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Cyngor Bwrdeisdref Sirol
Blaenau Gwent
County Borough Council

Blaenau Gwent County Borough Council
Cyngor Bwrdeisdref Sirol Blaenau Gwent

Renewable Energy Assesment

Asesiad Ynni Adnewyddadwy

Deposit Local Development Plan

Cynllun Adeneuo Datblygu Lleol

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www.blaenau-gwent.gov.uk

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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EXECUTIVE SUMMARY

The One Wales document sets out the Welsh Assembly Government's commitment to tackling climate change which include 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 CO_2 emissions and is committed to developing a comprehensive energy strategy and a renewable energy route map to ensure understanding of what "playing full part" will mean.

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

Blaenau Gwent County Borough Council is currently preparing its Local Development Plan. 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 Assembly Government's Renewable Energy Assessment Toolkit for Planners, to establish the potential for renewable energy in the County Borough that could support a selection of policy objectives: many of which could also be addressed through corporate action.

The methodology used in this 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 Renewable (BIR) uptake.

It is noted that for Blaenau Gwent, the percentage of renewable electricity generation exceeds the UK-wide target. However, heat demand potentially met by renewable energy sources is below the 12% target. LDP policies could therefore be formulated to encourage more of the County Borough's electricity and heat requirements to be generated by renewable and low/zero carbon technologies 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 co-operation between the Council and other public sector bodies, and between public and private sector. The greatest challenge to this co-operation may arise in attempting to reduce the carbon emissions of existing building stock, potentially through 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. 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. Rather, in the case of wind power, it has identified smaller scale opportunities.

Policy Wording

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

Defining Renewable Energy and Low Carbon Energy

Renewable Energy

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_2) – 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 energy (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_2, the same amount of CO_2 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 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".*

1.25 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 generated in the Earth's core.

1.26 Of all these, perhaps the most complex and multifaceted are biomass energy, 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 energy generated from the biodegradable fraction of waste going into an energy 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

Wind Energy

- 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 x 1 = 2MWh of energy. If it ran at full power for one day (24 hours), it would have generated 2 x 24 = 48 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 has revised Planning Policy Wales and Technical Advice Note (TAN) 8 on renewable energy. In its 'One Wales' commitments the Welsh 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".

2.7 In September 2009 changes were made to 'permitted development' rights to make provision for the installation of certain types of microgeneration 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 Assembly 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 microgeneration and other small scale technologies can play a significant role in delivering these proposals, as supported by the Microgeneration 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 microgeneration.

Wales Low Carbon Energy Strategy

2.11 In March 2010, the Assembly 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 microgeneration

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_2 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_2 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 31st 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

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 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 Assembly Government's Community Scale Renewable Energy Programme

2.22 The Welsh Assembly 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 The support is available to social enterprises across Wales and consists of three different elements:

- Technical Development Officers

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 solar enterprises and provide locally based advice on renewable energy.

- Preparatory stage grants

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 events.

- Capital grants

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

Wood Energy Business Scheme (WEBS)

2.24 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.

2.25 The Wood Energy Business Scheme (WEBS) is a £17 million 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.

2.26 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 social capital grant support to micro-businesses; SMEs and social enterprises to further develop the sustainable and renewable wood heat market across Wales.

2.27 Three types of project are eligible for grant support:

- Wood fuel heating systems
- Small scale electricity generation using wood – Combined Heat and Power
- Wood fuel supply businesses – enabling high quality equipment and fuel supply chains to be developed

3.0 HOW TO USE THIS RENEWABLE ENERGY ASSESSMENT

Structure of the Renewable Energy Assessment

3.1 This REA has primarily been developed to undertake an area wide assessment of the potential for renewable energy generation in Blaenau Gwent 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 Blaenau Gwent 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 Blaenau Gwent County Borough Council based upon the pilot study for Pembrokeshire undertaken by AECOM as part of the Welsh Assembly 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 translation of potential resources into potential targets have been informed by a wider officer stakeholder group. Further, any decision about the setting of area wide targets and enhanced targets for development 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 now be undertaken as part of the wider consultation on the deposit LDP.

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

	Total Energy 2008 (GWh)		
Sector	**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 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 Blaenau Gwent 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 also been collected at the local authority level on installed renewable heating capacity, and small-scale electricity generation.

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)	Status	Source
Silent Valley Landfill Scheme	Landfill Gas	2.65	Operational	Ofgem
Unit 15 Rassau Industrial Estate	Wind Onshore	0.75	Planning Consent	BGCBC
The Grouse Farm	Wind Onshore	0.0013	Operational	BGCBC
Photovoltaic (Household)	Solar	0.0033	Grant Supported	DECC
Ysgol Bro Helyg School	Micro Combined Heat and Power	0.011	Operational	BGCBC
	Total	**3.4156**	**-**	**-**

Table 5: Existing Renewable Heat Capacity in Blaenau Gwent

Name of scheme	Technology	Capacity [MWe]	Status	Source
Tesco Stores	Combined Heat and Power	0.2	Operational	BGCBC
Ysgol Bro Helyg School	Micro Combined Heat and Power	0.031	Operational	BGCBC
Ysgol Bro Helyg School	Solar Thermal System	0.0074	Operational	BGCBC
'The Works' Energy Centre	Gas Boilers	1.75	Planning Consent	BGCBC
'The Works' Energy Centre	Combined Heat and Power	0.39	Planning Consent	BGCBC
'The Works' Energy Centre	Biomass Boiler	2.4	Planning Consent	BGCBC
	Total	**4.7784**	-	-

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 TAN 8 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. TAN 8 provides details of Strategic Search Areas (SSAs), SSAs are sites identified as suitable and potential for large-scale wind. These have not been investigated as part of this evidence base.

4.12 Further constraints to onshore wind development not considered within this assessment 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 assessment has not utilised national grid data and 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 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	2MW
Hub Height	80 m
Rotor Diameter	80 m
Tip Height	120 m
Turbine Density	5 turbines into 1km^2

4.17 Once this initial constraints assessment has been carried out the map in Appendix 1 was produced. The pink areas highlighted indicate the unconstrained areas suitable for wind energy generation taking into account the constraints listed above.

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^2)	Potential Energy Generated (MWh)	Capacity (MW)
Priority 1	2.1	49,669	21
Priority 2	11.4	269,633	114
Priority 3	0.9	21,287	9
Priority 4	0.6	14,191	6
Total	**15**	**354,780**	**150**

4.19 In reality harnessing all of the resource in Table 7 may cause significant cumulative visual and landscape impacts. Therefore this potential impact needs to be incorporated as a constraint and the accessible resource revised accordingly. The Toolkit recommends a 7km minimum separation buffer be applied.

4.20 Taking this additional factor into account 2 'potential wind energy cluster areas have been identified. Table 8 sets out the potential wind resource from these two areas/ Appendix 2 identifies the potential wind energy cluster areas.

4.21 The toolkit also recommends that the process should be re-run to exclude priority areas 3 and 4, that is areas which are identified as 'at risk' in terms of impacts on NATS en-route radar. On doing this, upper and lower bound figures should be identified for accessible wind resource.

4.22 Table 8 sets out the upper bound figure for accessible wind resource as it includes priority areas 1-4. Appendix 2 identifies the potential wind energy cluster areas for the upper bound figure. Table 9 includes a lower bound figure for accessible wind resource and excludes priority areas 3 and 4. Appendix 3 identifies the potential wind energy cluster areas for the lower bound figure.

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

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

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

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

4.23 Tables 8 and 9 calculate a potential capacity for each 'potential wind energy cluster area'. Area 1 identifies an upper bound figure of 52 MW and a lower bound figure of 45 MW. It is noted in the toolkit that wind farm clusters should not exceed 25MW unless they are located in a Strategic Search Area as identified in TAN 8. In light of this, it is therefore proposed to reduce the potential capacity of cluster area 1 to 25MW therefore Table 10 recalculates the upper and lower bound accessible wind energy resource figures in accordance with TAN 8.

Table 10: Recalculation of the Upper and Lower Bound Accessible Wind Energy Resource

Potential Wind Energy Cluster Area	Area (km^2)	Potential Capacity (MW)
1	5.2	25
2	0.6	6
Total	**5.8**	**31**
Lower Bound Figure		
1	4.5	25
2	0.65	6.5
Total	**5.15**	**31.5**

Biomass Energy Resource

4.24 The focus of this REA is on establishing the potential biomass resource. The resource is defined as:

- Wind fuel resource
- Energy crops (miscanthus & short-rotation coppice)

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_2 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).

Table 11: Potential Available Biomass Resource for Blaenau Gwent

Outputs	Energy Crops	Woodland	Total
Available Area (Ha)	436	1,137	**1,573**
Percentage of area that can be used	10%	n/a	**-**
Usable area (Ha)	44	1,137	**1,181**
Yield (oven dried tonnes ((odt) per Ha)	12	0.6	**-**
Yield (odt)	528	682	**1,210**
Electricity			
Required odt per MWe	6,000	n/a	**-**
Potential installed capacity (MWe)	**0.1**	**n/a**	**0.1**
Heat from CHP			

Outputs	Energy Crops	Woodland	Total
Required odt per 1MWt	3,000	n/a	-
Potential installed capacity (MWt)	**0.2**	**n/a**	**0.2**
Heat-only option			
Required odt per MWt	n/a	660	-
Potential installed capacity (MWt) from boilers	**n/a**	**1.03**	**1.03**

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 biodegradable (BD) element).

4.35 In order to comply with the Welsh Assembly Government requirements contained in the National Waste Strategy for Wales: *Towards Zero Wales* at least 70% of all main streams should be recycled by 2025. Land filling of all waste will be phased out as far as possible by this time.

4.36 Other targets for consideration include a maximum level of 30% of 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.

4.37 The energy from waste potential is calculated using data on total municipal solid waste (MSW) and commercial and industrial (C & I) waste. Data used in these calculations have been collected from Blaenau Gwent County Borough Council Waste and Recycling Team and the Environment Agency Wales.

Table 12: Potential Energy from Waste Resource for Blaenau Gwent

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

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 capacity, additional to what is already installed, has been identified. With policy in place to prevent further biodegradeable material being sent for landfill, not further opportunities for energy from landfill gas are anticipated.

4.40 Data has been obtained from: WAGs Small Area Agricultural Statistics; Blaenau Gwent's Waste department; Environment Agency and Bioenergy Action Plan for Wales.

Food Waste

Table 13: Potential Energy from Food Waste in Blaenau Gwent

Municipal Food Waste	Predicted tonnes per annum (2019/2020)
Total Waste (tonnes)	6,483
Electricity	
Required tonnes per MW	32,000
Potential Installed Capacity (MW)	**0.2**
Heat	
Potential Installed Capacity (MWt)	**0.3**

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
Electricity		
Total wet tonnes required per MWe		225,000
Potential installed capacity (MWe)		**0.005**
Heat from CHP		
Total wet tonnes required per MWt		150,000
Potential installed capacity (MW)		**0.007**

*** 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

Sewage Sludge	Predicted tonnes per annum
Total sewage sludge	2,308
Electricity	
Required dry sold (tonnes) per MWe	13,000
Potential Installed Capacity (MWe)	**0.2**
Heat	
Required tonnes for 1 MW	8,667
Potential installed capacity (MWt)	**0.3**

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 potential to generate 0.14 MW. Appendix 4 identifies the potential 'win-win' locations.

Table 16: Potential Energy from Hydropower in Blaenau Gwent

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
Blaenau Gwent	39	1.22	66%	11.5%	0.14

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. Microgeneration in Blaenau Gwent County Borough could play an important part in any area wide renewable energy assessment. It is considered that microgeneration 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 microgeneration technologies in Blaenau Gwent County Borough.

5.3 The official definition of microgeneration 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 can include systems that are larger than microgeneration, 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 microgeneration technologies that are not renewable, such as fuel cells (where the hydrogen is produced from main 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 microgeneration 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 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.

Table 17: Potential Energy from BIR Renewable Electricity Sources in Blaenau Gwent

Row No.			Units
1	**Existing dwellings and non residential buildings**		
2	No. of existing dwellings in Pembrokeshire	55,592	
3	No. of existing dwellings in Blaenau Gwent CB	30,453	
4	Calculate EDR (divide row 3 by row 2)	0.6	
5	Predicted RE electricity capacity for Pembrokeshire	2.2	MWe

Row No.			Units
	by 2020		
6	Predicted RE electricity capacity for Blaenau Gwent CB by 2020 (multiply row 5 by row 4)	1.3	MWe
7	**Future dwellings**		
8	No. of average net annual completions assumed for Pembrokeshire	585	
9	No. of average net annual completions planned for Blaenau Gwent CB	244	
10	Calculate NDR (divide row 9 by row 8)	0.4	
11	Predicted RE electricity capacity for Pembrokeshire by 2020	4.3	MWe
12	Predicted RE electricity capacity for Blaenau Gwent by 2020 (multiply row 11 by row 10)	1.72	MWe
13	**Future non-residential buildings**		
14	Future new non-residential average annual new floor area assumed for Pembrokeshire by 2020	56,000	m^2 GIFA
15	Future new non-residential average annual new floor area estimated for Blaenau Gwent by 2020	23,245	m^2 GIFA
16	Calculate FNR (divide row 15 by row 14)	0.4	
17	Predicted RE electricity capacity for Pembrokeshire by 2020	6.32	MWe
18	Predicted RE electricity capacity for Blaenau Gwent by 2020 (multiply row 17 by row 16)	2.5	MWe
	TOTALS		
19	**Total predicted new BIR RE electricity capacity for Blaenau Gwent by 2020 (sum of rows 6, 12 and 18)**	**5.52**	**MWe**
20	Existing BIR RE electricity capacity in Blaenau Gwent CB (Table 2)	0.0156	MWe
21	**Total predicted new and existing BIR RE electricity capacity for Blaenau Gwent by 2020 (row 19 plus row 20)**	**5.5356**	**MWe**

5.11 Data from the LDP has been used to calculate the residential development figures. When calculating the potential energy for non-residential development from BIR electricity sources, a total requirement of approximately 232,445 sq m until the end of plan period has been derived using the assumptions in Table 18. The figure for the potential energy for non-residential development from BIR heat sources, which is set out in Table 20 is slightly different. This is due to the proposed energy centre at 'The Works' which will provide community heating to large public buildings located on 'The Works' site. The capacity of the proposed energy centre is set out in Table 5.

Table 18: Data used for Future Non-Residential Development from BIR Electricity Sources

Development	Floorspace sq m	Assumptions	Source
Comparison Retailing	2,960	Assumes indicative net sales area	Retail Background Paper Potential LDP allocations
Convenience Retailing	1,085	Assumes indicative net sales area	Retail Background Paper Potential LDP allocations
Employment Development	200,000	10 years of 5.0 ha pa at ratio of 4,000 sq m of development to ha	Employment Background Paper Potential LDP allocations
Community / Leisure Facilities	28,400	Assumes 3 x Primary Schools at 3,000 sq m Assumes 1 x Secondary School at 6,500 sq m Assumes 3 x Community Centres at 300 sq m Assumes 2 x Leisure Centre at 6,000 sq m	Potential LDP allocations
TOTAL	**232,445**	**Annual Requirement over 10 years**	**23,245 sq m**

Table 19: Potential Energy from BIR Renewable Heat Sources in Blaenau Gwent

Row No.			Units
1	**Existing dwellings and non residential buildings**		
2	No. of existing dwellings in Pembrokeshire	55,592	
3	No. of existing dwellings in Blaenau Gwent CB	30,453	
4	Calculate EDR (divide row 3 by row 2)	0.6	
5	Predicted RE heat capacity for Pembrokeshire by 2020	3.7	MWt
6	Predicted RE heat capacity for Blaenau Gwent CB by 2020 (multiple row 5 by row 4)	2.2	MWt
7	**Future Dwellings**		
8	No. of average net annual completions assumed for Pembrokeshire	585	
9	No. of average net annual completions planned for Blaenau Gwent CB	244	
10	Calculate NDR (divide row 9 by row 8)	0.4	
11	Predicted RE heat capacity for Pembrokeshire by	4.3	MWt

Row No.			Units
	2020		
12	Predicted RE heat capacity for Blaenau Gwent CB by 2020 (multiple row 11 by row 10)	1.7	MWt
13	**Future non-residential buildings**		
14	Future new non-residential average annual new floor area assumed for Pembrokeshire by 2020	56,000	m^2 GIFA
15	Future new non-residential average annual new floor area assumed for Blaenau Gwent CB by 2020	21,395	m^2 GIFA
16	Calculate FNR (divide row 15 by row 14)	0.4	
17	Predicted RE heat capacity for Pembrokeshire by 2020	1.23	MWt
18	Predicted RE heat capacity for Blaenau Gwent CB by 2020 (multiply row 17 by row 16)	0.5	MWt
	TOTALS		
19	**Total predicted new BIR Re heat capacity for Blaenau Gwent CB by 2020 (sum of rows 6, 12, 18)**	**3.8**	**MWt**
20	Existing BIR heat capacity in Blaenau Gwent CB	**0.2384**	MWt
21	**Total predicted new and existing BIR RE heat capacity for Blaenau Gwent CB by 2020 (row 19 plus 20)**	**4.0384**	**MWt**

Table 20: Data used for Future Non-Residential Development from BIR Heat Sources

Development	Floorspace sq m	Assumptions	Source
Comparison Retailing	2,960	Assumes indicative net sales area	Retail Background Paper Potential LDP allocations
Convenience Retailing	1,085	Assumes indicative net sales area	Retail Background Paper Potential LDP allocations
Employment Development	200,000	10 years of 5.0 ha pa at ration of 4,000 sq m of development to ha	Employment Background Paper Potential LDP allocations
Community Facilities	9,900	Assumes 1 x Primary Schools at 3,000 sq m Assumes 3 x Community Centres at	Potential LDP allocations

Development	Floorspace sq m	Assumptions	Source
		300 sq m Assumes 1 x Leisure Centre at 6,000 sq m	
TOTAL	**213,945**	**Annual Requirement over 10 years**	**21,395 sq m**

6.0 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; and
- Extent of institutional and infrastructural support, covering the likelihood of securing planning consent (i.e. issues of political will 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 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

Table 21: Resource Summary for Potential Renewable Electricity in Blaenau Gwent

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	31.5	74.5	0.75	1.8	32.25	76.3
Energy crops	0.9	0.1	0.8	0	0	0.1	0.8
Energy from Waste	0.9	1.1	8.7	0	0	1.1	8.7
Landfill Gas	0.6	0	0	2.65	13.9	2.65	13.9
AD (animal / food)	0.9	0.21	1.7	0	0	0.21	1.7
Sewage	0.42	0.2	0.7	0	0	0.2	0.7
Hydropower	0.37	0.14	0.5	0	0	0.14	0.5
BIR	0.1	5.52	4.8	0.0156	0.01	5.5356	4.81

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

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
TOTAL	**-**	**10.0**	**33.9**	**4.7784**	**20.32**	**14.7784**	**54.2**
Local Authority Projected Heat Demand in 2020							901
Percentage heat demand in 2020 potentially met by renewable Energy resource							**6.0%**

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 (%)	UK Scenario to meet EU Directive (%)
Electricity	38	>30
Heat	6.0	12.0

6.5 It is noted that for Blaenau Gwent, the percentage of renewable electricity generated exceeds the UK- wide target. However, heat demand potentially met by renewable energy sources is below the 12% target. LDP policies could therefore be formulated to encourage more of the County Borough's electricity and heat requirements to be generated by renewable and low/zero carbon technologies 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.

6.6 Consideration can also be given to the formulation of an Energy Opportunities Plan as Supplementary Planning Guidance to the LDP. This would identify potential sources

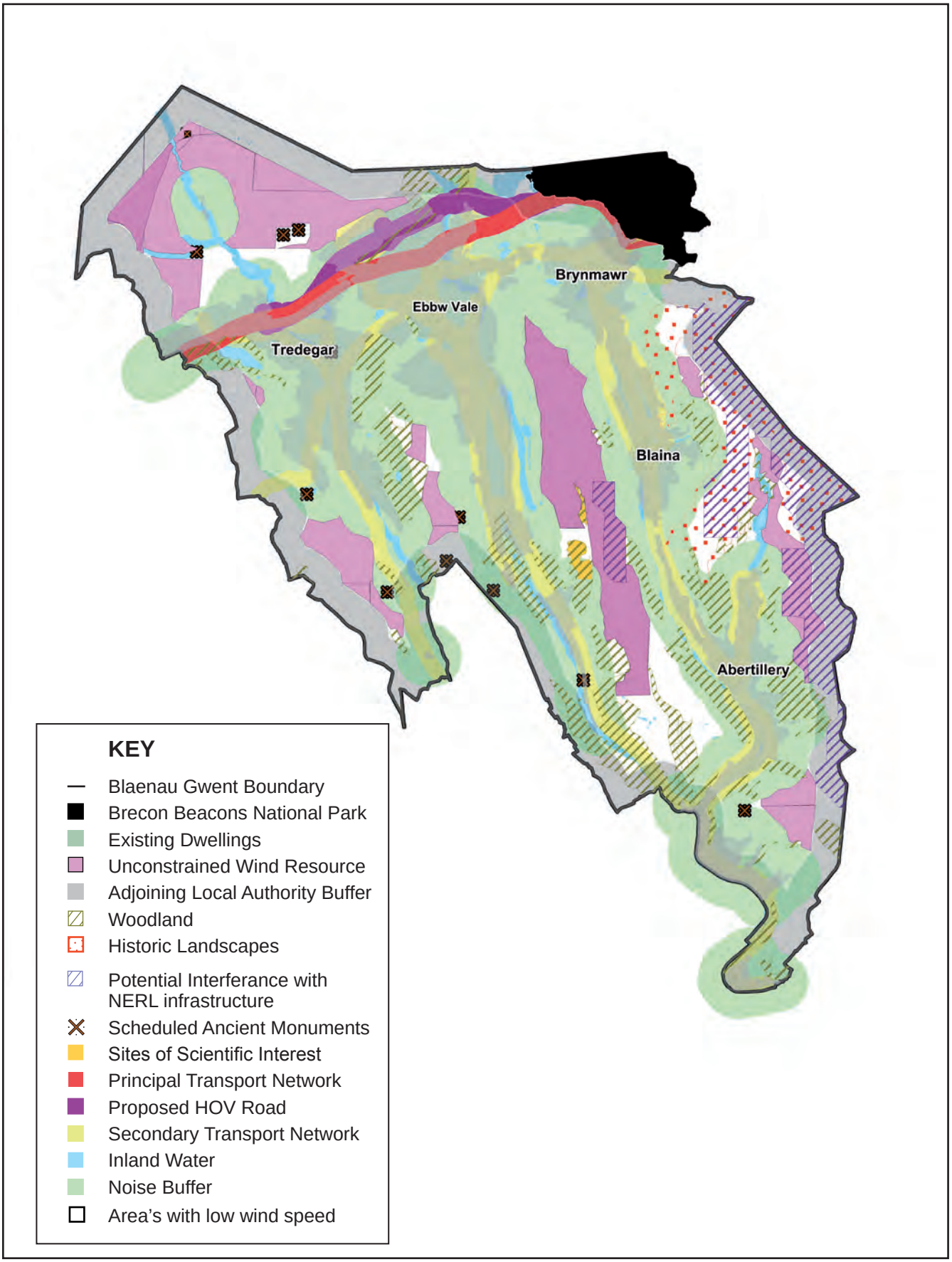
for renewable energy generation, and would also highlight possible receptors (particularly public sector buildings) of heat energy generation.

APPENDICES

RENEWABLE ENERGY ASSESSMENT

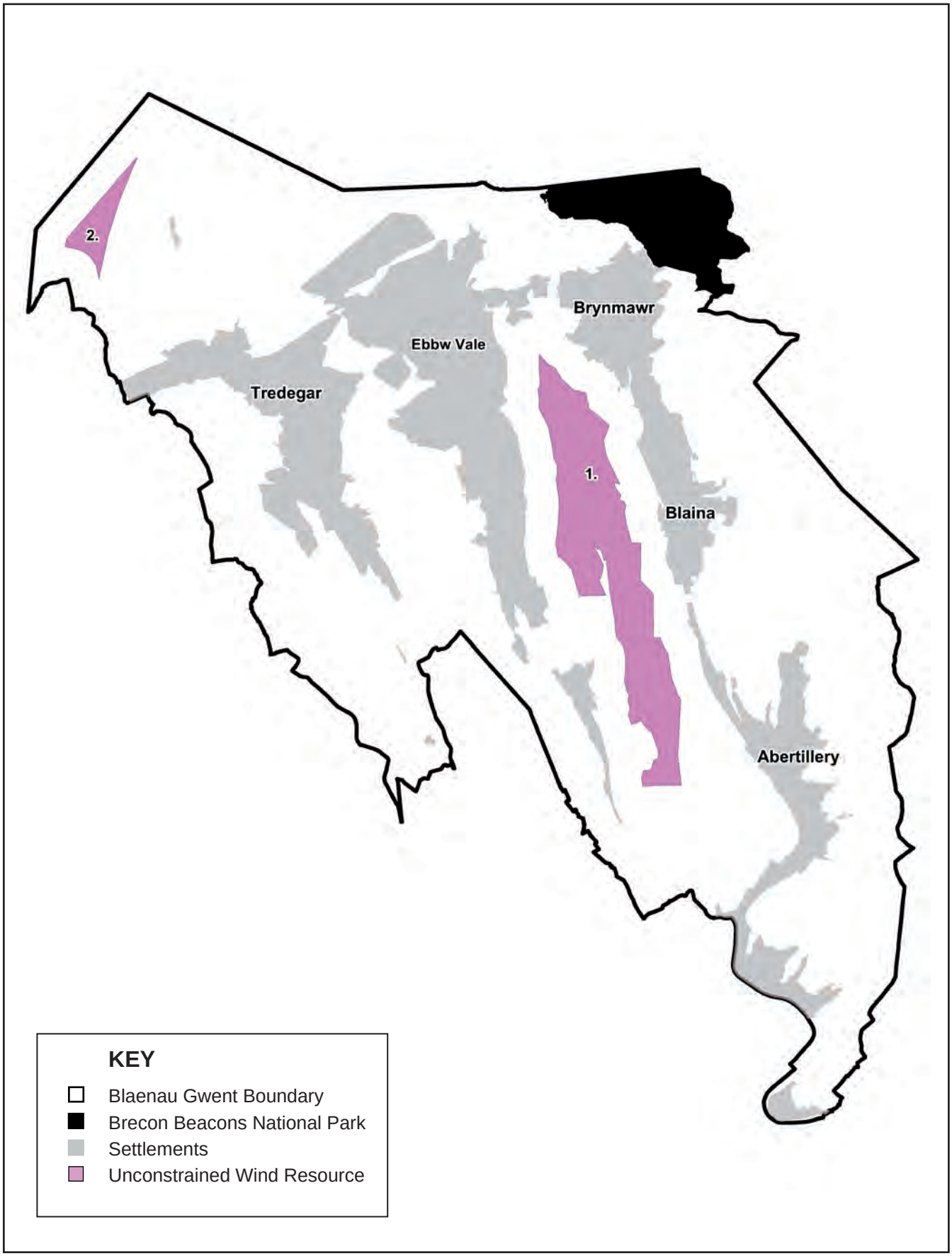
Appendix 1

Date : 18/01/2010	**Blaenau Gwent Renewable Energy Assesment**	Blaenau Gwent County Borough Council Regeneration Division
Scale : 1:2000	**Wind Energy Resource Constraints Map**	



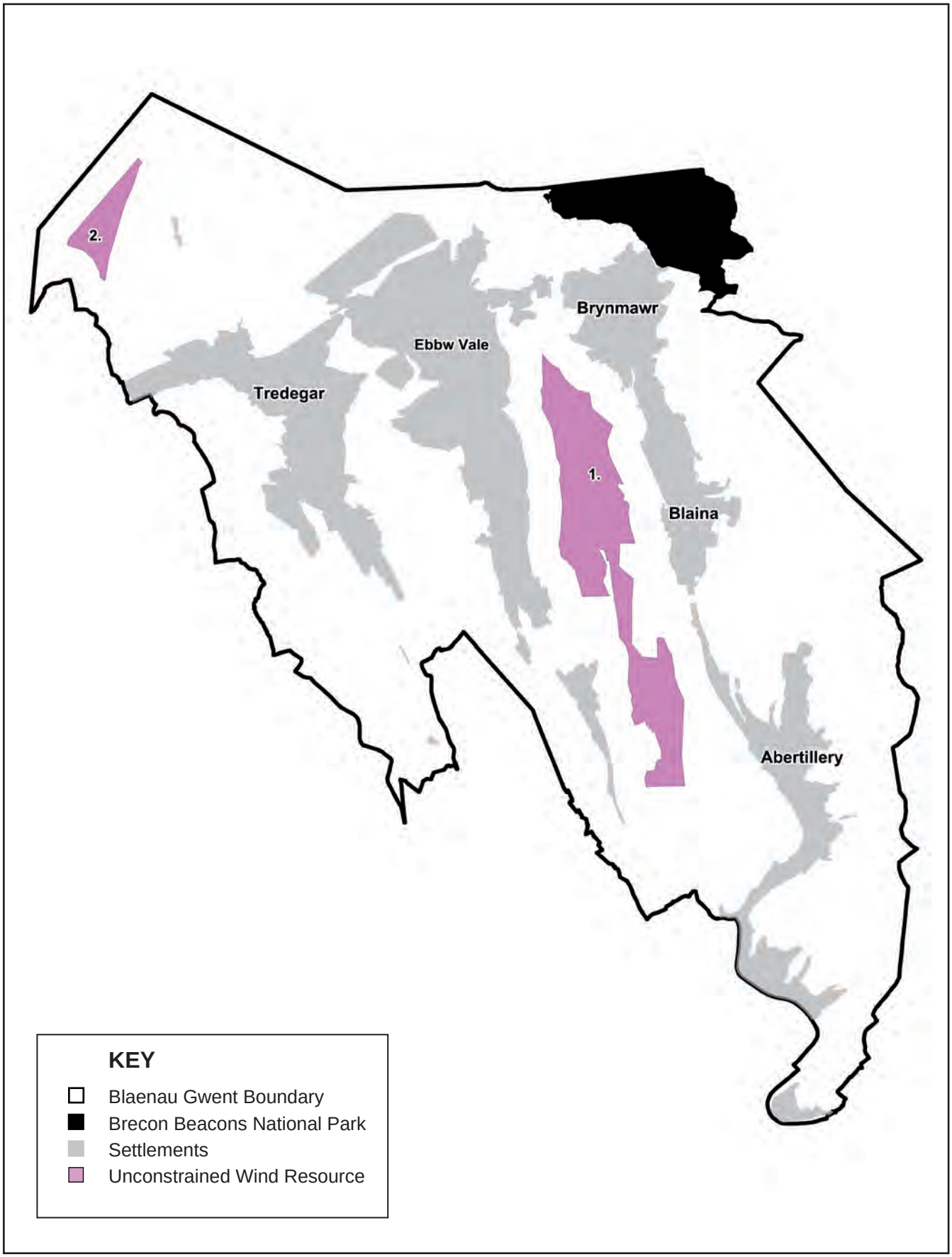
Appendix 2

Date : 18/01/2010	Blaenau Gwent Renewable Energy Assesment	Blaenau Gwent County Borough Council Regeneration Division
Scale : 1:2000	Location of Potential Wind Farm Clusters (Upper Bound Figure)	

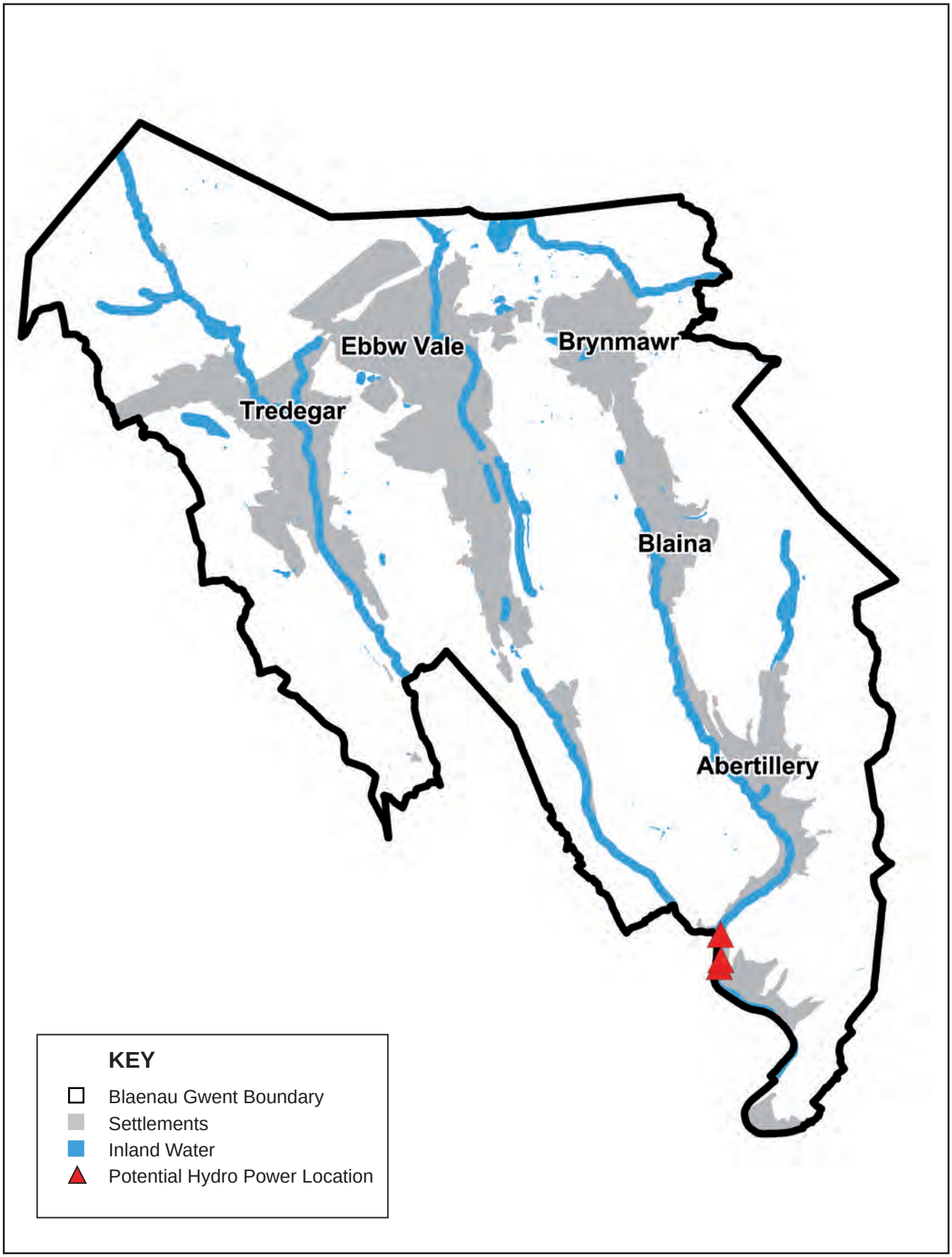


Appendix 3

Date : 18/01/2010	Blaenau Gwent Renewable Energy Assesment	Blaenau Gwent County Borough Council Regeneration Division
Scale : 1:2000	Location of Potential Wind Farm Clusters (Lower Bound Figure)	



Date : 18/01/2010	Blaenau Gwent Renewable Energy Assesment	Blaenau Gwent County Borough Council Regeneration Division
Scale : 1:2000	Potential Hydropower 'Win Win' Locations	



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