

Blaenau Gwent County Borough Council  
Cyngor Bwrdeisdref Sirol Blaenau Gwent

# Renewable Energy Assessment Aseiad Ynni Adnewyddadwy

Deposit Local Development Plan  
Cynllun Adeneuo Datblygu Lleol

**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.**

**The contribution is acknowledged; however all evidence, data sources and target information is relevant to Blaenau Gwent County Borough Council and has been produced by Blaenau Gwent County Borough Council in this regard to inform the Blaenau Gwent Local Development Plan**



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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. Blaenau Gwent County Borough Council, through this REA, is fulfilling this role in identifying some of these potential opportunities within its area.

## 1.0 INTRODUCTION

### Background and Purpose of the Renewable Energy Assessment

- 1.1 The Welsh Assembly 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 Assembly 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% 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 sources;
  - 12% of our heat generated from renewable energy sources; and
  - 10% transport energy from renewable energy sources.
- 1.3 The Climate Change Act 2008 introduces a legally binding target of at least a 34% cut in greenhouse gas emissions by 2020, and at least an 80% cut by 2050, against a 1990 baseline.
- 1.4 In terms of the land use planning system the Assembly Government has produced policy guidance in Planning Policy Wales and the associated Technical Advice Note (TAN) 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".
- 1.5 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 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
- 1.6 This REA has been prepared by Blaenau Gwent 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.



- 1.7 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.**
- 1.8 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.
- 1.9 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**

- 1.10 This REA can assist Blaenau Gwent County Borough 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 LDP’s”*.
- 1.11 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 ‘Planning for Renewable and Low Carbon Energy – A toolkit for Planners’ for identifying assessing potential.

### **Wider Corporate Role**

- 1.12 In terms of wider roles, all local authorities including Blaenau Gwent 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**

- 1.13 This REA focuses on planning policy, rather than development management. As explained above, this assessment has been developed primarily for Blaenau Gwent County Borough Council, as an evidence base to support renewable and low carbon energy policies and targets in the LDP.
- 1.14 This REA is not intended for use by development management officers to assess planning applications for either strategic new development sites that are incorporating renewable energy, or for stand alone renewable energy generating systems.

#### **Technology**

- 1.15 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

- 1.16 This 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. This is not to imply that the latter is less important in terms of mitigating climate change: it is at least as, if not more, important. However, 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 standards in Wales, and future changes to part L of the Building Regulations.

## Transport

- 1.17 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

- 1.18 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 cable footfall onshore, offshore renewable energy are not within the planning jurisdiction of local planning authorities.

## Large Scale On Shore Wind

- 1.19 This 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, none of which are located in Blaenau Gwent. E0.00004 Tc 1 -1.HTJ 0.1232 T

- 1.21 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 (for hydro-electricity, wave and tidal power), solar, geothermal energy and plant material often referred to as biomass.”
- 1.22 An important characteristic of renewable energy, which is 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 gas emissions.
- 1.23 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. The latter (from burning organic matter), as all plants photosynthesise sunlight in order to fix carbon and grow.
- 1.24 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% of the weight of which is derived organically, from plant or animal matter. This includes agricultural, forestry or wood waste or residues, sewage and sludge, and crops”*.
- 1.25 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 stored in the Earth’s core.
- 1.26 Of all these, perhaps the most complex and multifaceted are biomass. They, as it can take so many forms. It can include: burning of forestry residues; 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 other gas. The latter, from the biodegradable fraction of waste going into an anaerobic digester. The methane from waste plant.
- 1.27 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 below.

**Table 1: Renewable Energy Technologies covered by the REA**

<b>Wind Energy</b>
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- On-shore wind and community scale development

## **Biomass Energy**

- Forestry residues
- Miscanthus
- Short rotation coppice
- Straw

## **Energy from Waste**

- Waste wood
- Municipal waste
- Industrial and commercial waste

## **Centralised Anaerobic Digestion**

- Food waste
- Agricultural wastes
- Sewage sludge

## **Hydropower energy**

## **Building Integrated Renewables (BIR)**

- Biomass boilers
- Air and ground source heat pumps
- Photovoltaic
- Small and micro wind power

## **Low Carbon Energy Options**

1.28 Low carbon energy options cover a range of energy sources that are not renewable, 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, where the heat is usefully used
- Stirling engine or fuel cell CHP, where the heat is usefully used
- The non-biodegradable fraction of the output from energy from waste plants

## **Explanation of Energy Terms**

### **Power vs. Energy Output**

1.29 In the context of this REA, power is measured in either kilowatts (kW), or MegaWatts (MW), which is a thousand kW, or gigaWatts (GW), which is a thousand MW. It is the 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.

1.30 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  $2 \times 24 = 48\text{MWh}$ .

- 1.31 The 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**

- 1.32 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 and Power (CHP) plant.
- 1.33 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 to denote electricity power of electricity 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.

## 2.0 POLICY CONTEXT AND DRIVERS FOR RENEWABLE ENERGY

### Introduction

2.1 In 'One Wales', the programme for government, the Welsh Assembly Government set out 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 Assembly 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 Assembly 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 company is a national priority. The UK Government is committed to meeting the EU target of 15% of energy from renewable sources by 2020, and the Welsh Assembly 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

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 0.000

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 TWh 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 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 Allowance 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 Heating Network. The power to make Buildings 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 5MW. The impact of FITs will be significantly increased 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**

- 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**





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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.

- 2.26 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



## 4.0 BLAENAU GWENT COUNTY BOROUGH COUNCIL AREA WIDE RENEWABLE ENERGY ASSESSMENT

4.1 This section details the 'accessible' renewable energy resources in Blaenau Gwent 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 study include:

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

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

### **Existing and Proposed Low Zero Carbon Energy Technologies**

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

### **Wind Energy Resource**

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

### **Biomass Energy Resource**

- What is the potential from biomass in the Blaenau Gwent County Borough?

### **Energy from Waste**

- What is the potential energy from municipal solid waste in Blaenau Gwent County Borough?
- What is the potential energy from commercial and industrial waste in Blaenau Gwent County Borough?
- What is the potential energy from energy from food waste in Blaenau Gwent County Borough?
- What is the potential energy from energy from animal manure and poultry litter in Blaenau Gwent County Borough?
- What is the potential energy from digestion of sewage sludge in Blaenau Gwent County Borough?

### **Hydropower Energy Resource**

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

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

4.3 The method employed for base-lining the Blaenau Gwent 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; and
  - WAG derived data and statistics currently published by DECC.
- 4.5 Table 2 below shows the split between electricity and heat for the UK, Wales and for Blaenau Gwent County Borough Council for 2008. Table 3 below shows the predicted electricity and heat demand for Blaenau Gwent County Borough Council for 2020.

**Table 2: Total DECC Energy 2008 (GWh) Data Reported by UK RES Energy Sector for Blaenau Gwent**

Sector	Total Energy 2008 (GWh)		
	UK	Wales	Blaenau Gwent
Electricity	304,626	16,267	285
Heat	815,626	55,658	1,070
Transport	477,984	27,161	298

Source: DECC (January 2011)

**Table 3: Predicted Future Energy Demand for Blaenau Gwent**

Sector	Total Energy 2008 (GWh)	Predicted % change to 2020	Total Energy 2020 (GWh)
Electricity	285	-0.3	284
Heat	1,070	-15.8	901
Transport	298	+1.2	302

Source: DECC (January 2011) and UK Renewable Energy Strategy

### Existing and Proposed Low Zero Carbon Energy Technologies

4.6

- 4.9 Table 4 outlines existing renewable electricity capacity in the County Borough. Table 5 outlines the existing renewable heat capacity.

**Table 4: Existing Renewable Electricity Capacity in Blaenau Gwent**

Name of scheme	Technology	Capacity (Mwe)
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4.18 The unconstrained wind resource was then prioritised into different categories of wind speed and potential NATS radar interference as set out in Table 6. Table 7 provides a figure for the total area of unconstrained land potentially available for wind power development according to these categories.

**Table 6: Wind Resource Priority**

Wind Resource Priority	Average Annual Wind Speed	Potential Disruption to the National Air Traffic Service
Priority 1	High (>6.5m/s)	Low
Priority 2	Moderate (6.0-6.5m/s)	Low
Priority 3	High	High
Priority 4	Moderate	High

**Table 7: Unconstrained Wind Resource Output for Blaenau Gwent County Borough Council**

Wind Resource Priority	Unconstrained Area (km <sup>2</sup> )	Potential Energy Generated (MWh)	Capacity (MW)
Priority 1	2.1	49,669	21
Priority 2	11.4	269,633	114



**Table 8: Potential Accessible Wind Resource across Blaenau Gwent (Upper Bound Figure)**

Potential Wind Energy Cluster Area	Area (km <sup>2</sup> )	Potential Energy Generated (MWh)	Potential Capacity (MW)
1	5.2	122,990	52
2	0.6	14,191	6
<b>Total</b>	<b>5.8</b>	<b>137,181</b>	<b>58</b>

**Table 9: Potential Accessible Wind Resource across Blaenau Gwent (Lower Bound Figure)**

Potential Wind Energy Cluster Area	Area (km <sup>2</sup> )	Potential Energy Generated (MWh)	Potential Capacity (MW)
1	4.5	106,434	45
2	0.65	15,374	6.5
<b>Total</b>	<b>5.15</b>	<b>121,808</b>	<b>51.5</b>

4.23 Tables 8 and 9 calculate a potential c

## RENEWABLE ENERGY ASSESSMENT

- 4.25 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.
- 4.26 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.
- 4.27 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.
- 4.28 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.
- 4.29 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; and
  - CO<sub>2</sub> savings if replanting occurs and long distance transportation is avoided.
- 4.30 There is no consideration of the utilisation of straw as an energy source as Wales is a net importer.
- 4.31 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
Required odt per 1MWt	3,000	n/a	-
<b>Potential installed capacity (MWt)</b>	<b>0.2</b>	<b>n/a</b>	<b>0.2</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>1.03</b>	<b>1.03</b>

### Energy from Waste

- 4.32 Blaenau Gwent County Borough Council is working with Caerphilly and Torfaen to deal with its Food and Organic Waste. The project is currently at Detailed Solutions Stage though no specific technology has been specified. For Residual Waste Blaenau Gwent is working with Torfaen County Borough Council to seek a solution through the procurement process which best delivers the project objectives. The Councils are considering options but again no specific technology has been specified for this project.
- 4.33 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.
- 4.34 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 residual waste stream (the proportion usually refers to the proportion of residual waste deemed to be the bio3sur energy fr

**Table 12: Potential Energy from Waste Resource for Blaenau Gwent**

<b>Outputs</b>	<b>MSW</b>	<b>C &amp; I</b>	<b>Total</b>
Total Waste (tonnes)	36,533	66,948	103,481
Total Residual (30%)	10,960	20,084	31,044
Total Biodegradable (renewable) element (35%)	3,836	7,029	10,865
<b>Electricity</b>			
Potential wet tonnes per MWe	10,320	10,320	-
<b>Potential installed capacity (MWe)</b>	<b>0.4</b>	<b>0.7</b>	<b>1.1</b>
<b>Heat</b>			
Required wet tonnes per MWt	1,790	1,790	-
<b>Potential installed capacity (MWt)</b>	<b>2.1</b>	<b>3.9</b>	<b>6.0</b>

## Anaerobic Digestion

- 4.38 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
- 4.39 There is no output table for Blaenau Gwent County Borough for landfill gas as no

## Animal Manure

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

**Table 14: Potential Installed Capacity from Total Available Animal Manure in Blaenau Gwent**

Livestock	Number	Available resource per head/yr (t)
Cattle	844*	1.50
Pigs	0*	0.15
<b>Electricity</b>		
Total wet tonnes required per MWe		225,000
<b>Potential installed capacity (MWe)</b>		<b>0.005</b>
<b>Heat from CHP</b>		
Total wet tonnes required per MWt		150,000
<b>Potential installed capacity (MW)</b>		<b>0.007</b>

\* Source: <http://wales.gov.uk/docs/statistics/2010/100811smallareaen.xls>

## Poultry Litter

- 4.42 No farms in Blaenau Gwent 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

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

**Table 15: Potential Energy from Sewage Sludge in Blaenau Gwent**

Tf 0 Tc 0 Tw 1.1 m f 542.46 430.1 0 Tw 1.1

## Hydropower Energy Resource

- 4.44 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.
- 4.45 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 the projects, the willingness of landowners and riparian rights of owners to advance projects. However, the major constraint is environmental issues and the need for the Environment Agency acceptance and permitting.
- 4.46 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 Blaenau Gwent County Borough are shown below. 36 'barriers' were identified in the area, these are structures within rivers that could provide a hydropower opportunity but are also barriers to fish movement.
- 4.47 Removing a barrier is usually the best thing to do to improve the ability of fish to move around a river and fulfil 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.
- 4.48 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. 3 such sites were identified in Blaenau Gwent County Borough Council with the po4 . 4 6

## 5.0 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 Blaenau Gwent County Borough. The assessment is based on the method detailed in 'Planning for Renewable and Low Carbon 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 microgeneration in the energy mix of Wales?
- How is 'microgeneration' defined in this REA?
- What is the difference between 'microgeneration' and 'building integrated renewables'?
- How much energy is generated from BIR currently installed in Blaenau Gwent County Borough?
- What is the potential energy generated by building integrated renewable energy technologies in Blaenau Gwent 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 microgeneration in the energy mix of Wales. There is likely to be an increasing emphasis on the uptake of microgeneration technologies. Ms on the up006 Tc 0.169 Tw -1overnmenrnm4l602 0 rg 0.0.1f20.000hTSs

- 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 Planner’ 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 Blaenau Gwent, the simplified method for modelling building integrated renewable uptake has been used. This 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 Blaenau Gwent County Borough compared to that assumed for Pembrokeshire.







Row No.			Units
	2020		
12	Predicted RE heat capacity for Blaenau Gwent CB by 2020 (multiple row 11 by row 10)	1.7	MWt
<b>13</b>	<b>Future non-residential buildings</b>		
14	Future new non-residential average annual new floor area assumed for Pembrokeshire by 2020	56,000	m <sup>2</sup>

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## RENEWABLE ENERGY ASSESSMENT

Development	Floorspace sq m	Assumptions	Source
		300 sq m Assumes 1 x Leisure Centre at 6,000 sq m	
<b>TOTAL</b>	<b>213,945</b>		

		Accessible Resource		Current Installed Capacity		Total (Accessible +Current)	
<b>TOTAL</b>	-	<b>38.77</b>	<b>91.7</b>	<b>3.4156</b>	<b>15.71</b>	<b>42.1856</b>	<b>107.41</b>
Local Authority Projected Electricity Demand in 2020							284
<b>Percentage electricity demand in 2020 potentially met by renewable energy resource</b>							<b>38%</b>

**Table 22: Resource Summary for Potential Renewable Heat in Blaenau Gwent**

Energy Technology	Capacity Factor	Accessible Resource		Current Installed Capacity		Total (Accessible +Current)	
		MWe	GWh/yr	MWe	GWh/yr	MWe	GWh/yr
Biomass CHP or large scale heat only (energy from crops)	0.5	0.2	0.9	4.54	19.9	4.74	20.8
Heat from energy from waste (CHP or heat only)	0.5	6.0	26.3	0	0	6.0	26.3
BIR	0.2	3.8	6.7	0.2384	0.42	4.0384	7.1
<b>TOTAL</b>	-	<b>10.0</b>	<b>33.9</b>	<b>4.7784</b>	<b>20.32</b>	<b>14.7784</b>	<b>54.2</b>
Local Authority Projected Heat Demand in 2020							901
<b>Percentage heat demand in 2020 potentially met by renewable Energy resource</b>							<b>6.0%</b>

6.4 A comparison between the energy generation potential identified in Tables 21 and 22 against the UK Renewable Energy Strategy scenario (paragraph 1.2 above) to meet the EU Renewable Energy Directive is contained in table 23 below.

**Table 23: Blaenau Gwent Energy Potential and UK Preferred Scenario**

	Blaenau Gwent Energy Generation Potential (%)

## RENEWABLE ENERGY ASSESSMENT

for renewable energy generation, and would also highlight possible receptors (particularly public sector buildings) of heat energy generation.



# APPENDICES



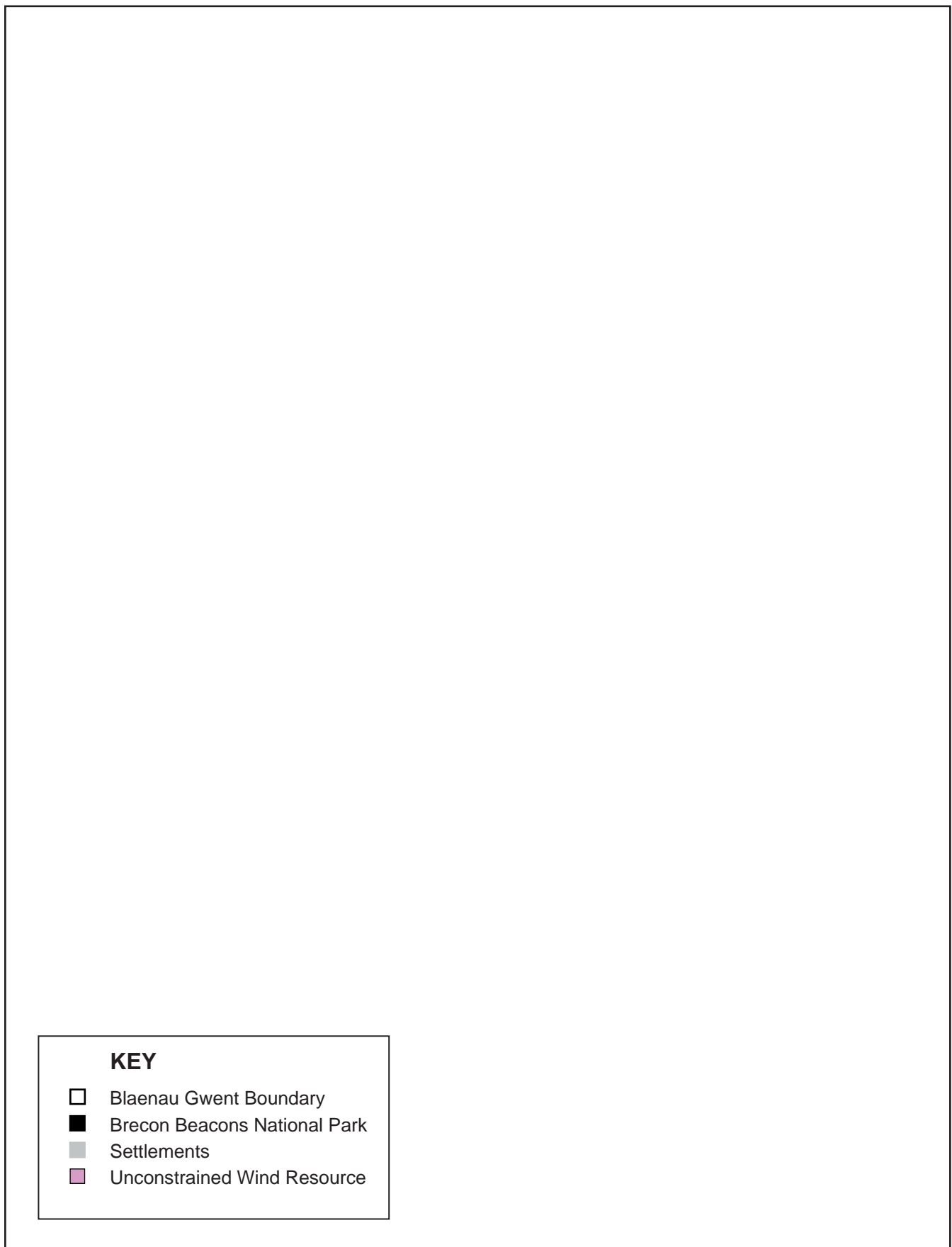


Date : 18/01/2010	<b>Blaenau Gwent Renewable Energy Assesment</b>	Regeneration Division
Scale : 1:2000	<b>Wind Energy Resource Constraints Map</b>	

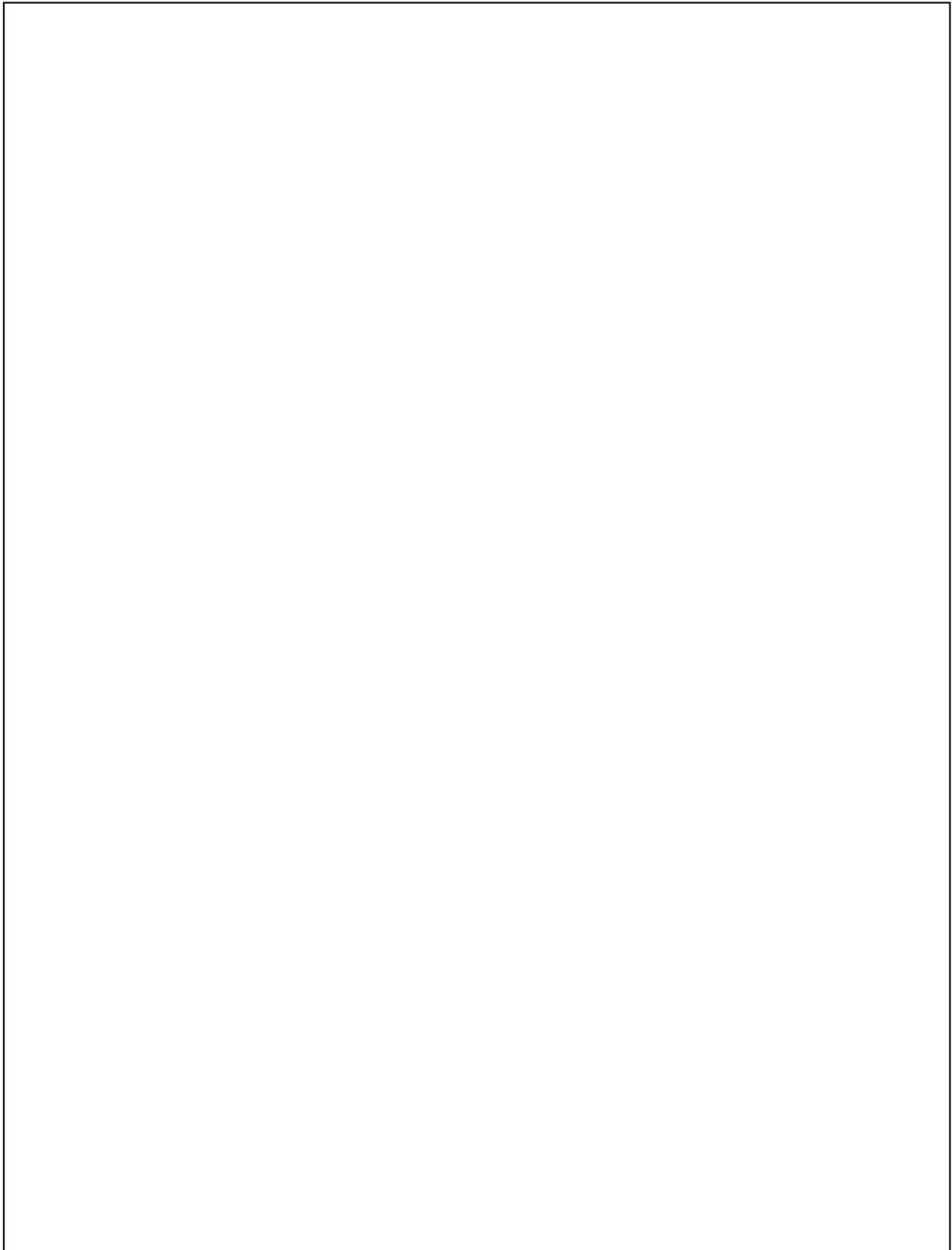
### KEY

- Blaenau Gwent Boundary
- Brecon Beacons National Park
- Existing Dwellings
- Unconstrained Wind Resource
- Adjoining Local Authority Buffer
- ▨ Woodland
- ▨ Historic Landscapes
- ▨ Potential Interference with NERL infrastructure
- ✕ Scheduled Ancient Monuments
- BWHVRIEHOLEWUHVW
- Principal Transport Network
- Proposed HOV Road
- Secondary Transport Network
- Inland Water
- Noise Buffer
- Area's with low wind speed

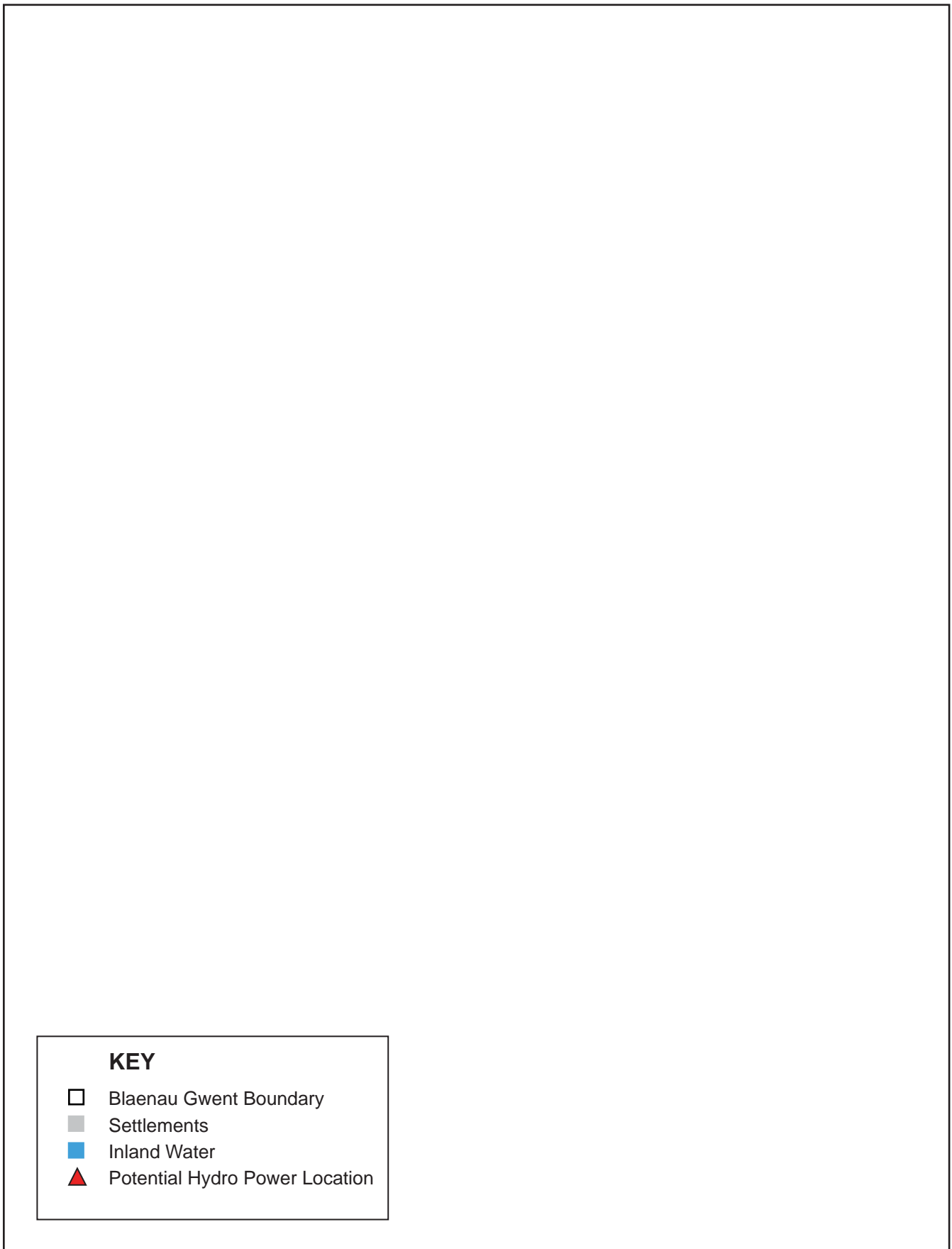
Date : 18/01/2010	<b>Blaenau Gwent Renewable Energy Assessment</b>	
Scale : 1:2000	<b>Location of Potential Wind Farm Clusters (Upper Bound Figure)</b>	Regeneration Division







<b>Date : 18/01/2010</b>	<b>Blaenau Gwent Renewable Energy Assessment</b>	
<b>Scale : 1:2000</b>	<b>Location of Potential Wind Farm Clusters (Lower Bound Figure)</b>	Regeneration Division



Date : 18/01/2010	<b>Blaenau Gwent Renewable Energy Assesment</b>	Regeneration Division
Scale : 1:2000	<b>Potential Hydropower 'Win Win' Locations</b>	



<b>KEY</b>	
	Blaenau Gwent Boundary
	Settlements
	Inland Water
	Potential Hydro Power Location

For further information please contact:

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