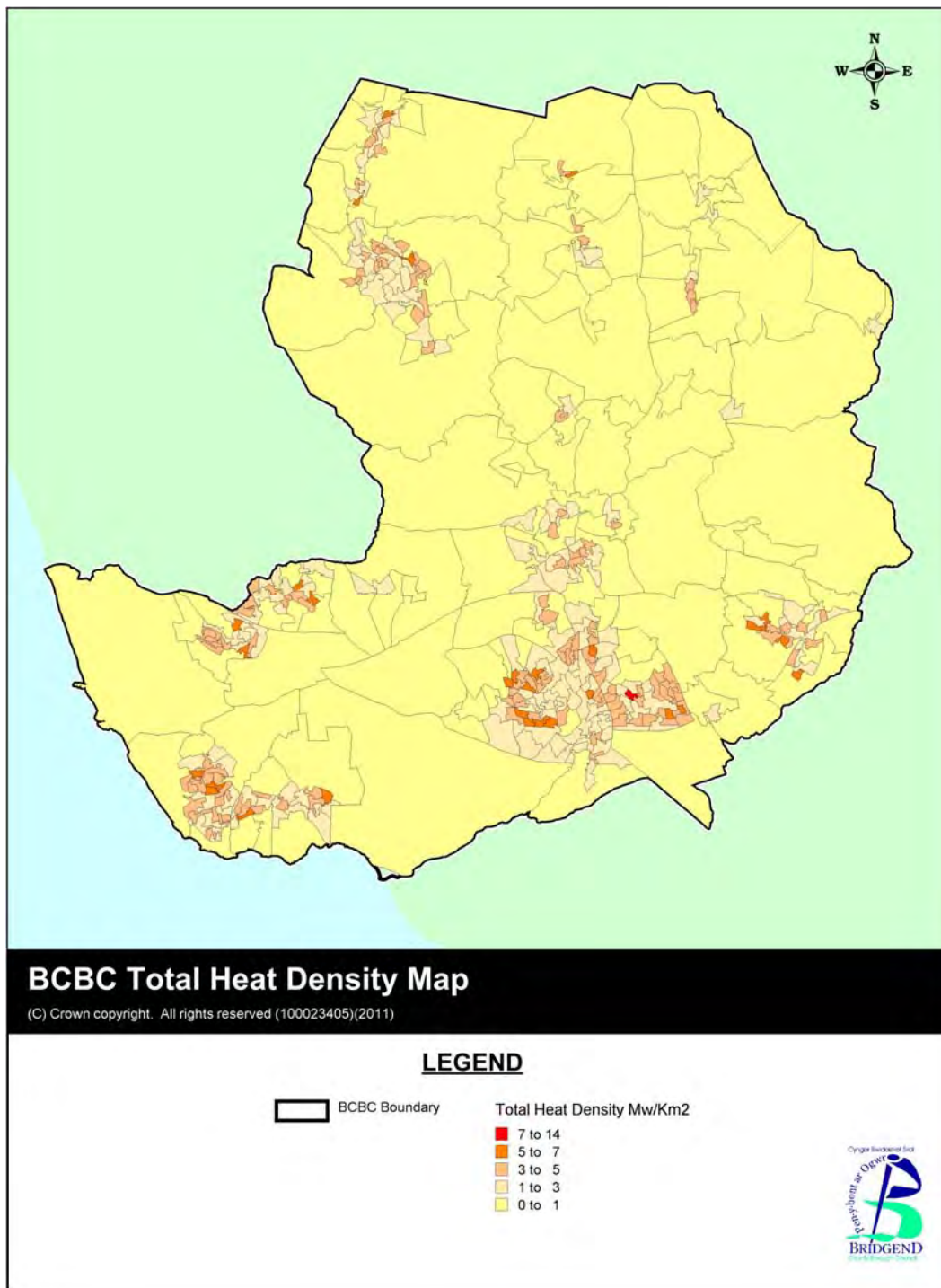
7.21 This data has then been used to calculate the heat density of an area. Map 4 illustrates this heat density across Bridgend County Borough. Those areas which have a heat density above 3MW/km<sup>2</sup> have been identified on the Energy Opportunities Plan.

### Identifying areas of high fuel poverty

7.22 Fuel poverty is a key concern of national governments and Local Authorities alike. Often, it is those living in rural parts of the country who suffer disproportionately from fuel poverty and this is attributable to a number of factors. For example, typically, wages are lower than for those employed in more urban areas, there is often a higher proportion of unemployed and fewer job opportunities, etc. A greater proportion of households are not connected to mains services and pay higher prices for fuels such as Liquefied Petroleum Gas [LPG] and heating oil. The combination of factors means that energy bills can constitute a greater proportion of the household costs than for many urban households.

7.23 Those areas of the County Borough where over 20% of households are in fuel poverty is included in the Energy Opportunities Plan. Also highlighted are those areas of the County Borough designated as a Community Energy Saving Programme (CESP) area. CESP targets households across Great Britain, in areas of low income, to improve energy efficiency standards, and reduce fuel bills. The inclusion of this data within the Energy Opportunities Plan will hopefully add value by assisting the Council in its targeting of resources to address fuel poverty and this might

be integrated with other tools to assess potentially effective ways of addressing the issue.



**Map 4 Residential heat density across Bridgend County Borough**

### Identifying existing DH & CHP schemes and sources of waste heat

7.24 It is important to establish existing energy infrastructure as it may provide opportunities for expanded connectivity or increased efficiency / viability. Identification of current utilisation of renewable energy resources is

covered by this Renewable Energy Assessment, including the current proportion of potential area wide targets being met.

- 7.25 The identification of existing CHP has been achieved through analysis of the Ofgem (Renewable Obligation Certificates) register and through discussion with relevant Council officers (energy & planning). These are shown in Table 7.3 below and are identified on the Energy Opportunities Plan.

Name	Energy Technology	Fuel Source	Capacity (MW)
Georgia Pacific	Waste Heat? CHP	Unknown Unknown	Unknown 9
Ford Motor Company	Waste Heat?	Unknown	Unknown
Penybont Water Treatment Works	CHP	Sewage Gas	0.35
Princess of Wales Hospital	CHP	Unknown	0.5
Bridgend Recreation Centre	CHP	Unknown	0.25e 0.39h
Pyle Swimming Pool	CHP	Unknown	0.054e 0.097h
Ynysawdre	CHP	Unknown	0.015e 0.0234h
Tesco Maesteg	CHP	Unknown	0.130
Tythegston Landfill	Electricity Generator	Landfill Gas Energy from Waste	4 1.7

**Table 7.3 Existing CHP or Sources of Waste Heat for Bridgend County Borough**

- 7.26 The utilisation of current sources of waste heat can provide opportunities to improve fuel efficiency and secure CO<sub>2</sub> emission reductions. Extending existing infrastructure to additional users can increase the viability of a particular scheme.

### **Developing an Energy Opportunities Plan for DHNs**

- 7.27 The bringing together of the various data layers of heat opportunities described above, together with the location of PCC strategic sites for new development, creates an 'Energy Opportunities Plan'.
- 7.28 A District Heating Network [DHN] is the term given to a system providing multiple individual buildings with heat generated from a single source. The source is generally a building known as an energy centre in which heat can either be generated from traditional fossil fuels (from a boiler) or from a low carbon source such as biomass.

- 7.29 The practical realisation is a centrally located energy centre building transmitting heat (as hot water) along buried pipes to a number of buildings in the local area. The pipes are known as heat mains. The scale can be anywhere from a few blocks of flats to a significant proportion of a city. A heat exchanger in each building is controlled and operated in the same way as the gas boiler it replaces, and buildings can retain a conventional distribution system, such as radiators.
- 7.30 Heat is sold to consumers in the same way that gas or electricity is sold traditionally, i.e. by metering of end use and regular billing. This is combined with a service charge to cover maintenance of the shared distribution system.
- 7.31 Combined heat and power [CHP] is simply where the energy centre produces heat as a by-product of electricity generation. The heat is used to supply the DH network in the conventional way, whilst the electricity is either sold locally or onto the wholesale electricity market. The heat from CHP units can also be used to meet cooling demands via the use of absorption chillers. This can involve either a centralised chiller, distributing “coolth” via a chilled water network, or decentralised absorption chillers in individual buildings. This approach is sometimes referred to as “trigeneration” or CCHP [Combined Cooling Heat and Power].
- 7.32 The method used to develop the ‘Energy Opportunities Plan’ is as detailed in Renewable energy: A toolkit for planners’.
- 7.33 The heat map clearly shows the strategic new development sites, and other opportunities, such as potential anchor heat loads, either within or in close proximity to each other. The accuracy of the heat map has been tested with a select few officers within the local authority including officers responsible for planning policy, housing, energy management and sustainable development.
- 7.34 A draft Energy Opportunities Plan was circulated and discussed with these officers at a meeting on the 11<sup>th</sup> November 2011. The minutes of which are attached at Appendix 2. The stakeholders provided a ‘sense check’ of the heat map and identified additional opportunities and constraints. This meeting was also used to discuss the potential of the PLA3 sites and particularly the process by which further work could be undertaken to examine the feasibility and viability of DHNs to be incorporated in to the detailed planning of these sites.

### **Way Forward / Next Steps**

- 7.35 The stakeholders identified up to 5 areas / sites around the County Borough where more specialised advice could be received on the viability and feasibility of installing heat networks as part of the wider development proposals. This work would be subject to a separate report.

- 7.36 The Renewable Energy Assessment and Energy Opportunities Plan could also be used to inform a Supplementary Planning Guidance (SPG) document which will give developers advice on how to investigate the potential of renewable / low carbon energy sources in their proposals in order to comply with new Local Development Plan policies.

**Appendix 1 – Notes from Internal Officer Workshop – 11<sup>th</sup> January 2011**



## BRIDGEND RENEWABLE ENERGY ASSESSMENT INTERNAL STAKEHOLDER WORKSHOP

11<sup>th</sup> JANUARY 2011

### Present:

Huw Jenkins	(HJ)	Group Manager – Streetworks
Susan Jones	(SJ)	Development Planning Manager
David C Davies	(DCD)	Development Control Manager
Nick Lloyd	(N JL)	Team Leader – Development Planning
Jonathan Parsons	(JDP)	Team Leader – Development Control
Julie Jenkins	(JEJ)	Team Leader – Development Control
Stuart Ingram	(SAI)	Principal Planning Officer – Development Planning
Stephen Bool	(SJB)	Principal Planning Officer – Minerals & Waste
Will Thomas	(WT)	Principal Mechanical & Electrical Engineer (Energy)
Mike Jenkins	(MJ)	Principal Sustainable Development Officer
Helen Williams	(HW)	Senior Environmental Health Officer
Kath Carter	(KC)	Planning Assistant – Development

### Apologies:

David Llewellyn	Group Manager - Development
Lee Jones	Group Manager – Public Protection
Christopher Jones	Energy Manager

### 1. Welcome and Introductions

SJ welcomed everyone to the meeting and stated that the reason for the meeting was to discuss the Bridgend Renewable Energy Assessment.

### 2. Background to Renewable Energy Assessment

SAI explained that in early 2011 it is anticipated that the Welsh Assembly Government (WAG) will require Local Planning Authorities to include targets for renewable energy generation within their Local Development Plans (LDPs). This policy change is expected to occur with the publication of an amendment to Section 12.8: *Planning for Renewable Energy of Planning Policy Wales*.

[This policy requirement was not included in the revised version of Planning Policy Wales when published in March 2011]

In order to assist in the formulation of meaningful targets in LDPs, WAG has also issued *Practice Guidance: Planning for Renewable and Low Carbon Energy – A Toolkit for Planners* which has been formulated by AECOM. This toolkit gives a step by step instruction for planners to undertake an in-house assessment of the renewable energy resource from the following sources: wind; wood fuel and energy crops (biomass); energy from waste; anaerobic digestion – (animal manure, food Waste, poultry Litter and sewage sludge); and hydropower. The



toolkit also includes models to estimate Buildings Integrated Renewables (BIR) uptakes.

The purpose of this meeting is to go through the initial assessment and test the assumptions used in the methodology with those present; as well as discussing implications for delivery of renewable energy projects in the County Borough.

### **3. Renewable energy technologies**

HJ queried if BCBC are expected to have land available for waste treatment facilities and if it was for municipal waste only.

SAI explained that the LDP will allocate waste sites.

SJB explained that BCBC was in a joint venture with Neath Port Talbot Council and used the facility at the MREC in Neath Port Talbot which has about 15 years left on the contract. However, it was noted that any renewable energy figure from this site could not be included as it was out of the Borough.

HJ explained that there is a contract due to go out to tender for an Anaerobic Digestion Facility with may be located outside of the County Borough. SAI explained that due to these facts it was likely that the potential assessment from municipal waste and food waste would be zero up to 2020.

MJ enquired if figures from historic/existing waste sites were used e.g. Tythegston. SAI explained that landfill gas was included.

It was noted that solar arrays were not included as it was difficult to devise a methodology to predict contributions from this source. However, solar power is included in Building Integrated Renewables assessment.

### **4. Baseline: Existing and consented schemes / data**

SAI referred the meeting to data giving existing renewable electricity and energy in the County Borough and asked those present if it had any additions or amendments.

DCD advised the group of several schemes at Tythegston, Stormy Down and Kenfig NNR. SAI stated that he would add these to the tables.

WT advised that various schools and other BCBC buildings were using biomass plants. SAI enquired with WT if he could provide figures relating to these installations. WT advised that he would forward figures to SAI.

It was noted that the new Roman Catholic School, Brackla had achieved the BREEAM standard without using a Biomass Boiler.

SJ requested an update on Fforch Nest Windfarm. JDP advised that the BCBC side of the windfarm is reaching the signing of the S106 agreement stage and that the RCT side of the development would probably go to appeal.

## 5. Data / Assumptions used in assessment

SAI stated the next stage was to go through each renewable technology to discuss the methodology and assumptions used.

- **Wind Energy**

SAI gave a brief outline on the methodology used to assess the potential from wind.

Four areas have been identified in the Borough: One on the border with Neath Port Talbot, one east of Nantyffyllon, one at Stormy Down and one South/South West of Laleston

JDP advised that BCBC had received a number of queries and screening/scoping requests with regard to small scale wind turbine development and commented as to whether this would result in a greater visual / amenity impact than that created by a single large scale wind farm.

It was noted that these sites would not form part of the LDP as they were to assess potential only. Planning applications would need to take into account more detailed information such as the potential for noise and impact on the landscape etc. There may also be suitable areas outside of those identified for different sizes of turbine.

The size of the wind turbines, noise impact and the buffer zones used in the methodology were discussed and agreed by the group.

- **Biomass Energy**

SAI gave a brief outline on the methodology used to assess the potential from biomass.

HW advised the group on emissions and cumulative impacts and that permits would be necessary for certain sized installations and that it should be noted that there would be higher levels of Nitrous Oxides with biomass.

It was discussed whether the 100% of wood used for biomass energy was good for the environment.

*(SAI subsequently advised the group that the wood sourced was from lopping and crown reduction only thereby leaving the trees intact. This was assumed in the generation potential. This would be made explicit in the final report)*

- **Energy for Waste**

SAI gave a brief outline on the methodology used to assess the potential from waste.

### **Municipal Waste**

HJ advised the group that the growth in waste arisings was dropping due to the new recycling scheme in place in Bridgend County Borough. DCD suggested that if waste is slowing down, more up to date figures are needed. SAI stated the waste projections were taken from the Regional Waste Plan (RWP). HJ advised that more up-to-date projections may be available in the new WAG Waste Strategy. SAI advised that he would check the figures.

*(SAI subsequently advised the group that the figures contained in the WAG Waste Strategy were target projections. It is advisable to use data in the RWP as this would give a consistent approach between municipal and commercial and industrial waste)*

As discussed earlier, it was noted that existing contracts concerning municipal waste mean the potential from this source will be zero until at least the end of the study period.

### **Commercial and Industrial Waste**

HJ stated that he was not aware of any developments to handle commercial and industrial waste coming forward in the County Borough. However, many waste disposal firms may use existing facilities which also deal with municipal waste.

- **Anaerobic Digestion (AD)**

#### **Food Waste**

SAI gave a brief outline on the methodology used to assess the potential from food waste.

HJ stated that he thought the current projection seemed to low and that a figure of 2kg per household per week was considered to be average. SAI stated that he would revise the figure by applying this figure to the LDP household projection.

As discussed earlier, it was noted that the Council and its neighbours are currently examining sites for an AD plant which may be located outside the County Borough. This would mean the potential from this source will be zero.

### **Agricultural Waste (Animal Manure and Poultry Litter)**

SAI gave a brief outline on the methodology used to assess the potential from agricultural sources.

The group agreed that the figures used seemed realistic.

### **Sewage Sludge**

SAI stated that information on Sewage Sludge had been provided directly from the toolkit. It was noted that the potential from this source matched the existing generation at Penybont Waste Treatment Works.

- **Hydropower Energy**

SAI gave a brief overview on the methodology used to calculate the capacity for Hydropower Energy in the County Borough. This information had come from the Environment Agency.

- **Buildings Integrated Renewables (BIR)**

SAI explained that there are two models in the toolkit to calculate the potential from BIR sources. The model used in Bridgend had been that which up scaled the Pembrokeshire figures for Bridgend.

WT noted that in Pembrokeshire there may be more of an incentive for households to investigate micro-generation schemes as many are not connected to the gas network. This would have implications for the Bridgend target where the majority of households are.

## **6. Developing area wide targets for Bridgend LDP**

[Although part of the original discussion; setting a target in LDPs for renewable energy is not a requirement of national planning policy]

SAI gave a brief outline on developing area wide targets for Bridgend LDP. He stated that the low and high scenarios given in the toolkit tables were a guide only and that the figure for each technology should not be seen as an individual target. However, the likelihood of certain types of technology coming forward would contribute towards the overall figure.

A discussion took place on the merits of having low and high targets for each technology.

The impact of building regulations and national policy was discussed; which would see more development proposals seeking to utilise these types of technologies.

HJ asked if it was possible to take into account the resources from Bridgend (ie waste) that was being taken elsewhere to generate energy. DCD also queried the presence of Rockwool Ltd in the County Borough which manufactured insulation products which were used all over the world.

SJB stated that as this was land-use study it could not be taken into account. SAI suggested that these issues should still be highlighted in the final assessment report and at the monitoring stage of the LDP.

## **7. Policies and approach for Bridgend LDP**

SAI briefed the group that officers were considering policies in the LDP which promoted renewable energy and required major development to assess the potential to both generate renewable energy and share that energy with nearby receptors.

This would be assisted by an Energy Opportunities Plan (which is also included as part of the toolkit) which highlights areas of potential renewable energy generation and buildings within the County Borough which could also use the energy.

## **8. Corporate promotion of REA**

SAI stated the corporate promotion of the REA was a key component of the toolkit. It was agreed by the group that the Energy Opportunities Plan would be very useful document for the Council in identifying potential for further public-sector investment in renewable energy.

SAI thanked the group for its contribution to the project to date and that a draft copy of the REA would be circulated to them for comment.

SJ thanked officers for attending the meeting.

**Appendix 2 – Notes from Internal Officer Meeting – 11<sup>th</sup> November 2011**



## **MINUTES OF A MEETING ENERGY OPPORTUNITIES PLAN**

**11<sup>th</sup> NOVEMBER 2011**

### **Present:**

Susan Jones	-	Development Planning Manager (SJ)
Nick Lloyd	-	Policy Team Leader (NL)
Stuart Ingram	-	Principal Planning Officer (SAI)
Mike Jenkins	-	Principal Sustainable Development Officer (MJ)
Elaine Williams	-	Senior Housing Strategy Officer (EW)
Gillian Warren-Holder	-	Energy Officer (GW-H)
Kathryn Carter	-	Planning Assistant (KC)

### **Apologies:**

Chris Jones	-	Energy Manager
Jonathan Flower	-	Information & Service Improvement Officer

### **1. Welcome and Introduction**

An introduction was given by those present.

SAI advised the group that the purpose of the meeting was to bring everyone up-to-date with the work the Development Planning section has been undertaking on the Renewable Energy Assessment and Energy Opportunities Plan and how the document would be taken forward in terms of planning policy.

### **2. Renewable Energy Assessment (REA) Background**

SAI informed the meeting that the initial REA had been published in February 2011. This had been used to inform and justify Policy ENV17 of the LDP which requires energy assessments to be carried out for all major developments in Bridgend County Borough.

The REA had now been updated to reflect further information which had been provided by the Energy Section with regards to existing and planned renewable energy systems in the Council's own buildings. It also included updated information on wind energy potential, using a different assumed wind turbine to calculate the assessment for the County Borough.

### **3. Energy Opportunities Plan (EOP) Development**

SAI presented the Energy Opportunities Plan and briefly outlined the different designations which are displayed, how they were calculated and why they were important to be illustrated.



GW-H queried the data used to calculate residential heat densities. SAI stated that model data had been used from BRE. GW-H stated that the HEED database could be used to give Bridgend-specific information. SAI agreed to liaise with GW-H to manipulate the HEED database to see if relevant data could be extracted.

#### **4. Energy Opportunities Plan Discussion**

SAI asked the meeting if there was any additional information / buildings which could be included on the EOP

EW enquired how often the data would be updated. SAI explained that this had yet to be decided, but felt that big developments could be monitored as they come on stream; with the information being updated periodically in a report format.

SAI advised the group that the Countryside Council for Wales and Environment Agency were interested in the EOP. To this end it has been suggested that SACs and SSSIs should be shown on the EOP.

The possible connection between Ynysawdre pool and the new school was discussed and whether it was possible to put the lines of network on plan. SAI agreed to liaise with Chris Jones in the Energy Section on this. The CHP in Ynysawdre pool could be used to heat new school and Glan yr Afon. SJ agreed to contact the education department to find out which of BCBC schools had CHP presently.

The meeting agreed that there was nothing on the EOP which should be excluded before it is made available.

#### **5. District/Community Level Heat Networks**

SAI advised the group that the next stage of work was to look at the proposed mixed use sites allocated in the LDP under Policy PLA3 and to decide whether it be beneficial to undertake further feasibility and viability work on the potential for heat networking.

NJL advised that it is beneficial to look at these issues now as it is harder and more expensive to try and retrofit CHP at a later date.

#### **6. LDP 'PLA3 – Mixed Use Regeneration Schemes' Suitability for DHN**

##### **i. North East Bridgend**

The potential for a heat network at Parc Derwen was discussed. This was seen as a good candidate; not necessarily due to the large housing development, but the fact that there will be a new school, community building and 'district centre' in close proximity to each other.

North East Brackla was also seen as another potentially good area for further discussion. Not only was it a significant mixed-use area, but the development brief which has been prepared for the site also made reference to DHN. The proximity of the district hospital (with an existing CHP) could also have a beneficial impact on the viability and feasibility of the site.

#### **ii. Parc Afon Ewenni / Waterton**

The Parc Afon Ewenni area was also seen as good area with potential for district heating. The Ford plant has been identified as a source of significant waste heat by DECC. The new developments at Waterton plus the existing industrial units in the area could be potential receptors of waste heat.

SJ said that should would liaise the Economic Development section to ascertain how best to approach Ford.

#### **iii. Maesteg Sites**

The sites at Maesteg Washery and Coegnant were discounted from further assessment due to the nature of the developments proposed; and the lack of significant heat loads in the vicinity.

However, as a major mixed-use site, the Ewenny Road area was deemed to have potential. It was noted that renewable energy generation had been looked at in this area when producing the recent draft development brief. The mix of uses involved also made it ideal for further consideration.

#### **iv. Porthcawl**

NJL gave an up-to-date position on the regeneration of Porthcawl. SAI informed the group that the development brief for regeneration area committed developers to generate 10% of their energy generation from renewable sources and promotes the use of decentralised energy systems.

The group found that given this commitment, plus the nature of the uses proposed within the Porthcawl regeneration area, it would be an ideal site for further investigation in to heating networks.

#### **v. Valleys Gateway**

The development of a mini heat network between Ynysawdre swimming pool, the new secondary school and Glan yr Afon nursing home was an ideal opportunity to investigate the potential of this area for extending this network. Given the presence of a number of redevelopment sites in the area it was considered a good candidate to undertake further work.

## **7. Way Forward / Next Steps**

The group had a discussion on the priority of the sites which it had identified as candidates for further investigation. The sites were 'ranked' as follows in case funding for undertaking further work could not be found for all sites.

- Porthcawl Waterfront Regeneration Area – PLA3 (8)
- Valleys Gateway Area – PLA3(12/13)
- Parc Afon Ewenni, Waterton, Bridgend – PLA3 (4)
- Brackla / Parc Derwen, North East Bridgend – PLA3(1/2)
- Ewenny Road, Maesteg – PLA3(7)

SAI explained that using funding from the Welsh Government which the planning department had received the Council would now proceed to engage consultants to take the project forward.

## **8. Corporate Implications / Uses for Report**

SAI enquired if existing buildings could be used to connect CHP. The group discussed the matter and found that Bridgend Recreation Centre could possibly be used to connect to major offices in Bridgend.

SAI agreed to discuss this matter further with colleagues, particularly if other sites (not necessarily those linked to new development) could be identified and considered as part of the feasibility / viability work.

## **9. Any Other Business**

None

## **Appendix 3 – Bridgend Energy Opportunities Plan and PLA3 Site Plans**



# LEGEND

## Retail/Commercial/Employment Buildings Gas Benchmark (Kwh)

- 0 to 50,000
- 50,000 to 100,000
- 100,000 to 200,000
- 200,000 to 300,000
- 300,000 to 400,000
- 400,000 to 1,000,000
- 1,000,000 to 40,000,000

— Bridgend CBC Boundary

— Wind Resource Areas

— Energy Crop Areas

— Wood Fuel Areas

⊕ Existing Renewable Energy Installations / Consents

— Special Landscape Areas

✕ Existing CHP Schemes

★ Potential Sources of Waste Heat

— Deposit LDP Settlement Boundaries

— Community Energy Savings Programme Areas (CESP)

— Fuel Poverty - Areas where no. of households in fuel poverty exceeds 20 percent.

— Residential Heat Density > 3MwKm2

## LDP Mixed Use (PLA3) Sites Gas Benchmark (Kwh)

- 10,000,000 to 15,000,000
- 5,000,000 to 10,000,000
- 1,000,000 to 5,000,000
- 500,000 to 1,000,000
- 100,000 to 500,000
- 0 to 100,000

◆ Social Housing Areas

● Hydro Power Sites

● Fire, Police and Ambulance stations

● Primary, Junior, Infants or Middle School

● Secondary School

● Leisure, Libraries

● Sporting activities e.g. leisure centre, golf course

● Theatres/arenas/stadium

● Hospitals

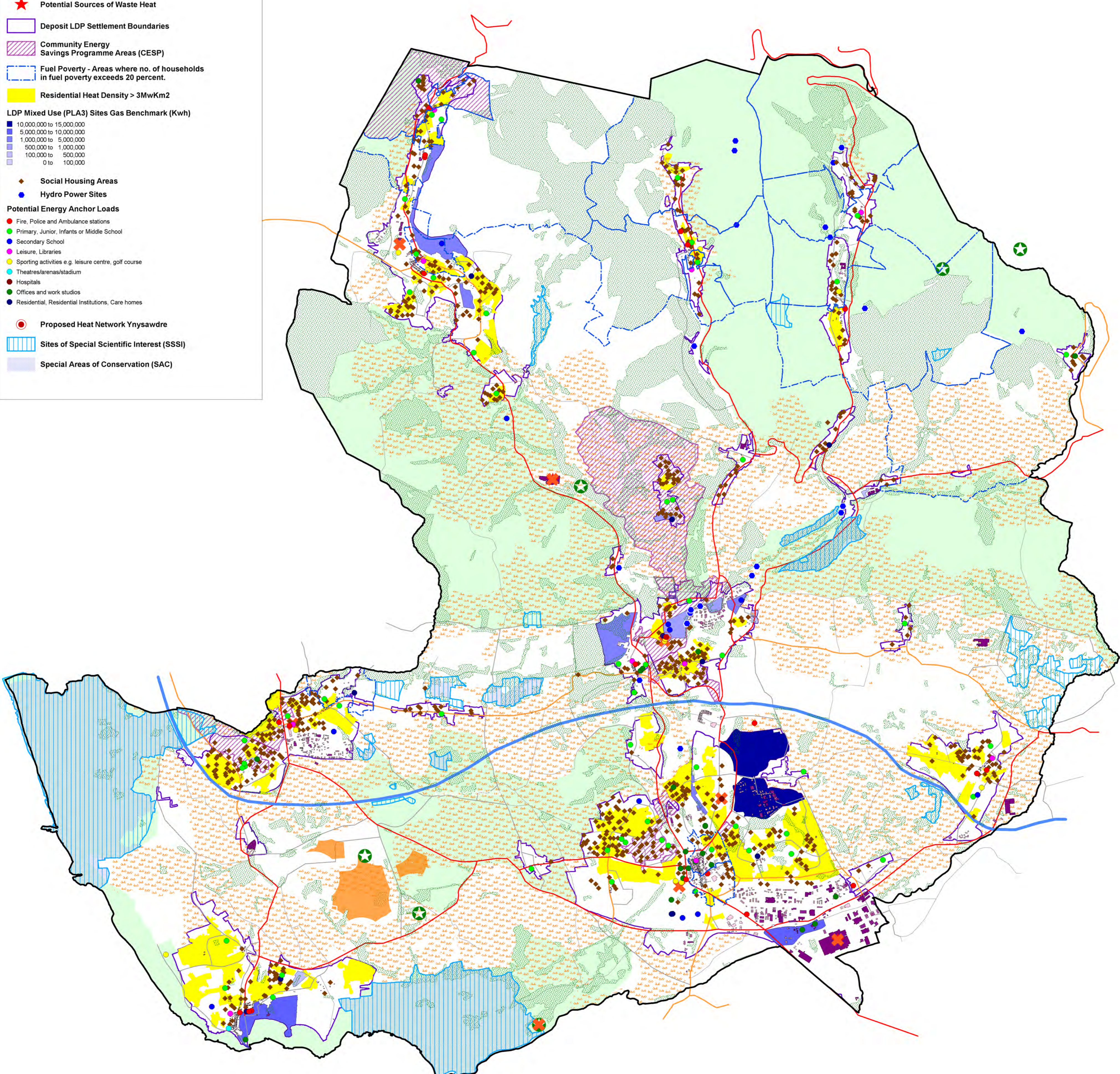
● Offices and work studios

● Residential, Residential Institutions, Care homes

● Proposed Heat Network Ynysawdre

— Sites of Special Scientific Interest (SSSI)

— Special Areas of Conservation (SAC)





**ENERGY OPPORTUNITIES PLAN**

Scale: 1:40,000  
@ A1 Portrait

Date Issued: 16/11/2011



Louise Fradd  
Corporate Director - Communities

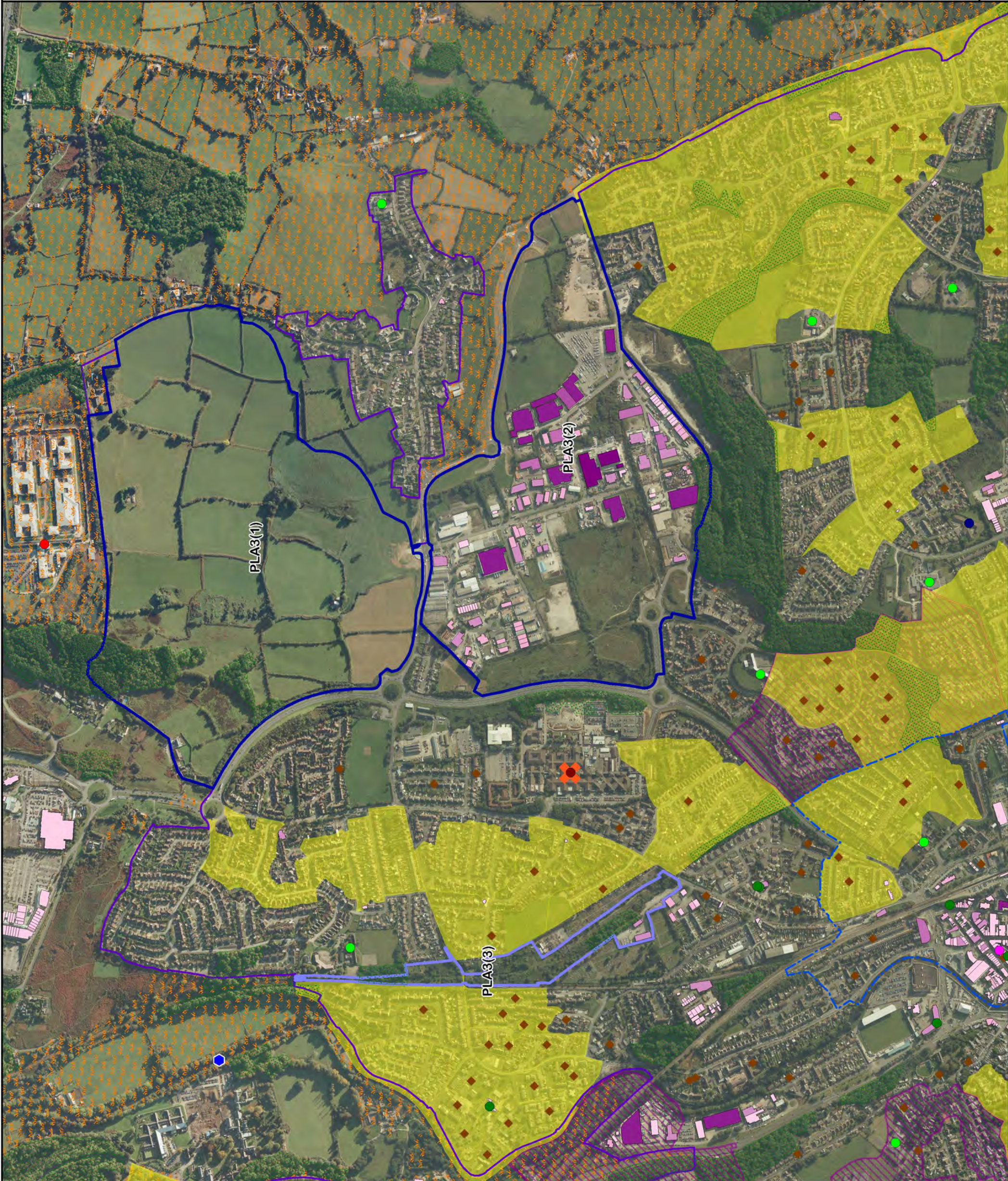
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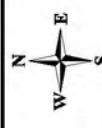
- Retail/Commercial/Industrial Buildings Gas Benchmark (Kwh)
  - 0 to 50,000
  - 50,000 to 100,000
  - 100,000 to 200,000
  - 200,000 to 300,000
  - 300,000 to 400,000
  - 400,000 to 1,000,000
  - 1,000,000 to 40,000,000
- Bridgend CBC Boundary
- Wind Resource Areas
- Energy Crop Areas
- Wood Fuel Areas
- Existing Renewable Energy Installations / Consents
- Special Landscape Areas
- Existing CHP Schemes
- Potential Sources of Waste Heat
- Deposit LDP Settlement Boundaries
- Community Energy Savings Programme Areas (CESP)
- Final Poverty Areas where no. of households in fuel poverty exceeds 20 percent.
- Residential Heat Density > 3kW/km<sup>2</sup>
- LDP Mixed Use (PLA3) Sites Gas Benchmark (Kwh)
  - 10,000,000 to 15,000,000
  - 5,000,000 to 10,000,000
  - 1,000,000 to 5,000,000
  - 500,000 to 1,000,000
  - 100,000 to 500,000
  - 0 to 100,000
- Social Housing Areas
- Hydro Power Sites
- Potential Energy Anchor Loads
  - Fire, Police and Ambulance stations
  - Primary, Junior, Infants or Middle School
  - Secondary School
  - Leisure, Libraries
  - Sporting activities e.g. leisure centre, golf course
  - Theatres/arena/stadium
  - Hospitals
  - Offices and work studios
  - Residential, Residential Institutions, Care homes



**PLA3(2) NE Brackla  
Regeneration Area  
PLA3(3) Coity Sidings, Bridgend**

Scale:  
**1:10000**  
@ A3 Landscape

Date Issued:  
**31th Oct 2011**



**Louise Fradd**  
Corporate Director - Communities  
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**LEGEND**

Retail/Commercial/Employment Buildings Gas Benchmark (Kwh)

- 0 to 50,000
- 50,000 to 100,000
- 100,000 to 200,000
- 200,000 to 300,000
- 300,000 to 400,000
- 400,000 to 1,000,000
- 1,000,000 to 40,000,000

Bridgend CBC Boundary

Wind Resource Areas

Energy Crop Areas

Wood Fuel Areas

Existing Renewable Energy Installations / Consents

Special Landscape Areas

Existing CHP Schemes

Potential Sources of Waste Heat

Deposit LDP Settlement Boundaries

Community Energy Savings Programme Areas (CESP)

Fuel Poverty Areas where no. of households in fuel poverty exceeds 20 percent.

Residential Heat Density > 3Mw/km2

LDP Mixed Use (PLA3) Sites Gas Benchmark (Kwh)

- 10,000,000 to 15,000,000
- 5,000,000 to 10,000,000
- 1,000,000 to 5,000,000
- 500,000 to 1,000,000
- 100,000 to 500,000
- 0 to 100,000

Social Housing Areas

Hydro Power Sites

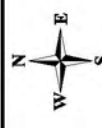
Potential Energy Anchor Loads

- Fire, Police and Ambulance stations
- Primary, Junior, Infants or Middle School
- Secondary School
- Leisure, Libraries
- Sporting activities e.g. leisure centre, golf course
- Theatres/cinemas/stadium
- Hospitals
- Offices and work studios
- Residential, Residential Institutions, Care homes



**PLA3(4) Parc Afon Ewenni,  
Bridgend**

Scale: 1:10000  
Date Issued: 31th Oct 2011  
@ A3 Landscape

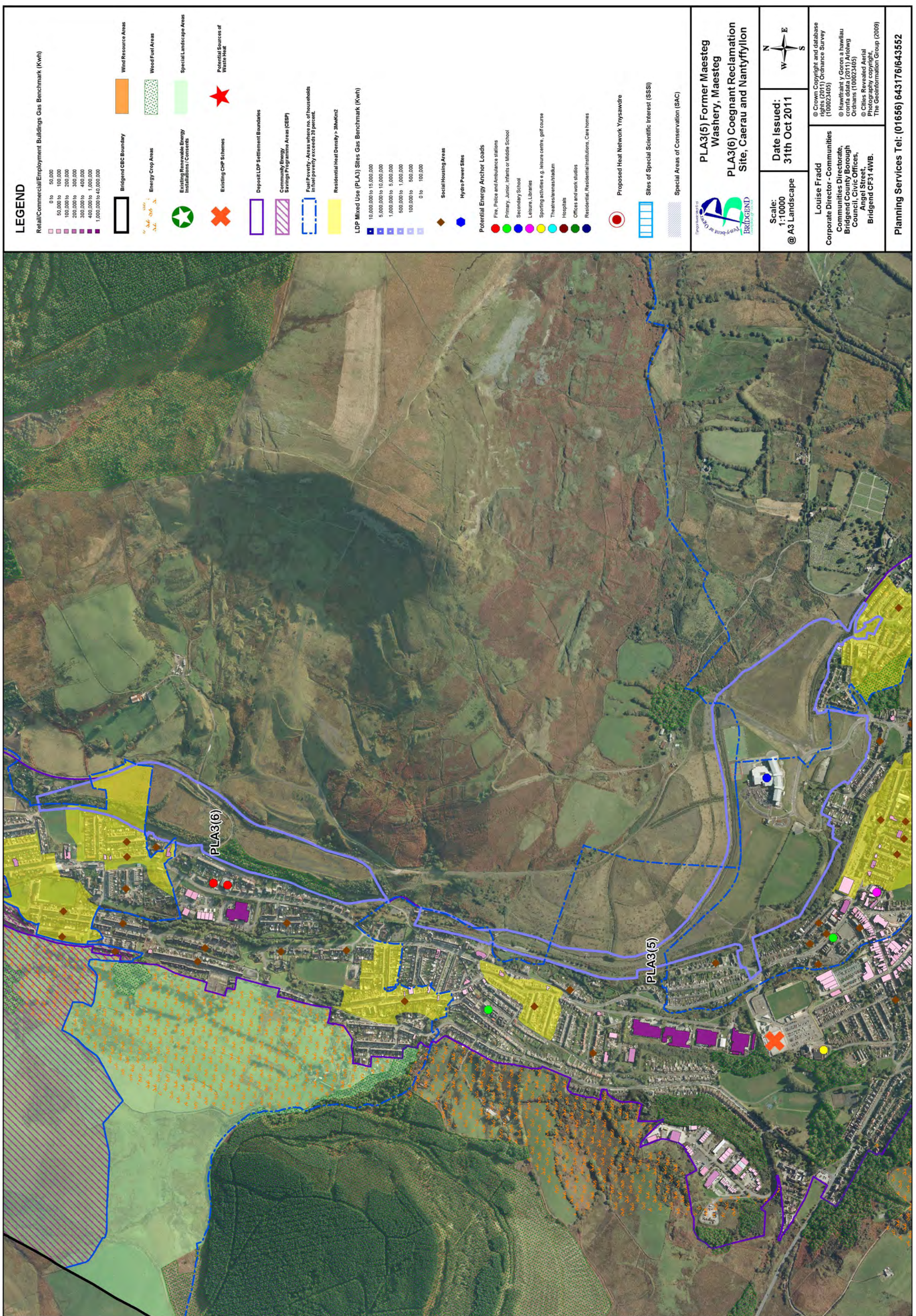


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**LEGEND**

Retail/Commercial/Employment Buildings Gas Benchmark (Kwh)

- 0 to 50,000
- 50,000 to 100,000
- 100,000 to 200,000
- 200,000 to 300,000
- 300,000 to 400,000
- 400,000 to 1,000,000
- 1,000,000 to 40,000,000

Bridgend CBC Boundary

Wind Resource Areas

Energy Crop Areas

Wood Fuel Areas

Existing Renewable Energy Installations/Consents

Special Landscape Areas

Potential Sources of Waste Heat

Existing CHP Schemes

Deposit LDP Settlement Boundaries

Community Energy Savings Programme Areas (CESP)

Fuel Poverty - Areas where no. of households in fuel poverty exceeds 20 percent.

Residential Heat Density > 30W/km2

LDP Mixed Use (PLA3) Sites Gas Benchmark (Kwh)

Social Housing Areas

Hydro Power Sites

Potential Energy Anchor Loads

Fire, Police and Ambulance stations

Primary, Junior, Infants or Middle School

Secondary School

Leisure, Libraries

Sporting activities e.g. leisure centre, golf course

Theatre/Recreation Stadium

Hospitals

Offices and work studios

Residential, Residential Institutions, Care homes

Proposed Heat Network Ynysawdre

Sites of Special Scientific Interest (SSSI)

Special Areas of Conservation (SAC)

Scale: 1:10000

@ A3 Landscape

Date Issued: 31st Oct 2011

North Arrow

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Angel Street,

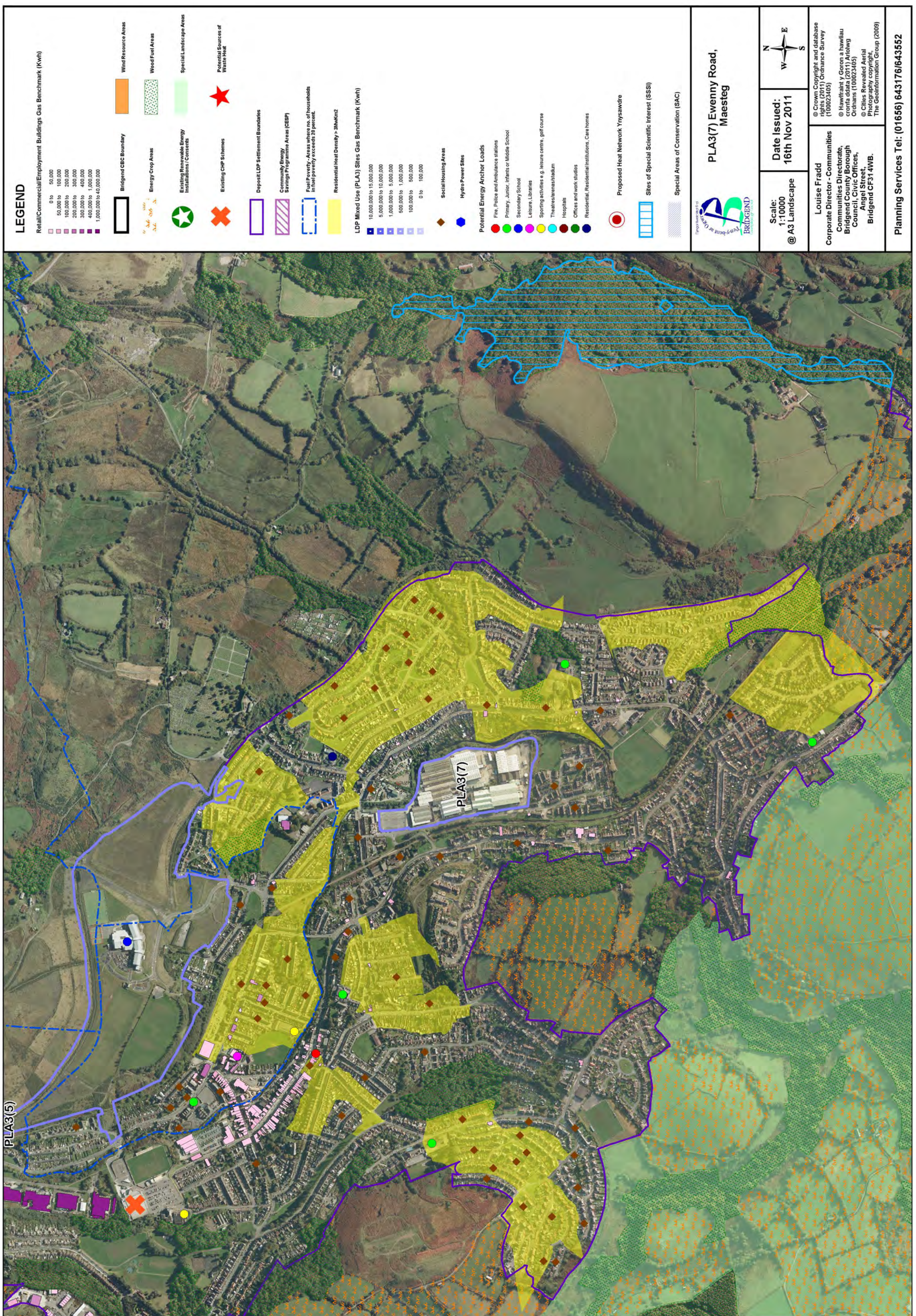
Bridgend CF31 4WB.

PLA3(5) Former Maesteg Washery, Maesteg

PLA3(6) Coeignant Reclamation Site, Caerau and Nantyllyllon

BRIDGEND

Planning Services Tel: (01656) 643176/643552



**LEGEND**

Retail/Commercial/Employment Buildings Gas Benchmark (Kwh)

- 0 to 50,000
- 50,000 to 100,000
- 100,000 to 200,000
- 200,000 to 300,000
- 300,000 to 400,000
- 400,000 to 1,000,000
- 1,000,000 to 40,000,000

- Bridgend CBC Boundary
- Wind Resource Areas
- Energy Crop Areas
- Wood Fuel Areas
- Existing Renewable Energy Installations/Consents
- Special Landscape Areas
- Existing CHP Schemes
- Potential Sources of Waste Heat

- Deposit LDP Settlement Boundaries
- Community Energy Savings Programme Areas (CESP)
- Fuel Poverty - Areas where no. of households in fuel poverty exceeds 20 percent.
- Residential Heat Density > 30W/km2

LDP Mixed Use (PLA3) Sites Gas Benchmark (Kwh)

- 10,000,000 to 15,000,000
- 5,000,000 to 10,000,000
- 1,000,000 to 5,000,000
- 500,000 to 1,000,000
- 100,000 to 500,000
- 0 to 100,000

- Social Housing Areas
- Hydro Power Sites
- Potential Energy Anchor Loads**
- Fire, Police and Ambulance stations
- Primary, Junior, Infants or Middle School
- Secondary School
- Leisure, Libraries
- Sporting activities e.g. leisure centre, golf course
- Theatre/theatres/stadium
- Hospitals
- Offices and work studios
- Residential, Residential Institutions, Care homes

- Proposed Heat Network Ynysawdre
- Sites of Special Scientific Interest (SSSI)
- Special Areas of Conservation (SAC)



**PLA3(7) Ewenny Road,  
Maesteg**

Scale:  
1:10000  
@ A3 Landscape

Date Issued:  
16th Nov 2011



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Corporate Director - Communities  
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**LEGEND**

**Retail/Commercial/Employment Buildings Gas Benchmark (Kwh)**

- 0 to 50,000
- 50,000 to 100,000
- 100,000 to 200,000
- 200,000 to 300,000
- 300,000 to 400,000
- 400,000 to 1,000,000
- 1,000,000 to 40,000,000

Bridgend CBC Boundary

Wind Resource Areas

Energy Crop Areas

Wood Fuel Areas

Existing Renewable Energy Installations / Consents

Special Landscape Areas

Existing CHP Schemes

Potential Sources of Waste Heat

Deposit LDP Settlement Boundaries

Community Energy Savings Programme Areas (CESP)

Final Poverty Areas where no. of households in fuel poverty exceeds 20 percent.

Residential Heat Density > 3Mw/Km2

LDP Mixed Use (PLA3) Sites Gas Benchmark (Kwh)

- 10,000,000 to 15,000,000
- 5,000,000 to 10,000,000
- 1,000,000 to 5,000,000
- 500,000 to 1,000,000
- 100,000 to 500,000
- 0 to 100,000

Social Housing Areas

Hydro Power Sites

Potential Energy Anchor Loads

- Fire, Police and Ambulance stations
- Primary, Junior, Infants or Middle School
- Secondary School
- Leisure, Libraries
- Sporting activities e.g. leisure centre, golf course
- Theatres/arenas/stadium
- Hospitals
- Offices and work studios
- Residential, Residential Institutions, Care homes



**PLA3(8) Porthcawl Waterfront  
Regeneration Area  
PLA3(9) Pwll-y-Waun, Porthcawl**

Scale: 1:10000  
@ A3 Landscape

Date Issued:  
31th Oct 2011



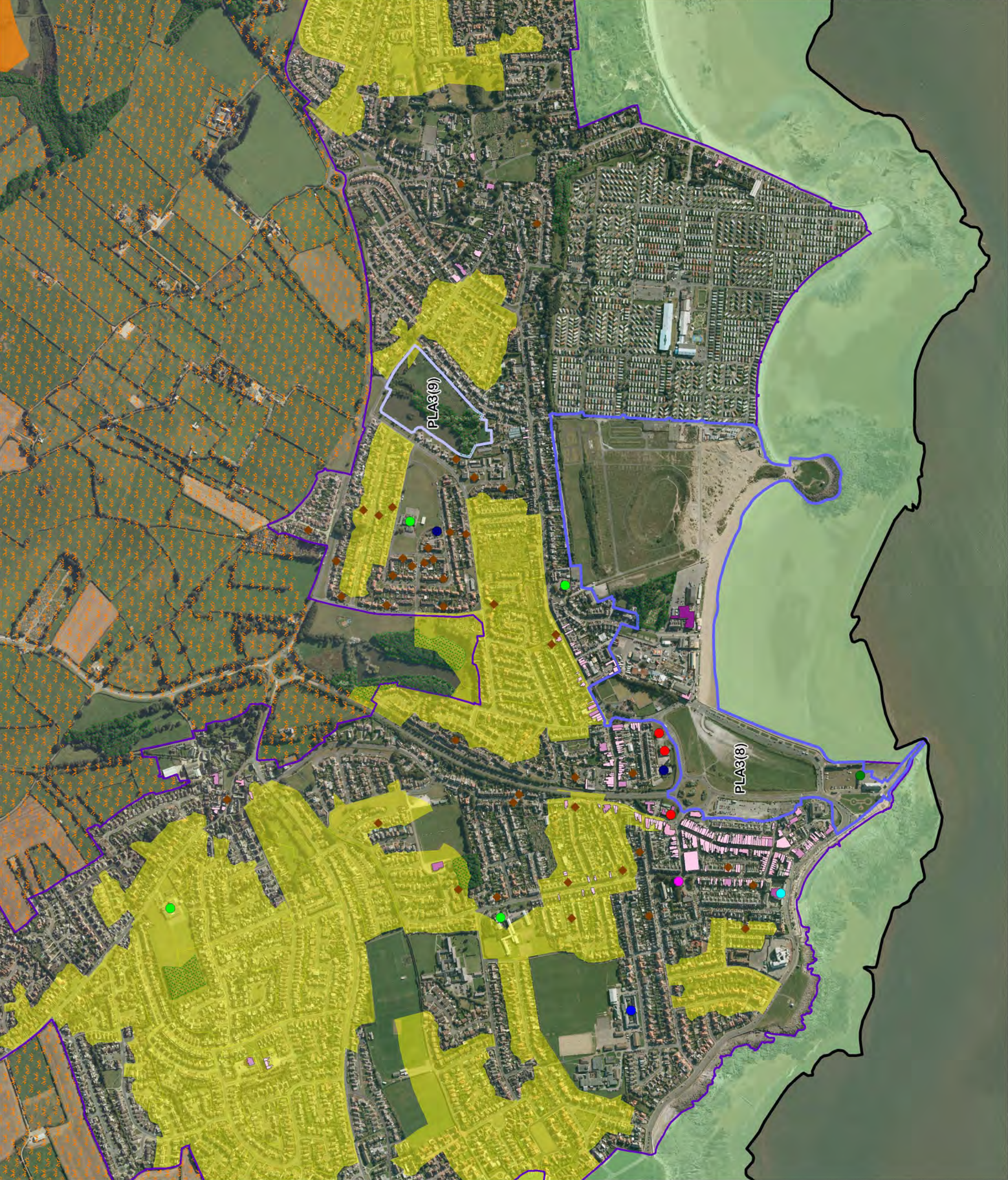
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Bridgend CF31 4WB.

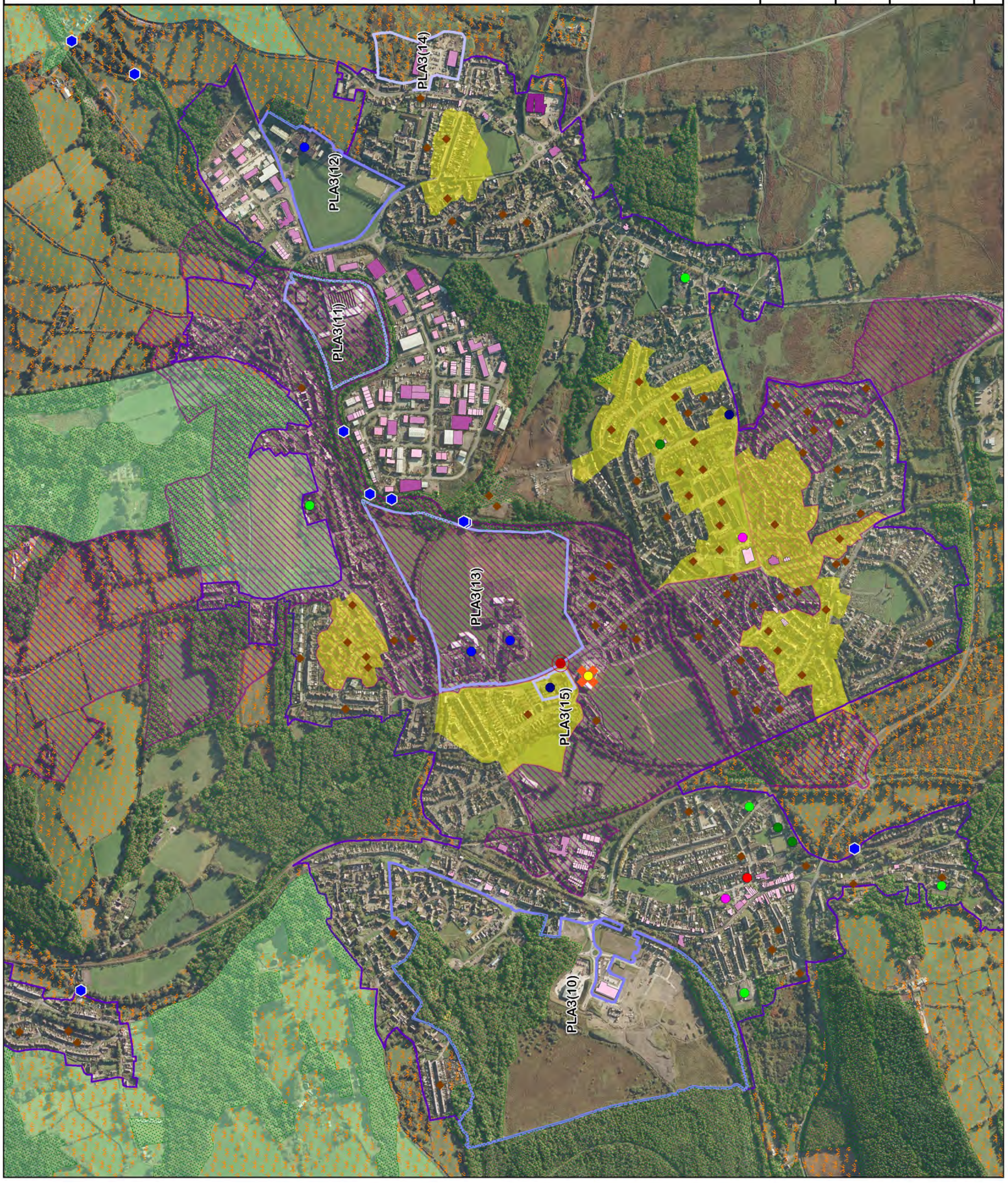
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**LEGEND**

**Retail/Commercial/Employment Buildings Gas Benchmark (Kwh)**

- 0 to 50,000
- 50,000 to 100,000
- 100,000 to 200,000
- 200,000 to 300,000
- 300,000 to 400,000
- 400,000 to 1,000,000
- 1,000,000 to 40,000,000

**Wind Resource Areas**

**Wood Fuel Areas**

**Special Landscape Areas**

**Existing Renewable Energy Installations/Consents**

**Existing CHP Schemes**

**Potential Sources of Waste Heat**

**Bridgend CBC Boundary**

**Energy Crop Areas**

**Deposit LDP Settlement Boundaries**

**Community Energy Savings Programme Areas (CESP)**

**Fuel Poverty - Areas where no. of households in fuel poverty exceeds 20 percent.**

**Residential Heat Density > 30W/km<sup>2</sup>**

**LDP Mixed Use (PLA3) Sites Gas Benchmark (Kwh)**

- 10,000,000 to 15,000,000
- 5,000,000 to 10,000,000
- 1,000,000 to 5,000,000
- 500,000 to 1,000,000
- 100,000 to 500,000
- 0 to 100,000

**Social Housing Areas**

**Hydro Power Sites**

**Potential Energy Anchor Loads**

- Fire, Police and Ambulance stations
- Primary, Junior, Infants or Middle School
- Secondary School
- Leisure, Libraries
- Sporting activities e.g. leisure centre, golf course
- Theatre/theatres/clubhouse
- Hospitals
- Offices and work studios
- Residential, Residential Institutions, Care homes

**Proposed Heat Network Ynysawdre**

**Sites of Special Scientific Interest (SSSI)**

**Special Areas of Conservation (SAC)**

**PLA3(10) Land West of Maesteg Road, Tondur**  
**PLA3(12) Ogmores Comprehensive School, Brynmynn**  
**PLA3(13) Gateway to the Valleys, Tondur**  
**PLA3(14) Bryncethin Depot, Bryncethin**

**Scale:**  
1:10000  
**@ A3 Landscape**

**Date Issued:**  
16th Nov 2011

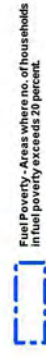
**Louise Fradd**  
Corporate Director - Communities  
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**LEGEND**



**PLA3(16) Land South West of City Road, Bettws**

Scale: 1:10000  
@ A3 Landscape

Date Issued: 31th Oct 2011



Louise Fradd  
Corporate Director - Communities  
Communities Directorate,  
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