



# **SUSTAINABLE ENERGY AND RESOURCES**

**DEPOSIT LOCAL DEVELOPMENT PLAN  
UP TO 2021**

**October 2008**

## **CYNALADWYEDD YNNI AC ADNODDAU**

**CYNLLUN ADNEUO DATBLYGU LLEOL  
HYD AT 2021**

**Hydref 2008**



**CAERPHILLY COUNTY BOROUGH  
LOCAL DEVELOPMENT PLAN  
Up to 2021**

**BWRDEISTREF SIROL CAERFFILI  
CYNLLUN DATBLYGU LLEOL  
Hyd at 2021**

# **BACKGROUND PAPER 1 SUSTAINABLE ENERGY & RESOURCES**

## **PAPUR CEFNDIR 1 CYNALADWYEDD YNNI AC ADNODDAU**

**LDP DEPOSIT  
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## 1. INTRODUCTION

- 1.1 It is now widely accepted that global climate change is taking place. All aspects of our local environment, economy and society are likely to be affected by unpredictable and severe impacts as a result of global warming.
- 1.2 When all it takes is a flick of a switch to illuminate a house or to activate a television set, it is not surprising that most people pay little attention to where their energy comes from and the emissions that are generated as a result. It is estimated that 70% of global emissions come from the way we produce and use our energy. Renewable energy is the term used to cover energy derived from wind, water, solar, geothermal and biomass. It does not include fossil fuel or nuclear fuel. Sustainable energy covers not only renewable energy but also energy derived from passive systems such as passive solar gain and design. Sustainable energy has been recognised as playing a key role in reducing harmful emissions.
- 1.3 Sustainable resources refers to the use of resources such as water, materials used in construction, for example and waste products such as food waste that can be re-used and recycled whilst reducing harmful emissions. However, the rise of sustainable energy isn't just about preventing or mitigating against climate change, it could be the basis for a higher standard of living right around the globe.
- 1.4 Renewable energy currently accounts for 3% of the Wales's electricity generation although it is predicted that the generating capacity of renewable energy in the UK is three times that of what we consume. It is believed however, that with Wales's coastline, geography and climate it is quite feasible for Wales to produce more electricity than we as a nation consume within 20 years. Wales has signed up to the 2020 EU target of 20% of energy requirements (electricity, heat and vehicle fuels) coming from renewable sources.
- 1.5 The production of renewable energy and the sustainable use of resources are not the only measures available to mitigate against climate change. Energy efficiency is the efficient use of energy in order to reduce economic and environmental costs and impacts, and reduce emissions. It is the use of less energy including electricity, to perform the same function as 'conventional' energy generation.
- 1.6 Whilst the environmental benefits of sustainable energy and resources are widely documented and advocated, adapting to climate change can have many other positive benefits including economic and social benefits such as increased security and reliability of energy supply, direct job creation, expertise in manufacturing and development, educational and tourism opportunities, longer term health and quality of life and improved air, soil and water quality.
- 1.7 This background paper is a supporting document of the LDP, it sets out the detailed information, evidence and reasoning behind the sustainable energy policies and will highlight the key issues.

## **2. KEY SUSTAINABLE ENERGY & RESOURCE POLICY AND LEGISLATIVE ASSESSMENT**

### **2.1 International**

#### **2.1.1 United Nations Framework Convention on Climate Change (UNFCCC) Treaty, 1994**

The United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty produced at the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit, held in Rio de Janeiro in 1992.

The Framework Convention on Climate Change treaty was adopted in 1994 and was seen as a major step forward in tackling the problem of global warming. One of the key mechanisms of reducing greenhouse gas emissions was through the use of renewable energy sources, including the non-burning of fossil fuels.

However, the framework did not provide a legally binding commitment to reduce emissions and as greenhouse gas emissions continued to rise, it became evident that a legally binding targets would be required. Member countries of the UNFCCC began negotiations on a protocol and the Kyoto Protocol was adopted in 1997.

The United Nations Framework Convention on Climate Change hold an annual meeting to progress work and commitments on the climate change agenda. The most recent meeting was held in December 2007 in Bali. The most significant development at the Bali Conference was the approval of *The Bali Roadmap*, which creates a roadmap to secure climate future and a climate secure course for humanity.

The next major UNFCCC conference will be held in 2009 in Copenhagen. This is the last opportunity for the parties of the UNFCCC to meet at a government level before the climate agreement needs to be renewed before the 2012 deadline when the Kyoto Protocol runs out.

#### **2.1.2 Kyoto Protocol, 1997**

The Kyoto Protocol is an update of the United Nations Framework Convention on Climate Change Treaty and set mandatory emissions limits in response to the treaty.

The objective of the Kyoto Protocol is to achieve "*stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.*" (Article 2, Convention on Climate Change). Because it covers such a wide range of issues, the Kyoto Protocol is considered one of the most far reaching and sustainable environmental agreement ever reached.

The Kyoto Conference of Party (COP) was held in December 1997, each member state of the European Union that had agreed to sign up to the Kyoto treaty agreed to reduce emissions of harmful green house gases by 8% below 1990 levels by 2008 – 2012. The protocol finally came into force in February 2005.

The UK set its own targets and now has a legally binding commitment under the Kyoto Protocol to reduce emissions of greenhouse gases by 12.5% below 1990 levels over the period 2008-2012.

The Copenhagen conference in 2009 will update all the existing Kyoto treaty figures and targets.

### **2.1.3 The European Commission White Paper on Environmental Liability, February 2000**

The European Commission (EC) White Paper on Environmental Liability sets out a comprehensive strategy and action plan on renewable energy sources. Targets are set out in the paper to achieve an increase in the renewables share of the European Union's (EU) total energy supply. The white paper seeks to address and comply with the Kyoto protocol requirements and targets.

As part of the white paper a "Campaign for Take-Off" has been outlined. This includes a goal to identify 100 communities that are aiming to meet 100% of their energy needs from renewables. The campaign also aims to encourage 'renewable energy partnerships' between the EC and public and private bodies that wish to demonstrate their commitment to the campaign.

Legislative proposals are also established under the white paper, and a number of directives have been implemented as part of the renewables policy, which include;

- The Directive on the Promotion of Electricity from Renewable Sources (Renewables Directive);
- The Directive on the Promotion of the use of Biofuels for Transport
- The Directive on Energy Performance in Buildings.

### **2.1.4 Directive on the Energy Performance of Buildings, Jan 2003 (Directive 2002/91/EC)**

Buildings are major consumers of energy. Around 40% of final energy consumption in the European Community is from the buildings. EC research has indicated that by improving energy efficiency, carbon emissions from buildings could be reduced by 22%. This will help the EU to meet its climate change objectives under the Kyoto Protocol commitments.

The principle objectives of the Directive are:

- To promote the improvement of the energy performance of buildings within the EU through cost effective measures;
- To promote the convergence of building standards towards those of Member States which already have ambitious levels.

The legislation for the transposition of the Directive in the UK was laid to Parliament in March 2007. It was agreed that a phased approach to the legislation would be rolled out between April 2007 and January 2009, and will be phased in by the building sector. In the UK, Energy efficiency and saving measures are being implemented in three key areas; Air conditioning systems, boilers and energy assessment certificates.

## **2.2 National – UK**

### **2.2.1 Climate Change – The UK Programme, 2000**

The 2000 UK Climate Change Programme is the UK Government's response to the Rio Earth Summit. The document confirmed a domestic policy goal of moving towards a reduction in emissions of carbon dioxide (CO<sub>2</sub>) by 20% below 1990 levels by 2010.

The key renewable objectives in the UK programme include:

- Improve business use of energy, stimulate investment and cut costs;
- Stimulate new and more efficient use of power generation;
- Promote better energy efficiency in the domestic sector, saving householders money;
- Improve the energy efficiency requirements of the building regulations.

The Welsh Assembly Government (WAG) is committed to playing its part in developing and delivering a climate change programme which meets these targets through '*Wales: Challenging Climate, Challenging Choices – A Scoping study of climate impact in Wales*' (2000) and '*Climate Change Wales: Learning to Live Differently*' (2001).

### **2.2.2 The Draft Climate Change Bill, 2007**

The draft Climate Change Bill sets out a framework for moving the UK to a low carbon economy. It demonstrates the UK's commitment to establishing a post-2012 global emissions agreement and makes the targets set by the government legally binding.

The key component of the legislation would be to require a mandatory 60% cut in the UK's carbon emissions by 2050 (compared to 1990 levels), with an intermediate target of between 26% and 32% by 2020. These targets exclude international aviation and shipping. The climate change bill does not outline how emissions will be reduced, but it does make provisions for the government to implement policies that will help to meet its targets. A strategy document is due to be published and sit alongside the bill. This will outline how the UK can move to a low carbon economy by investing in new technologies and encouraging businesses and households to produce energy and not just consume it.



### **2.2.3 The Energy White Paper: Our Energy Future – Creating a Low Carbon Economy, 2003**

The 2003 Energy White Paper developed the UK's climate change policy by adopting a longer-term goal of putting the UK on a path to reduce CO<sub>2</sub> emissions by 60% by 2050, with real progress being made by 2020. The energy white paper recognises that with the necessary changes required to reduce carbon emissions, an opportunity exists to develop, apply and export leading-edge technologies, create new jobs and businesses and the lead the way across the world to develop environmentally sustainable, reliable and competitive energy markets.

The Energy White Paper seeks to fully integrate renewable energy into the environment and economy and ensure that growth is properly and sustainably integrated.

The main aims of the Energy White Paper are:

- To cut the UK's CO<sub>2</sub> emissions by 60% by 2050;
- To maintain the reliability of energy supplies;
- To promote competitive markets in the UK and beyond, helping to raise the rate of sustainable economic growth and improve productivity;
- To ensure that every home is adequately and affordably heated.

In spring 2006, following a review, the government published an updated UK Climate Change Programme. This has introduced additional measures that will take us close to our domestic goal and ensure that the UK can make real progress by 2020.

### **2.2.4 The Energy White Paper: Meeting the Energy Challenge, 2007**

Energy is essential in almost every aspect of our lives and for the success of our economy. The Energy White Paper identified two long-term energy challenges:

- Tackling climate change by reducing carbon dioxide emissions both within the UK and abroad; and
- Ensuring secure, clean and affordable energy as we become increasingly dependent on imported fuel.

This White Paper sets out the Government's international and domestic energy strategy in responding to these changing circumstances, addressing the long term energy challenges we face and delivering our four energy policy goals.

These include:

- Putting the UK on a path to cutting CO<sub>2</sub> emissions by some 60% by about 2050, with real progress by 2020;
- Maintaining the reliability of energy supplies;
- Promoting competitive markets in the UK and beyond;
- Ensuring that every home is adequately and affordably heated.

The paper anticipates that it will be necessary to install 30-35 GW of new electricity generation within 20 years to plug the energy gap resulting from increased demand and the expected closure of existing power plants. It also states that, based on existing policies, renewable energy is likely to contribute around 5% of the UK's consumption by 2020, rather than the 20% target set in the 2006 Energy Review.

### 2.2.5 The Energy Review, The Energy Challenge, 2006

The Government's report on the Energy Review: "*The Energy Challenge*" was released on 11 July 2006. The Energy Review aims to meet the two major long-term challenges in UK energy policy:

- The need to tackle climate change by reducing carbon dioxide emissions;
- The need to deliver secure, clean energy at affordable prices, as we move to increasing dependence on imported energy.

The Energy Review combines the aims and objectives of the review document with other independent documents, which when read in conjunction with each other serve to fulfill all the UK targets and requirements. Some of the other documents include the Renewables Obligation, Energy billing and metering, new nuclear policy framework and planning and microgeneration.

### 2.2.6 The Sustainable Energy Act, 2003

The Sustainable Energy Act makes provision for the development and promotion of sustainable energy. The Act sets a number of targets relating to energy efficiency and renewable energy generation. These are as follows:

- To generate 25 per cent of electricity from renewable sources by 2020.
- To generate 10GW of electricity by combined heat and power (CHP) by 2010.
- To improve domestic energy efficiency by 20 per cent by 2010 (based on 2002 levels).
- To reduce carbon emissions by 20 per cent by 2010 (based on 1990 levels).
- To develop policies that will reduce carbon emissions by 60 per cent by 2050.

Local authorities have a key role to play in implementing these national targets at the local level.

### 2.2.7 The Climate Change and Sustainable Energy Act 2006

The Climate Change and Sustainable Energy Act 2006 is an Act of Parliament which aims to make provision for "*the reduction of emissions of greenhouse gases, the reduction of fuel poverty, the promotion of microgeneration and the use of heat produced from renewable sources, compliance with building regulations relating to emissions of greenhouse gases and the use of fuel and*

*power, the renewables obligations relating to the generation and supply of electricity”* (House of Commons, March 2006) in the United Kingdom.

One of the key principles of the Act is to integrate action by local authorities, which is seen as critical to the achievements of the Government's climate change and energy objectives. The Government published an Energy Measures Report on 18 September 2007, which sets out the steps that local authorities can take to address climate change and fuel poverty.

The Energy Measures Report sets out the steps that local authorities can take to;

- Improve Energy Efficiency;
- Increase the levels of microgeneration and low carbon technologies;
- Reduce green house gas emissions;
- Reduce the number of households living in fuel poverty.

Local authorities will have to *‘have regard’* to the report when exercising their functions.

#### **2.2.8 The Renewables Obligations Order, 2002**

The Renewables Obligation (RO) is the Government's main mechanism for supporting the generation of renewable electricity. The Renewables Obligation requires licensed electricity suppliers to source a specific and annually increasing percentage of the electricity they supply from renewable sources. The current level is 7.9% for 2007/08 rising to 15.4% by 2015/16.

There are currently proposals to review the obligation, which includes increasing the level of the obligation to a 20% increase in electricity generation and to band the RO to provide differentiated levels of support for different technologies. The proposed changes to the renewable obligations are due to be implemented in April 2009.

#### **2.2.9 UK Sustainable Construction Strategy: Building a Better Quality of Life, A Strategy for more sustainable construction, 2008**

The UK's construction industry is vast, its outputs are worth £100bn a year, accounts for 8% of GDP and employs 2.1 million people. Yet, it is responsible for almost half of the UK's carbon emissions, half of the water consumption, a third of landfill waste and 13% of all raw materials used in the UK economy. The UK Sustainable Construction Strategy stresses that to achieve government sustainable development goals, the UK has to change the way we build (dti, 2007)

The UK Sustainable Construction Strategy has been developed within the framework of the UK Government Strategy for Sustainable Development. Four priority areas have been identified within the construction industry that will contribute to achieving the vision of the UK sustainable Construction Strategy, these are;

- Sustainable Consumption and Production;
- Climate Change and Energy;
- Natural resources and Enhancing the Environment;
- Creating Sustainable Communities.

It has also established key themes for action by the construction industry. These include:

- Design for minimum waste;
- Lean construction & minimise waste;
- Minimise energy in construction & use;
- Do not pollute;
- Preserve & enhance biodiversity;
- Conserve water resources;
- Respect people & local environment;
- Monitor & report, (i.e. use benchmarks).

The Strategy for Sustainable Construction is a joint industry and Government initiative that intends to promote leadership and behavioural change, as well as delivering benefits to both the construction industry and the wider economy.

#### **2.2.10 Code for Sustainable Homes, December 2006**

The Code for Sustainable Homes has been developed to enable a change in sustainable building practice for new homes. It has been prepared by the UK Government in consultation with the Building Research Establishment (BRE) and Construction Industry Research and Information Association (CIRIA). The code is a means of driving continuous improvement, greater innovation and exemplary achievement in sustainable home building.

The Code is intended to provide a single national standard to guide industry in the design and construction of sustainable homes. The code measures the sustainability of a home against design categories including; energy, CO<sub>2</sub> emissions, water, materials, surface water run-off, waste, pollution and management and ecology. Homes are rated by their sustainability performance on a scale of 1 – 6 star rating (1 being the least sustainable and 6 being the most sustainable).

The Welsh Assembly Government aspire to meet the equivalent of level 5 of the code by 2011, meaning that homes will emit zero carbon in relation to building regulations (i.e. zero emissions from heating, hot water, ventilation and lighting).

The code for sustainable homes came into effect on the 1<sup>st</sup> April 2008. From this point onwards housing associations will need to reduce carbon emissions by 25% on all new homes built, with private developers given a further two years to achieve the cut.

### 2.2.11 The Stern Review: The Economics of Climate Change

The Stern Review is an independent review commissioned by the Chancellor of the Exchequer and completed by Sir Nicholas Stern, the former chief economist of the World Bank on behalf of the UK Government. The Stern report assessed the evidence on the impacts of climate change on the world economy and considered the policy challenges involved in managing “*the transition to a low-carbon economy and in ensuring that societies can adapt to the consequences of climate change that can no longer be avoided.*” (Executive Summary, Stern Report, Oct 2006).

The review states that “ *The scientific evidence is now overwhelming: climate change presents very serious global risks, and it demands an urgent global response.*” Climate change will affect the basic elements of life for people around the world – access to water, food production, health and the environment. Hundreds of millions of people could suffer hunger, water shortages and coastal flooding as the world warms.

In economic terms, the review estimates that if we don't act, the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP per year. This figure could rise to 20% or more if a wider range of risks and impacts are taken into account. In contrast, the costs of acting now and reducing green house gases to avoid the worst impacts could be limited to 1% of global GDP each year.

In summary, the Stern review concludes that the investments that take place to adapt to and mitigate against climate change in the next 10-20 years will be the most necessary. This investment will have a profound impact upon the climate of the second half of the century and beyond and will prevent major disruption to economic, social and environmental activity. Without this immediate investment it will be difficult to reverse these changes.

The Governments response to the Stern review included;

- Set a new target to reduce carbon emissions by 30% by 2020 and 60% by 2050.
- Pass a bill to enshrine carbon reduction targets and create a new independent body to monitor progress
- Create a new commission to spearhead British company investment in green technology, with the aim of creating 100,000 new jobs
- Reduce consumer demand for heavily polluting goods and services
- Make global energy supply more efficient
- Act on non-energy emissions – preventing further deforestation for example, would go a long way towards alleviating this source of carbon emission
- Promote cleaner energy and transport technology, with non-fossil fuels accounting for 60% of energy output by 2050.

## 2.3 National – Wales

The Welsh Assembly Government is committed to developing a sustainable future for Wales and a key element of this, is the distinctive duty to promote sustainable development in all its work. Sustainable energy and use of resources is one of the key drivers to deliver sustainable development. WAG has set a target to generate 7terrawatt hours of energy from renewable sources by 2020.

### 2.3.1 **Government of Wales Act, 2006**

The Government of Wales Act 2006, places a duty on the Welsh Assembly Government to promote sustainable development in all its functions. This duty includes the a commitment to reducing green house gas emissions, ensuring effective adaptation to climate change including the promotion and effective implementation of sustainable energy supplies and the sustainable use of existing resources.

The Act does not set targets or specific commitments, it simply sets out the requirements that need to be transposed into Welsh legislation and guidance.

### 2.3.2 **Wales Spatial Plan, 2004 (WSP, 2004)**

*The Wales Spatial Plan “aims to ensure the Welsh Assembly Government’s policies and programmes come together effectively with the workings of local government, business and other partners across Wales, to enable a truly sustainable future”*

The WSP identifies climate change, in particular, presents an enormous challenge. Wales CO<sub>2</sub> emissions are currently running at roughly double the capacity of our natural environment to absorb them. Energy consumption in Wales is not in decline and the amount of energy Wales’ generates from fossil fuel is still low.

The WSP map illustrates that amongst many things, parts of Wales are already at risk from increased flooding and severe weather event are set to increase. However, Wales has the wind and tidal resources to make a major contribution to producing renewable energy and reducing the emissions of greenhouse gases.

The objectives of the Wales Spatial Plan in respect of renewable and sustainable energy include:

- Managing the environment comprehensively with respect to its distinctive characteristics, so that it contributes to sustainable development, including maintaining soil carbon;
- Reduce Wales’ contribution to climate change by, for example, increasing its share of renewable energy in those areas best suited to provide it and by increasing energy efficiency in industry, housing and transport, as well as protecting carbon sinks;
- Work now to help the environment, economy and society adapt to climate change’s potential impacts, including flood risk;

- Develop sustainable demonstration projects to promote best practice in delivering economic as well as environmental and social benefits.

Local Planning Authorities are statutorily obliged to take into account the Wales Spatial Plan and to translate the requirements into the development plan.

### **2.3.3 People, Places, Futures: Wales Spatial Plan, 2008 Consultation Document**

The revised Wales Spatial Plan sets a vision for how each part of Wales should develop economically, socially and environmentally over the next 20 years and will guide the way the Assembly Government spends its money over the coming years. The document is currently in consultation form.

The updated Wales Spatial Plan (dWSP) has highlighted that since the publication of the Wales Spatial Plan in 2004, one issue has become ever more prominent – Climate Change. The increasing importance of adapting to and mitigating against climate change is critical and taking the long term view of the impacts on all aspects of Wales including the economy, society and the environment, and the prevention of further damage through carbon emissions reductions is vital.

Achieving the reduction in greenhouse gas emission that is required means rethinking where and how we live, work and move around, and how we produce and consume the energy required for this. Adapting to climate change can also have a positive impact on a wide range of other objectives, such as improving air quality, soil protection, provision of open space and improve the quality of the local environment for communities.

The Draft WSP has highlighted a number of actions and objectives in order to achieve the reductions in harmful emissions. These include:

- Using the BREEAM Excellent (or equivalent) and aspirations for zero carbon developments;
- Use new technologies and new ways of working to contribute positively to sustainable growth;
- Meet obligations with regard to reducing Wales reliance on environmentally damaging energy sources;
- Improve Wales carbon footprint through a combination of achieving self-sufficiency in low carbon electricity, through exploiting our natural, renewable resources and reducing heat demand dramatically through rapidly increasing the energy efficiency of our buildings, both old and new;
- Increasing the energy efficiency of all sectors;
- Promoting the use of micro-generation of energy in buildings and communities through Wales;
- Moving forward with a 'Green Job' strategy for Wales;

The Draft WSP has identified the following outcomes and actions in relation to sustainable energy and resources;

- Aspiration for all new buildings constructed in Wales from 2011 onwards to be built to zero carbon standards;

- From 2011 onwards, Wales will achieve a 3% annual reduction in Wales greenhouse gas emissions;
- By 2020, Wales will help meet the UK's contribution to the EU target of 20% of energy requirements (electricity, heat and vehicle fuels) coming from renewable sources;
- Publish a biomass strategy/action plan which explores bioenergy opportunities in the Welsh context. This will also cover the important issue of how to ensure that biomass energy fuel stocks used in Wales, including imports;
- The encouragement of community owned wind developments;
- To achieve a target of BREEAM excellent or equivalent in all new developments.

Caerphilly County Borough falls within the *South East – The Capital Network*, as defined by the WSP. The Capital Network is classified as “Low Carbon City Region” that must reduce its resource use, energy and travel footprint. It must increase opportunities for Combined Heat and Power Systems using renewable energy where possible, make new housing meet the highest energy standards of energy efficiency and take into account the impact of climate change and ways to address the challenges it presents including the use of opportunities to be served by local energy facilities. The Capital Network needs to develop a stronger presence in renewable energy, recycling and waste, with the priority for the South East Area will be to face up to the profound effects of climate change, from land use to sustainable energy.

#### **2.3.4 Planning Policy Wales, 2002**

Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Assembly Government (WAG). PPW is national planning policy and local government is obliged to take it into account when preparing development plans.

The key policy objectives of PPW relating to renewable energy and energy efficiency include;

- Promote resource-efficient settlement patterns that minimise land-take (para 2.3.2);
- Contribute to climate protection by encouraging land uses that result in reduced emissions of greenhouse gases, in particular energy-efficient development, and promoting the use of energy from renewable sources (para 2.3.2);
- Minimise the use of non-renewable resources, and, where it is judged necessary to use them, maximise efficiencies in their use. The use of renewable resources and of sustainably-produced materials from local sources should be encouraged (para 2.3.2);
- Promote a greener economy and social enterprises (para 2.3.2);
- Contribute to the protection and, where possible, the improvement of people's health and well being as a core component of sustainable development (para 2.3.2).



When preparing the LDP, PPW requires local planning authorities to:

- Undertake an assessment of the potential of all renewable energy resources;
- Assess the potential of renewable energy technologies;
- Assess the potential of energy efficiency and conservation measures;
- Seek opportunities to integrate energy efficiency and conservation objectives into the planning and design of new development;
- Indicate broad locations or specific areas where wind energy developments are likely to be permitted.

Planning Policy Wales requires Local Planning Authorities to “*facilitate the development of all forms of renewable energy and energy efficiency and conservation measures where they are environmentally and socially acceptable.*” (para 12.8.9). Local Planning Authorities should make a positive provision for the such development to meet society’s needs now and in the future by considering the contribution the authority can make towards developing renewable energy and energy efficiency through the LDP, recognise the environmental, economic and social opportunities that the use of renewable energy resources can make to wider planning to wider planning goals and the contribution the authority can make to the national and international renewable and climate change targets, policy and obligations.

### **2.3.5 Technical Advice Note (Wales) 8: Renewable Energy, 2005**

*Technical Advice Note 8 (TAN8)* provides technical advice to supplement the policy set out in *PPW*. *TAN8* relates to the land use planning considerations of renewable energy, however UK and national energy policy provide its context. *TAN 8* should be viewed in conjunction with *PPW* and *MIPPS: Planning for Climate Change*.

The Assembly Government has a target of 4TWh of electricity per annum to be produced by renewable energy by 2010 and 7TWh by 2020. Delivering these targets through the planning system is therefore at the core of this TAN. The TAN covers a number of potential renewable technologies. Local planning authorities should develop appropriate policies so that they put in place a comprehensive framework for renewable energy production.

As well as developing new sources of renewable energy, which are essential to meeting the targets set by energy policy, the Assembly Government is fully committed to promoting energy efficiency and energy conservation.

TAN8 considers the land use planning system one of the mechanisms that can help deliver improved energy efficiency. Local planning authorities are expected to consider matters of energy efficiency when considering planning policy and applications.

### **2.3.6 Technical Advice Note12: Design, 2000**

*Technical Advice Note 12: Design (TAN12)* provides technical advice to supplement the policy set out in *PPW* in respect of design. *TAN12* relates to the

land use planning considerations of design, however UK and national policy provide its context. *TAN 12* should be viewed in conjunction with *PPW*.

The Welsh Assembly Government is committed to achieving good design in all development at every scale throughout Wales. *TAN12* provides more detailed advice on how this may be facilitated within the planning system. The use of energy and natural resources is considered to be integral to design and as such, *TAN 12* addresses this issue.

*TAN 12* recognises that local authorities can influence:

- Resource efficient site layout and building design which incorporates energy efficient features;
- Changes in site layout such as building orientation, location on slope and planting can reduce significantly the energy requirements of a typical dwelling through the free ambient sources created by passive solar gain and microclimate improvements.
- Design for solar heating, with respect to sunlight and shelter from prevailing winds, and use of landscaping.
- Use of landform and planting to provide shelterbelts and improve energy conservation and use of building form and layout to minimise wind tunneling and eddying.
- Resource efficient buildings which include fenestration, water collection, floor plan layout, natural ventilation, waste collection facilities, sustainable materials and construction methods.

During the preparation of the LDP, design issues should be considered, although Supplementary Planning Guidance (SPG) is often considered to be the more appropriate mechanism for dealing with these issues.

### **2.3.7 Ministerial Interim Planning Policy Statement 01/2005 – Planning for Renewable Energy**

In 2005, a Ministerial Interim Planning Policy Statement (MIPPS) revising sections 12.8 – 12.10 of Planning Policy Wales was issued. It should be read in conjunction with *TAN 8: Renewable Energy* and *Tan 12: Design*.

The Assembly Government's aim is to secure an appropriate mix of energy provision for Wales, whilst minimising the impact on the environment. This will be achieved in part by strengthening renewable energy production, and through a greater focus on energy efficiency and conservation. (para 12.8.4).

It is considered that in order for Wales to meet its 2010 renewable energy targets, 800MW of renewables capacity should be provided from strategic onshore wind energy development – mostly in the form of a small number of large wind farms (*Joint Ministerial Assembly Government Energy Statement, July 2004*). The focus on wind farms is generated from Wales' abundant onshore wind resource and the fact that onshore wind power is the most viable commercial technology available that will provide a high degree of certainty of meeting the 2010 target.

Local planning authorities should facilitate the development of all forms of renewable energy and energy efficiency and conservation measures, which fit within a sustainable development framework. Specifically, they should make positive provision for such development to meet society's needs now and in the future by:

- Considering the contribution that their authority area can make towards developing and facilitating renewable energy and energy efficiency and conservation, and ensuring that development plan policies enable this contribution to be delivered;
- Ensuring that development control decisions are consistent with national and international climate change obligations, including contribution to renewable energy targets, having regard to emerging national and international policy on the levels of renewable energy required and on appropriate technologies; and
- Recognising the environmental, economic and social opportunities that the use of renewable energy resources can make to wider planning goals and objectives and the delivery of renewable energy targets.

At the same time local planning authorities should:

- Ensure that international and national statutory obligations to protect designated areas, species and habitats and the historic environment are protected from inappropriate development; and
- Ensure that any potential detrimental effects on local communities are minimised.

### **2.3.8 Ministerial Interim Planning Policy Statement on Climate Change, Dec 2006**

Climate change is one of the most critical challenges currently facing the world. Consorted action is required across the globe and the Welsh Assembly Government recognise the part that they must play. The Ministerial Interim Planning Policy Statement on Climate Change (Climate Change MIPPS) provides a commitment from the Assembly Government to reduce emissions of the greenhouse gases that cause climate change, and to plan for and respond to the change that is already underway.

Climate change presents not only risks to people, property, infrastructure and resources, but also presents opportunities. The climate change MIPPS highlights the significant role the planning system has to play in delivering the mitigation and adaptation measures required.

The climate change MIPPS recommends the inclusion of the following bullet points to paragraph 12.1.4 in PPW;

- *To ensure every opportunity is taken to use energy efficient, low carbon supply measures to meet demand. Major development is expected to incorporate decentralised heating, cooling and power (CHP) networks, preferably powered by renewable energy sources, or to connect to existing CHP (and CCHP) or communal/ district heating networks;*
- *To ensure every opportunity is taken to maximise the provision of renewable energy generation from micro generation equipment in new*

*and existing development, including allowing for future inclusion as part of the design of buildings where it is not being incorporated.*

Local Authorities, when preparing the LDP, should provide policies that will provide a clear framework for the objectives as set out in the climate change MIPPS, in order to facilitate and implement national policy objectives.

### **2.3.9 Environment Strategy for Wales, 2006**

*The Environment Strategy for Wales (ESW)* is the Assembly Government's long-term strategy for the environment of Wales and sets the strategic direction for the next 20 years. The purpose of the strategy is to provide the framework within which to achieve an environment that is clean, healthy, biologically diverse and valued by the people of Wales.

The ESW is supported by an annual Action Plan, which contains details of specific and additional actions that will be taken during its year life span to delivering the outcomes set out in the ESW.

The Environment Strategy requires local authorities to interpret it for the regional and local level, with development plans playing a key role in helping to deliver the outcomes.

### **2.3.10 The Welsh Declaration on Climate Change and Energy Efficiency, November 2005**

In November 2005, *The Welsh Declaration on Climate Change and Energy Efficiency* was put forward by the Assembly Government and Welsh Local Government Association (WLGA) as a way of local authorities to signal their intent on mitigating against climate change.

The declaration was signed by local authorities in Wales and includes commitments to:

- Reduce emissions through green energy sources;
- Energy efficiency of all council buildings;
- Encourage local residents and businesses to take action to reduce emissions of greenhouse gases and where appropriate publicise their actions;
- Work with key building operators e.g. health authorities, businesses and development bodies to seek ways to adapt to potential effects of climate change on our communities;
- Encourage the development of practical, economically viable, sustainable energy;
- Encourage production of combined heat and electricity from these sources e.g. bio-mass;
- Encourage local manufacture of energy efficient equipment for producing heat & power;
- Monitor the progress of our plan against the actions needed and publish the results.

Caerphilly County Borough signed up to the declaration on 7<sup>th</sup> April 2006.

### **2.3.11 Shaping the Way We Work, Live & Play: Practical Guidance on delivering sustainable development through the planning system, May 2007**

Shaping the Way We Work, Live & Play is practical guidance to assist local planning authorities in Wales in successfully promoting and implementing sustainable development through the statutory planning system. The guidance was produced by the Welsh Local Government Association (WLGA).

The key sustainable energy objectives of the guidance is to *“To reduce the demand for energy from any source through designing and constructing energy efficient buildings, and to increase the percentage of energy generated from renewable sources”*.

The key sustainable resource objective of the guidance is to *“To encourage developers to use locally produced and/ or sustainably sourced materials in the construction of developments, their settings and boundaries, and to minimise the impact of the build process in the environment”*

The sustainable water objective of the guidance is *“To reduce the demand for potable water through increased efficiency, rainwater harvesting and water re-use, and to ensure that new developments do not increase the risk of flooding elsewhere through their water run-off.”*

The guidance also offers advice on what the planning system can do to address sustainable energy and resource issues within development plans, including:

- Steer development towards sites which can take advantage of free, passive energy, and make sure developers have incorporated these energy sources;
- Encourage developers to suggest sites for development where energy efficiency and on-site energy generation are particularly appropriate;
- Require energy efficient buildings to reduce overall energy demand;
- Encourage the development of neighborhood heating/ combined heat and power for more efficient energy delivery;
- Set renewable targets for all buildings, and require buildings to be designed so that occupiers can easily fit renewable technologies if they wish;
- Ensure that building occupiers know how energy efficiency and renewable energy features work, and that they will be maintained, so that the building can perform as designed – and as permitted;
- Avoid siting development where there would be a negative overall impact on existing hydrological processes;
- Ensure developments are designed to minimise water demand;
- Make sure provision is made for rainwater collection and grey water recycling;
- Require the use of Sustainable Urban Drainage Systems (SUDS);

When preparing the LDP and formulating policies, the guidance suggests that Local Planning Authorities may wish to consider:

- Incremental increases in the renewable energy target across the lifetime of the plan, particularly for larger developments where renewable technologies can serve a number of buildings;
- A reduction in carbon emissions from heating, lighting and power;
- New technologies such as hydrogen fuel cells are likely to become available during the lifetime of the plan and policies should reflect this and encourage their use where appropriate;
- Setting lower targets for per capita portable water consumption in areas and encourage the use of grey water recycling;
- A requirement for minimum percentages of recycled and/or reused construction materials to be included in new developments.

### **2.3.12 Renewable Energy Route Map for Wales, February 2008**

The Welsh Assembly Government Renewable Energy Route Map seeks to address and fulfill the commitments of climate change and to provide clean energy and energy efficiency. The route map sets out specific actions on how the Assembly Government can meet the renewable electricity self-sufficiency objective, how biomass resources could be used for significant renewable heat production, and how we can support energy efficiency and small-scale micro-generation ambitions.

Actions for renewable sources and energy efficiency include;

- Support the development of community heat and power units (biomass);
- Ensure an effective micro-generation equipment supply and fitting sector and skill base;
- Support community engagement through an energy from waste toolkit for use by local authorities when considering applications for developments;
- Explore the scope for enabling more in-river local hydropower schemes;
- Ensure all new buildings in Wales are built to the highest possible low carbon standards, with the aim for all new buildings to be zero carbon by 2011;
- Support community sized wind, biomass and hydroelectric schemes.

## **2.4 Regional - South East Wales**

### **2.4.1 “Turning Heads..” The Heads of the Valleys Strategy, 2006**

The Minister for Enterprise, Innovation and Networks, Andrew Davies AM, launched the Heads of the Valleys Strategy in June 2006 to help tackle the issues faced by the Heads of the Valleys communities.

£140 million extra was committed to the area over the next 15 years to regenerate the whole area. As part of this regeneration the improvement to the social housing stock that would involve improved energy efficiency, the

incorporation of microgeneration and the use of larger community based renewable energy technology and schemes.

The potential to locate renewable energy based businesses in these areas is also considered an option to regenerate the area and improve the renewable energy supply in the area.

## **2.5 Local – Caerphilly County Borough**

As a corporate document, the Local Development Plan must have regard to other strategies produced by the Council in order to ensure consistency. The relevant guidance issued in relation to the topic area of sustainable energy is set out below.

### **2.5.1 Community Strategy, November 2004**

The community strategy aims to improve the quality of life for the population of the County Borough by reviewing the current position, identifying a vision for the future and focusing on how this will be achieved and monitored. It identifies objectives that all organisations and communities need to work towards and will have clear links to the Local Development Plan.

The Community Strategy has four main themes: Living Environment, Regeneration, Education for Life and Health, Social Care and Well-Being. The topic area of sustainable energy directly links to many of the identified objectives for these themes, in particular;

- Encourage the development and maintenance of high quality, well designed and efficient, sustainable homes and environments which can meet all needs (Living Environment);
- Ensure the protection and enhancement of the natural environment, including the quality of the air and river/ watercourses, flood prevention, landscape and biodiversity, and our built heritage (Living Environment);
- Improve energy, waste and water efficiency and promote environmentally acceptable renewable energy to reduce fuel poverty, maintain a cleaner environment and help reduce global warming (Living Environment);
- Address pollution and encourage waste minimisation, reuse and recycling of resources (Education for Life);
- Develop and promote business advice and support systems to encourage innovative, sustainable and legitimate business practice including local purchasing initiatives (Regeneration);
- Improve public health by promoting factors that contribute to healthy lifestyles and well being (Health, Social Care and Well-Being).

### 3. KEY ISSUES FOR CAERPHILLY COUNTY BOROUGH

A Local Development Plan Vision Statement has been produced for the Local Development Plan, which states:

*“The Development strategy for the Local Development Plan will capitalise on the strategic location of Caerphilly County Borough at the centre of the Capital Network region. It will ensure that the needs of all the County Borough’s residents and visitors are met and that the regeneration of our towns, villages and employment centres and the surrounding countryside is delivered in a well-balanced and sustainable manner that reflects the specific role and function of individual settlements”.*

In order to achieve the vision, the LDP outlines a series of key objectives that should be considered when preparing policies. The following are all relevant to the sustainable energy topic:

- Ensure the effective and efficient use of natural and built resources while preventing the unnecessary sterilisation of finite resources through inappropriate development (Objective 3).
- Ensure that the environmental impact of all new developments is minimised in order to ensure air quality improves (Objective 4);
- Improve energy, waste and water efficiency while promoting environmentally acceptable renewable to maintain a cleaner environment and help to reduce our impact on climate change (Objective 5);
- Encourage waste management based on a hierarchy of re-use, recovery (including material recycling, energy recovery and composting) and safe disposal (Objective 6);
- Manage, protect and enhance the quality and quantity of the water environment and reduce water consumption (Objective 14).

As part of the LDP preparation, a review of environmental data available for issue affecting Caerphilly County Borough was undertaken, along with key issue identification being undertaken through stakeholder participation workshops.

The following are some of the key land use issues raised in relation to the sustainable energy and resources:

- Sustainability issues should be considered such as energy efficiency in new business development;
- New housing should be energy efficient, should be specified in the LDP;
- Adapting new and existing homes to accommodate recycling and energy efficiency measures

The LDP preferred strategy identifies eight themes that were identified and considered by the stakeholders as the key components of the Local Development Plan. The relevant renewable energy themes are:

- Promote resource efficient settlement patterns;
- Promote a balanced approach to managing future growth;
- Reduce the impact of development on the countryside;
- Development targeted to reflect the role and function of individual settlements.

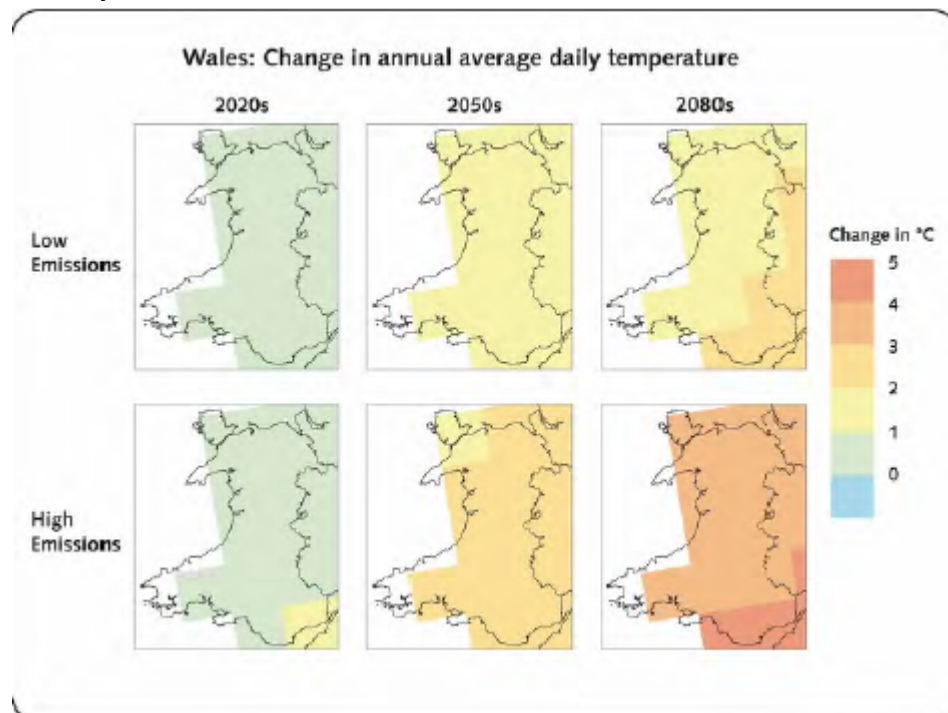


## 4. CLIMATE CHANGE

### 4.1 The Context

Some changes to the climate are inevitable and natural. Changes in the climate have been naturally occurring for thousands of years. Other changes however, have occurred more quickly and this has been attributed to human activity, particularly as a result of the industrial revolution in the developed world. The main human influence on global climate is emissions of the key greenhouse gases - carbon dioxide (CO<sub>2</sub>), methane and nitrous oxide. The gases present in the atmosphere act like an insulating 'blanket', trapping the energy within our atmosphere and warming the earth. This 'blanket' is getting thicker, which in turn has raised the earth's temperature and changed the climate, now more commonly known as the 'green house effect' or more generically 'Climate Change'.

The accumulation of these gases in the atmosphere strengthens the greenhouse effect. At present, just over 7 billion tonnes of CO<sub>2</sub> is emitted globally each year through fossil fuel use, and an additional 1.6 billion tonnes are emitted by land use change, largely by deforestation. The concentrations of these gases in the atmosphere have now reached levels unprecedented for tens of thousands of years. In the UK the average annual temperature rose by 0.5°C during the 20th Century.



Source: Wales Spatial Plan, 2008

Wales' industrial sector contribute 51% of all CO<sub>2</sub> emissions. In 2005, the energy sector as a whole, including energy production, road transport, construction and business and residential buildings account for 82.9% of all greenhouse gas emissions in Wales (AEA, Aug 2007). Emissions from electricity generation in

Wales have risen by 24.8% compared to an increase of 15.6% in the UK (AEA, 2007).

Combustion emissions from Manufacturing and Construction account for 24.1% of the Welsh CO<sub>2</sub> total, compared to 15.3% for the UK (AEA, 2007). Combustion emissions from the domestic sector account for 10.8% of the Welsh total for 2005.

Road transport emissions account for 12% of Welsh greenhouse gas emissions, with an increase of 9.3% emissions between 1990 base levels and 2005.

Agriculture accounts for 11% of all greenhouse gas emissions in Wales, with the majority of this coming from Methane (60% ) and N<sub>2</sub>O (82%).

These changes in our climate will lead to fundamental changes to not only our natural environment effecting our landscape, habitats and wildlife, but also to our built environment and to our tourism and recreation businesses and activities.

As pressure grows to set up green energy schemes such as wind farms, hydroelectric schemes and biofuel plantations to adapt and mitigate against the effects of climate change, so additional changes to our built and natural environment, our economy and our communities will be evident.

Planning systems need to recognise all these pressures in order to manage, plan and take the necessary steps required to effectively adapt to a changing climate. It is however, important to remember that the vast majority of these changes required will actually benefit the economy, the health and well being of communities and our natural environment, contrary to the misapprehension that adapting to and mitigating against climate change will be costly, inconvenient and a measure that is "too late".

## **4.2 The Impacts**

Climate change predictions suggest that by 2080 Wales will be on average 1.1 °C to 2.9°C warmer. Over the next few years, Wales can expect:

- A hotter average temperature generally;
- Hotter, drier summers;
- Milder winters with less snow;
- More rain falling in the winter;
- Heavier rain and storms;
- Rising sea levels.

These changes will affect us in lots of different ways, including;

- More storms and heavy rain will mean a greater risk of flooding and river and coastal erosion, which may cause damage to buildings and disruption to transport, and other services as well as rising insurance costs and additional pressure on sewer systems;

- Longer, drier summers will put increased pressure on our water supply at certain times of the year;
- It will be more difficult to keep buildings cool in the summer, resulting in more air conditioning units and increased generation of greenhouse gas emissions and heat related health problems with the possibilities of associated deaths;
- Wales' natural environment will also be affected. The changing climate will affect the landscape and range of plants and animals that live in Wales;
- Significant decrease in soil moisture content and poorer crop harvests due to wet summers costing farmers an estimated £500m in drying costs in 2004 (Farmers Guardian, 8<sup>th</sup> October 2004) and a further £180m in net losses as a result of the 1995 weather anomalies (Climatic Research Unit, University of Anglia 1995).

However, with the threats of climate change come opportunities. These include a longer agricultural growing season and potential for agricultural diversification reducing our reliance on importing food, reduced demand for winter heating and less cold related weather illness and fuel poverty. Retailers have reported a 6% rise in sales of seasonal goods such as garden furniture when summers are hot and dry. (UK Climate Impacts Programme, June 2005)

#### 4.3 Mitigation and Adaptation

Changes in our climate will lead to fundamental changes to not only our natural environment effecting our landscape, habitats and wildlife, but also to our built environment, to our communities and to Wales economy. As pressure grows to set up green energy schemes such as wind farms, hydroelectric schemes and biofuel plantations to adapt and mitigate against the effects of climate change, so additional changes to our built and natural environment, our economy and our communities will be evident. Planning systems need to recognise all these pressures in order to manage, plan and take the necessary steps required to effectively adapt to and mitigate against a changing climate.

It is important to remember that the vast majority of these changes will actually benefit the economy, the health and well being of communities and our natural environment, contrary to the misapprehension that adapting to and mitigating against climate change will be costly, inconvenient and a measure that is "too late".

*The Wales Spatial Plan, 2004* recognises that climate change presents an enormous challenge. Wales' CO<sub>2</sub> emissions are currently running at roughly double the capacity of our natural environment to absorb them. Our energy consumption is not in decline and the amount of energy we generate from non-fossil fuels is low.

The key objectives of the Wales Spatial Plan in relation to climate change are;

- Reduce Wales' contribution to climate change by, for example, increasing its share of renewable energy in those areas best suited to provide it and by increasing energy efficiency in industry, housing and transport, as well as by protecting existing carbon sinks

- Work now to help the environment, economy and society adapt to climate change's potential impacts, including flood risk
- Promote the efficient management and use of resources for the benefit of business, local communities and the environment.
- Work to achieve reliable routes by land, sea and air, and high speed internet necessary for our trade with the UK, mainland Europe and internationally, whilst meeting our commitments for CO<sub>2</sub> reductions.
- Tackle existing infrastructure constraints, supporting the sustainable futures of communities by investing in out infrastructure: In water, sewage, waste and energy for example.

## 5. Renewable/ Sustainable Energy Technologies

Renewable energy utilises natural resources such as sunlight, wind, tides and geothermal heat, which are naturally replenished. Renewable energy technologies include wind and solar power, hydro, geothermal, combined heat and power, biomass and energy from waste. It is though that between them, wind, wave and tidal power could deliver more than twice as much electricity than the new fleet of nuclear reactors being debated - and the renewables would be built more quickly (British Energy) and with considerably less short term and long term environmental damage.

The full potential of renewable sources in Caerphilly County Borough has not yet been identified or tapped into. Planning Policy Wales requires local planning authorities, when preparing development plans to undertake an *“assessment of all renewable energy resources and the potential for renewable energy technologies...and include detailed policies in their UDPs”* (para 12.9.1). Currently no initial or detailed assessment work of this nature has been undertaken for Caerphilly County Borough. However, assessment work will be undertaken to inform the first review of the plan. The assessment work will take into account the contribution that can be made by the area towards climate change and renewable targets, and recognise the different approaches that will be appropriate for the deployment of different renewable technologies as required by planning policy Wales (PPW, para 12.9.2).

The following describes the main stream renewable energy technologies and the potential for their integration within the development plan and within the Caerphilly County Borough context.

### 5.1 Wind

- 5.1.1 Wind has been harnessed for centuries to generate power and more recently for generating electricity. Wind power is a renewable source of energy that has great potential in both onshore and offshore locations. Wind power is currently considered as one of the cleanest and safest forms of renewable energy production.
- 5.1.2 Every unit (kWh) of electricity produced by the wind displaces a unit of electricity. This is a generally accepted fact used by many organisations including the government in their environmental calculations. A typical turbine generates 4.7 million units of electricity each year, which is sufficient to meet the average

annual electricity needs of 1,000 homes, to make 170 million cups of tea, to run a computer for 1,620 years, to prevent the emission of 4,000 tonnes of the greenhouse gas carbon dioxide, which is equivalent to taking 1,333 cars off the road (POST, Oct 2006).

- 5.1.3 There is a UK commitment to provide 10% of renewable energy from wind power by 2010 with a target of 20% by 2020 (SDC, May 2005). Currently, only 1% of renewable energy in the UK is produced by wind energy (BWEA, Oct 2005). However, within the European context, the UK is considered to have the largest wind resource, with the ability to produce 40% of Europe's total wind energy (Institute of Energy and Sustainable Development).
- 5.1.4 In Wales, no new onshore wind power has been commissioned since June 2006 meaning that Wales is now 75% behind the 2010 renewable schedule and target. However, Technical Advice Note 8: Renewable Energy (TAN8) highlights the role that onshore wind power has to play by recognising it as offering *"the greatest potential for an increase in the generation of electricity from renewable energy in the short to medium term"* (para 2.2).
- 5.1.5 Strategic Search Areas (SSAs) are specifically defined areas, that have been identified by the Welsh Assembly Government, that are considered the most suited to large scale wind farm development. Caerphilly County Borough does not currently have any SSAs. TAN 8 states *"Most areas outside of SSAs should remain free of large wind power schemes."* (para 2.12).
- 5.1.6 The potential for the development of wind power within urban/ industrial brownfield sites is currently unexplored (para 2.11), and smaller community based wind farm schemes are also untapped. TAN 8 recommends that Local Planning Authorities give careful consideration to these issues and provide criteria that are appropriate to local circumstances.
- 5.1.7 Wind power projects and schemes arouse strong opinions. A high level of national support for wind power is often contrasted against local opposition. This poses a difficult dilemma for local councils, planners and members who have to balance the wider environmental need against local concerns. In planning terms, when locating wind power schemes it is important to balance the scale and contribution of the development (in terms of total amount of renewable energy provided) against the impact on the immediate and surrounding environment.
- 5.1.8 When preparing the Local Development Plan, Planning Policy Wales requires the LPA to indicate broad locations or specific areas where wind energy developments may be likely to be permitted (para 12.9.4).
- 5.1.9 When preparing policies for the Local Development Plan, the advice of Technical Advice Note 8: Renewable Energy (2005) should be taken account of, which requires Local Development Plans to *"promote high standards of energy efficiency, energy conservation and the use of renewable energy as part of the national and international response to climate change"*. Local Authorities are required to *"consider the local availability of renewable energy resources and develop suitable policies that promote their implementation...and the specific*

*requirements of individual renewable energy technologies...which are likely to come forward during the plan period'* (Para 5.2).

- 5.1.10 Caerphilly County Borough has no strategic search areas or areas identified for large-scale wind farm developments. The production of wind power is essential to fulfilling International and national commitments and targets. As there is no local targets specifically for Caerphilly County Borough in relation to wind energy generation, a generic strategic local development plan policy that directly relates to renewable energy production at the local level, specifically as a requirement of new development, will be included within the plan.

## **5.2 Solar**

- 5.2.1 Solar energy is energy from the Sun. This energy drives climate and weather and supports virtually all life on Earth. Heat and light from the sun, along with solar-based resources such as wind and wave power, hydroelectricity and biomass, account for over 99.9 percent of the available flow of renewable energy. There are many technologies for harnessing solar energy including passive solar heating, solar water heating and solar photovoltaic (PV).
- 5.2.2 Solar water heating uses specially designed tubes filled with water and then fitted to the outside of the building to heat water. The use of this technology provides free hot water from the sun's energy and works independently of any grid based energy supply, meaning that fossil energy can be saved and emissions are reduced.
- 5.2.3 Solar photovoltaic cells convert UV light into electricity by fitting cells to the outside of buildings and harvesting the sun's energy. This technology is pollution free and can be generated anywhere as long as there is access to sunlight, it is a silent technology and requires no additional land as it is attached to a host building.
- 5.2.4 Passive solar systems use non-mechanical techniques to control the capture of sunlight and distribute this energy into usable outputs such as heating, lighting, cooling or ventilation. Passive solar design takes maximum advantage of sunlight and can significantly reduce the overall energy consumption of a building. Passive solar gain techniques include selecting materials with favourable thermal properties to absorb and retain energy, designing spaces that naturally circulate air to transfer energy and positioning a building to enhance energy capture.
- 5.2.4 Technical Advice Note 8 states that where there are no constraints associated with the site, historic buildings are conservation areas for example, *"appropriately designed solar thermal and PV systems should be supported"* (para 3.15). TAN8 goes on to confirm that *"Housing of all types is appropriate for the utilisation of solar water heating"* and local design guides and supplementary planning guidance should not only encourage solar water heating, but also incorporate appropriate advice.
- 5.2.5 When preparing policies for the Local Development Plan, the advice of Technical Advice Note 8: Renewable Energy (2005) should be taken account of, which requires Local Development Plans to *"promote high standards of energy*

*efficiency, energy conservation and the use of renewable energy as part of the national and international response to climate change*". Local Authorities are required to "*consider the local availability of renewable energy resources and develop suitable policies that promote their implementation...and the specific requirements of individual renewable energy technologies...which are likely to come forward during the plan period*" (Para 5.2).

- 5.2.6 Caerphilly County Borough has no local targets specifically in relation to solar energy generation, a generic strategic local development plan policy that directly relates to renewable energy production at the local level, specifically as a requirement of new development, will be included within the plan to address this issue.

### **5.3 Biomass**

- 5.3.1 Energy from biomass is produced from organic matter and usually consists of matter such as woods, grasses, agricultural crops, and biological or animal material. Biomass is a very versatile material and can be used to produce heat, electricity or a combination of both. Biomass energy is most commonly gathered from wood or specially grown crops such as willow, poplar or rapeseed. However, animal waste (anaerobic digestion), the use of municipal waste products and sewage farms are also sources of biomass energy. The production of energy crops can however, compete with other land uses such as food production and nature conservation.
- 5.3.2 Producing energy from biomass has both environmental and economic advantages. It is the most cost-effective when a local fuel source is used, which results in local investment and employment. There is potential for the County Borough to provide biomass energy. There are large areas of low graded agricultural land that could be utilised for growing energy crops, there are large areas of woodland and a number of sustainable woodland management schemes that could provide wood based energy sources such as chippings and pellets.
- 5.3.3 In practical terms, individual biomass heating systems are considered more appropriate in a more spacious settings as a large amount of space is required to not only house the system but more room is also required to store the fuel, normally in the form of wood chips or pellets. Biomass combined heat and power plants are often considered a good solution for a community based heating system, where neighbourhoods can be connected to the one plant.
- 5.3.4 Whilst landfill is generally an unacceptable from an environmental prospective, the capture of methane gas to generate electricity means that a potent greenhouse gas is not being released into the atmosphere and is being converted into a biomass resource.
- 5.3.5 When preparing policies for the Local Development Plan, the advice of Technical Advice Note 8: Renewable Energy (2005) should be taken account of, which requires Local Development Plans to "*promote high standards of energy efficiency, energy conservation and the use of renewable energy as part of the national and international response to climate change*". Local Authorities are

required to “*consider the local availability of renewable energy resources and develop suitable policies that promote their implementation...and the specific requirements of individual renewable energy technologies...which are likely to come forward during the plan period*” (Para 5.2).

- 5.3.6 Caerphilly County Borough, due to the potentially sufficient supply of biomass materials to supply energy on an individual and community scale should consider biomass as a valuable resource and seek to integrate the use of the biomass technology and encourage community based biomass schemes on all new development. A generic strategic policy is included within the LDP to address the provision of renewable energy within the local context, specifically as a requirement of new development, of Caerphilly County Borough.

#### **5.4 Combined Heat & Power**

- 5.4.1 Where electricity is produced through thermal processes the efficiency of conversion is often only 35% (i.e. 65% of the energy input is wasted through heat that is released into the atmosphere or a body of water). By capturing the excess heat, Combined Heat and Power (CHP) technology can turn the heat that would be wasted in a conventional power plant, into energy. This means that less fuel needs to be consumed to produce the same amount of useful energy in one process. CHP can provide a secure and highly efficient method of generating electricity and heat at the point of use. CHP systems are considered suitable in both the rural and urban context and are very well suited to users that require consistently high levels of heat throughout the year, hospitals, hotels and leisure centres for example.
- 5.4.2 In 2006, the UK had a total of 1,539 installed CHP schemes with a capacity of 5,549 MWe. Natural gas is the major fuel contributor towards producing energy through CHP with 84, 888 GWh, with other fuels (including process by-products, coke oven gas, blast furnace gas, gas oil and uranium) contributing 24,983 GWh, coal and fuel oil contribute 7,715 GWh and renewable fuels (including sewage gas, other biogases, municipal waste and refuse derived fuels) contributing 3,003GWh. (dti, 2007).
- 5.4.3 Micro CHP is defined as “*the simultaneous production of heat and power in an individual dwelling*” (EST, 2001). The use of CHP in domestic dwellings is anticipated to replace conventional gas central heating boilers. Overall efficiency of a micro CHP system installed in the home is 90% compared to 70% of a conventional boiler (EST, 2001). Householder emissions of CO<sub>2</sub> could be reduced by 20% by using a domestic CHP system.
- 5.4.4 Technical Advice Note 8 encourages Local Planning Authorities to “*take an active role in facilitating CHP systems through development plans*” (para 3.6).
- 5.4.5 When preparing policies for the Local Development Plan, the advice of Technical Advice Note 8: Renewable Energy should be taken account of, which requires Local Development Plans to “*promote high standards of energy efficiency, energy conservation and the use of renewable energy as part of the national and international response to climate change*”. Local Authorities are required to “*consider the local availability of renewable energy resources and develop*



- 5.4.6 Caerphilly County Borough has no provisions for a large-scale CHP provision. Community and individual CHP units would however, contribute to the International and national commitment to renewable energy. A generic strategic policy is included within the LDP to address the provision of renewable energy within the local context, specifically as a requirement of new development, of Caerphilly County Borough.

## 5.5 Hydropower

- 5.5.1 The energy potential of moving water has been harnessed for thousands of years, originally using water wheels to drive mills and machinery. Hydropower uses the force or energy of moving water to generate power. Power can be generated in a number of ways and for a number of reasons including hydro electricity, tidal power, tidal steam power, wave power and the traditional water wheel. Hydropower is most efficient in rainy, mountainous countries.
- 5.5.2 Hydroelectric power currently supplies 19% of the worlds energy, 40% of the UK's electricity needs are currently met through hydroelectricity (dti, April 2003).
- 5.5.3 The House of Commons Welsh Affairs, Third Report (2006) recognised the potential contribution of small-scale hydropower in Wales. A target was recommended to be set to promote and encourage development in this area, including the potential role for small-scale hydro in both community and microgeneration schemes.
- 5.5.4 Technical Advice Note 8 states that the most likely hydro-power structures in Wales will involve “*run-of-river*” (para 3.13). These are relatively small, with some flexibility in siting along a length of river or stream. There are potential impacts on ecological sensitive areas in particular, as well as a water abstraction licence being required from the Environment Agency.
- 5.5.5 When preparing policies for the Local Development Plan, the advice of Technical Advice Note 8: Renewable Energy (2005) should be taken account of, which requires Local Development Plans to “*promote high standards of energy efficiency, energy conservation and the use of renewable energy as part of the national and international response to climate change*”. Local Authorities are required to “*consider the local availability of renewable energy resources and develop suitable policies that promote their implementation...and the specific requirements of individual renewable energy technologies...which are likely to come forward during the plan period*” (Para 5.2).
- 5.5.6 Caerphilly County Borough has no provisions for the generation of renewable energy from hydropower. The water ways that could potentially be utilised to generate the energy are in many cases ecologically sensitive. However, A generic strategic policy is included within the LDP to address the provision of renewable energy within the local context of Caerphilly County Borough,

specifically as a requirement of new development, and would include hydropower in the right circumstances.

## 5.6 Geothermal

- 5.6.1 Geothermal energy is the heat of the Earth, which can be utilised to produce electricity and hot water, geothermal simply means *the Earth's Heat*. The centre of the Earth is estimated to be 5,500°C, with the upper three metres of the Earth's surface staying at a constant 10-16°C throughout the year. Currently only 1% of the planet's energy is generated from geothermal power, although it is the third most prevalent renewable energy source being exploited today.
- 5.6.2 Geothermal energy offers a number of advantages over traditional fossil fuel based sources. From an environmental standpoint, the energy harnessed is clean and safe for the surrounding environment. It is also sustainable because the hot water used in the geothermal process can be re-injected into the ground to produce more steam. In addition, geothermal power plants are unaffected by changing weather conditions.
- 5.6.3 The potential for geothermal energy is present around the globe, although there are hotspots on the planet that are more suited and easier to tap into. In cooler climates, such as the UK, which is not a natural hotspot, the temperatures supplied from the basic ground loop system will need to be raised by heat pump systems, though doing so is still a more efficient way of generating heated water than most other methods.
- 5.6.4 The potential for geothermal power in Wales is limited due to its location away from the natural hotspots. There are no significant geothermal plants in Wales at present, and it is unlikely that any such plant in the immediate future would be provided, as it would involve drilling to some considerable depth if high temperatures are to be reached. However, the possibility in the longer term should not be ignored.
- 5.6.5 When preparing policies for the Local Development Plan, the advice of Technical Advice Note 8: Renewable Energy (2005) should be taken account of, which requires Local Development Plans to "*promote high standards of energy efficiency, energy conservation and the use of renewable energy as part of the national and international response to climate change*". Local Authorities are required to "*consider the local availability of renewable energy resources and develop suitable policies that promote their implementation...and the specific requirements of individual renewable energy technologies...which are likely to come forward during the plan period*" (Para 5.2).
- 5.6.6 The potential to exploit natural geothermal energy within Caerphilly County Borough is limited due to the fact that we are not located within a 'hot spot'. The use of ground source heat pumps would be required to exploit the geothermal energy of the country but this is now commonplace and easily accessible renewable energy technology. As such the potential use of geothermal energy, particularly at the community and individual level would be high. A generic strategic policy is included within the LDP to address the provision of renewable energy within the local context of Caerphilly County Borough, specifically as a

requirement of new development, which would include hydropower in the right circumstances.

## **5.7 Heat Pumps**

- 5.7.1 Heat pumps are able to extract heat from soil, rock, air or water by a process that is similar to the operation of a refrigerator. The heat source could be a large area of ground or a river, stream, lake, sea or body of groundwater. Heat pumps do require electricity from another source to operate, but will extract much more energy than is input. Heat pumps work best when heat can be applied evenly and consistently (i.e. underfloor heating systems).
- 5.7.2 The most well known heat pumps available on the market are the ground source heat pumps. However, air and water source heat pumps are also available. Air source heat pumps can be fitted outside a house or in the roof space and generally perform better at slightly warmer air temperatures. Water source heat pumps can be used to provide heating in homes near to rivers, streams and lakes for example. However, there have been examples where heat pump technology has been used to extract energy from water that accumulates in abandoned coalmines.
- 5.7.3 When preparing policies for the Local Development Plan, the advice of Technical Advice Note 8: Renewable Energy (2005) should be taken account of, which requires Local Development Plans to “*promote high standards of energy efficiency, energy conservation and the use of renewable energy as part of the national and international response to climate change*”. Local Authorities are required to “*consider the local availability of renewable energy resources and develop suitable policies that promote their implementation...and the specific requirements of individual renewable energy technologies...which are likely to come forward during the plan period*” (Para 5.2).
- 5.7.4 The potential to exploit renewable energy using heat pumps within Caerphilly County Borough is high due to the topography and the natural features present within the borough. A generic strategic policy is included within the LDP to address the provision of renewable energy within the local context of Caerphilly County Borough, specifically as a requirement of new development, which would include hydropower in the right circumstances.

## **5.8 Energy from Waste**

- 5.8.1 Energy from waste is the recovery of energy in the form of electricity and/or heat from municipal solid waste (MSW). It maximises the amount of waste beneficially reused through recycling materials, reduces the need to send waste to landfill, displaces emissions that would otherwise be emitted by fossil fuel power stations and helps increase the UK's own security of fuel supply. Due to the nature of the energy from waste technology these are not generally suited to integration in urban environments and most energy from waste plants are situated in close proximity to landfill sites, sewage works or farms.

- 5.8.2 Energy from waste can be derived in a number of ways including Mechanical Biological Treatment, Gasification/ Pyrolysis and Anaerobic Digestion and has many benefits including;
- Reduces the UK's reliance on landfill for waste disposal;
  - Helps local authorities meet government targets;
  - Reduces the amount of methane and carbon dioxide produced by waste in landfill;
  - Reduces our dependency on fossil fuels to generate our electricity;
  - Displaces carbon dioxide produced by burning fossil fuels;
  - Retrieves metals to recycle;
  - Produces Incinerator Bottom Ash that can be used as a replacement for quarried aggregate in the construction industry.
- 5.8.3 The Landfill Directive has set targets for all European countries to reduce the amount of waste being disposed of in landfills. The UK target, which also covers Wales has a target to reduce biodegradable municipal waste to 75% of that produced in 1995 by 2010 reducing further to 50% of the previously reduced by 2013 and 35% by 2020. The UK and subsequently the Assembly Government has an obligation to meet these targets. The landfill directive identifies the use of energy derived from the sources in para 5.7.2 above as alternative waste disposal technologies.
- 5.8.4 The South East Wales Regional Waste Plan (2004) aims to further reduce the environmental impact of disposing of waste and seeks to recover not only further recyclable materials such as plastic and metal, but also generate energy through energy from waste technologies (paras 74-83). The regional wastes plans have all adopted Energy from Waste as their preferred option (TAN8, Para 3.8).
- 5.8.5 Currently, Caerphilly County Borough currently has no provisions for energy to be produced from waste. In general, technology is still a relatively new concept in the UK, with only 1.3% of energy being produced by waste technologies. Whilst in countries such as Germany, Austria and Italy the technology has been developing for a number of years now and often recover over 35% of its energy from municipal waste. (Department of Trade & Industry)
- 5.8.6 The provision for new and emerging renewable technologies and processes should be considered as part of the LDP preparation process. A generic policy should be provided that supports the development and use of new renewable technologies up until the end of the plan period, which is a considerable time away at present in the local context. A generic policy relating to the provision of renewable energy through new developments has been included within the LDP. No specific renewable technology is referred to and as such this facilitates the use of all existing and emerging renewable technologies, where they would be appropriate.

## **5.9 Microgeneration**

- 5.9.1 Micro generation is the production of heat or electricity on a small scale from a low carbon source (Section 82, Energy Act 2004). Various technologies can be used for microgeneration – heat pumps, fuel cells, micro-CHP, micro-hydro,

domestic wind turbines, bio-energy and solar. Solar micro-technology is the most common form of micro-generation equipment currently in use in the UK with 79,771 installations, followed by micro Combined Heat and Power with 990 installations.

Microgeneration Technology	No. Installations
Solar Water Heating	78,470
Solar PV	1,301
Micro CHP	990
Micro Wind	650
Ground Source Heat Pumps	546
Biomass Boilers (Pellets)	150
Micro Hydro	90
Fuel Cells	5
<b>Total</b>	<b>82,202</b>

Dti, March 2006

- 5.9.2 The built environment currently accounts for 47% of CO<sub>2</sub> emissions in the UK. Microgeneration technologies have the potential to reduce this figure. Despite approximately 82,000 microgeneration installations in the UK during 2004, a report undertaken by the Energy Saving Trust in December 2005 suggests that microgeneration could reduce household emissions by approximately 15% by 2050 and could provide 30-40% of the UK's electricity needs.
- 5.9.3 The Climate Change and Sustainable Energy Act 2006 is an Act of Parliament which aims to boost the number of heat and electricity microgeneration installations in the United Kingdom, so helping to cut carbon emissions and reduce fuel poverty. The principle aims of the Act require the setting of national targets for microgeneration no later than 31<sup>st</sup> March 2009 and make amendments to the Permitted Development Order and Building regulations.
- 5.9.4 *Our Energy Challenge: Power for the People, Microgeneration Strategy* (dti, March 2006) aims to create conditions under which microgeneration becomes a realistic alternative energy generation source for the householder, the community and for small businesses. The relevant government departments will have the responsibility for carrying out the actions that are identified in the microgeneration strategy that fall within their remit. The Microgeneration strategy identifies a list of constraints associated with microgeneration and a list of actions that will overcome these constraints.
- 5.9.5 *The Microgeneration Action Plan for Wales*, which was published by the Welsh Assembly Government in March 2007, presents a plan of action to facilitate the uptake of microgeneration technologies in Wales for the generation of local energy. The Microgeneration Action Plan sets out a number of targets including;
- 20,000 micro-heat systems installed by 2012 and 100,000 by 2020;
  - 10,000 micro-electricity systems installed by 2012 and 200,000 by 2020;
  - 50 combined heat and power and/or district heating systems in place by 2020.

- 5.9.6 The consultation document "*Lifting the Planning Barriers to Domestic Energy Micro-generation*" (*proposed changes to permitted development rights*) was published in July 2007. The aim of the document is to assist individuals in Wales who wish to change how they supply their dwellings with energy by lifting unnecessary planning controls and encouraging the establishment of renewable energy supplies (microgeneration). If the proposed changes to the GPDO are approved, solar panels would be permitted over 100% of dwelling house roofs and walls, wind turbines on roofs will be allowed a 2m diameter and be permitted at a height of 3ms above the roofline or 11metres in height for a stand-alone turbine.

## 5.10 Energy Efficiency

- 5.10.1 The cheapest and greenest use of energy is not to use it in the first place. Much of the energy we use is wasted, the energy we actually need is far less than that used. In the UK it is estimated that energy efficiency can provide at least 20% energy savings without employing any specialist renewable energy technology, saving many million tonnes of carbon dioxide each year.
- 5.10.2 Energy efficiency is a key policy topic of the Governments overall energy agenda. Energy efficiency is the control and reduction of energy demand. The Energy White Paper "*Meeting the Energy Challenge*", May 2007 highlights that the most important starting point for developing energy policy is to save energy. It is widely and generally accepted that this is the cheapest way of reducing carbon emissions and can also contribute to securing the energy supply as there would be less need to import energy and can contribute to reducing fuel poverty. One of the four main elements highlighted in the Energy White Paper, as part of the international strategy to deal with energy in the UK is "*promoting policies to improve energy efficiency*".
- 5.10.3 Energy efficiency is a topic that is often not considered in the planning context. Whilst it is accepted that building regulations can go some way in achieving energy efficiency, the Welsh Assembly Government is fully committed to promoting energy efficiency and conservation (Technical Advice Note 8, 2005). Simply by changing the layout of internal rooms to benefit from passive solar gain, changing the layout of windows, doors and roof lights to provide larger openings on the south facing elevation, the provision of rainwater collection and reuse, the use of sustainably sourced local products and implementing sustainable construction techniques and methods energy efficiency will be drastically improved.
- 5.10.4 Local Planning Authorities, when preparing development plans should undertake an "*assessment of all renewable energy resources and the potential for ...energy efficiency...and include detailed policies in their UDPs*" (PPW, para 12.9.1). Currently no initial or detailed assessment work of this nature has been undertaken for Caerphilly County Borough. Any assessment work should take into account and recognise that different approaches will be appropriate for the deployment of the different .... energy efficeincy and conservation measures (PPW, para 12.9.2).

- 5.10.5 Planning Policy Wales also requires LPA's to seek opportunities to "*integrate energy efficiency and conservation objectives into the planning and design of new development in their areas*" (para 12.9.3). This could include passive solar gain, layout of estates, orientation of buildings, natural vegetation planting, optimal use of topography.
- 5.10.6 Technical Advice Note 12: Design (TAN12) states that development plans "*supported by SPG should encourage the saving of energy and the use of renewable sources*" (para 5.70) TAN 12 identifies a number of factors that may be relevant in improving energy efficiency and include internal layout, use of natural ventilation, provision and collection for rainwater and the layout of windows etc to improve passive solar gain.
- 5.10.7 When preparing policies for the Local Development Plan, the advice of Technical Advice Note 8: Renewable Energy (2005) should be taken account of, which requires Local Development Plans to "*promote high standards of energy efficiency, energy conservation and the use of renewable energy as part of the national and international response to climate change*". Local Authorities are required to "*consider the local availability of renewable energy resources and develop suitable policies that promote their implementation...and the specific requirements of individual renewable energy technologies...which are likely to come forward during the plan period*" (Para 5.2).
- 5.10.8 TAN 8 also states that key to achieving energy efficiency in developments is the "*Design, infrastructure and site layout*" so that passive solar gain can be optimised. The orientation of the building and avoiding overshadowing are both recommendations of the TAN. This approach to energy efficiency is reiterated in the Renewable Energy MIPPS stating that "*Local planning authorities should seek opportunities to integrate energy efficiency and conservation objectives into planning and design of new developments in their area.*" (para 12.9.4)

## **6. Renewable Energy Schemes, Initiatives and Programmes**

The following are all practical schemes, initiatives or programmes that seek to implement renewable energy into everyday life and decision-making processes.

### **6.1 Community Energy Generation**

- 6.1.1 In January 2002 the government launched "Community Energy", a £50m UK-wide capital programme for installing and refurbishing community heating (HM Government, March 2006). Community energy schemes provide heat and/or power from one central source to multiple buildings. This might include homes, schools, universities, hospitals, leisure centres, prisons or offices. Schemes can range in size from one tower block with a central heat source for all the flats to citywide schemes connecting many public and commercial buildings.
- 6.1.2 The benefits of community heating include; low cost heating and power, improved energy efficiency (a centralised plant uses energy more efficiently, significantly reducing carbon dioxide emissions and fuel costs), reduced

management costs and increased reliability, ensuring energy security through fuel flexibility.

- 6.1.3 Small-scale wind schemes are often more appropriate in most locations in visual terms, but sensitive siting and design is still essential. Where there would be any adverse impact upon a sensitive or designated site, a SSSI for example, then an alternative location or renewable technology should be sought. Community CHP is the other popular community energy generation technique.
- 6.1.4 A strategic LDP policy addressing renewable energy provision in general should include the provision of community energy generation schemes where they are appropriate. Community energy generation is in essence a UK requirement and therefore national guidance, as the promotion of community energy projects is one of the objectives of the Climate Change and Sustainable Energy Act 2006. However, local authorities have a duty to take regard of energy generation as part of their function, and as such provisions for the inclusion of community energy generation schemes should be incorporated into a policy as a local solution.

## **6.2 Zero Carbon Buildings**

- 6.2.1 Domestic buildings in the UK are responsible for 27% of carbon dioxide emissions and 30% of the total UK energy use (CLG, 2006). It is estimated that 53% of emissions for domestic dwellings is emitted from space heating, water heating contributes to 20%, appliances equal 16% and lighting and cooking contribute 11%.
- 6.2.2 Zero carbon development is defined as “*development that delivers zero net emissions (over the course of a year) of carbon dioxide into the atmosphere resulting from energy use in buildings.*” (Maunsell, F & Capener, P, Jan 2007). This definition excludes energy used for transport and embodied energy in materials.
- 6.2.3 Zero carbon buildings will generally need to use a combination of sustainable energy technologies such as wind driven ventilation and heat-recovery systems, along with more traditional environmental building techniques. Traditional environmental building techniques include positioning buildings to south facing aspects to maximise passive solar gain and highly effective energy efficiency principles such as triple-glazed windows, and thermally efficient floors and walls to reduce the developments dependency on electricity and heating to an absolute minimum. The energy and water that the building does require is generated on site by micro-energy sources such as wind turbines and solar power and by using recycling water.
- 6.2.4 The UK Government has committed to achieving zero carbon standards for all new homes by 2016. The Welsh Assembly Government has stressed it wants to move more quickly and in February 2007 outlined a programme of action to tackle and deal with climate change, which includes setting a target that all buildings built from 2011 onwards should be zero carbon.



- 6.2.5 Currently, there are a number of documents that set standards and criteria for achieving varying levels and ratings of sustainable buildings including *the code for sustainable homes* and the *Building Research Establishment Environmental Assessment Method (BREEAM) ratings* (See para 6.3) and *The Code for Sustainable Homes* (See para 6.4). There are BREEAM ratings available for all building types and not just the domestic dwelling.
- 6.2.6 As a first step the Welsh administration has stated that it will be insisting that as a core condition of all Assembly Government funding, grants, investments, joint ventures and land disposals which involve new buildings the BREEAM 'excellent' rating will have to be achieved. The BREEAM 'excellent' rating covers a wide range of environmental issues, including energy use, pollution, buildings materials and water consumption.
- 6.2.7 There is serious doubt and speculation about the ability for Wales to achieve zero carbon housing by 2011. A number of factors contribute to this uncertainty regarding the ability to deliver zero carbon housing by 2011, which include locational constraints and the need to deliver affordable homes and growth.
- 6.2.8 A local development plan policy has been included within the countywide section, which will seek to ensure that all developments in the county borough will be as close to zero carbon as is reasonable. This is not considered to be repeating national guidance as currently the zero carbon housing by 2011 is aspirational. Even though it is an aspirational target, all efforts should be made by local authorities to attain as close to this as possible in an attempt to mitigate and adapt to climate change.

### **6.3 Building Research Establishment Environmental Assessment Method (BREEAM)**

- 6.3.1 Building Research Establishment Environmental Assessment Method (BREEAM) assesses the performance of buildings in the following areas:
- Management: overall management policy, commissioning site management and procedural issues;
  - Energy use: operational energy and carbon dioxide (CO<sub>2</sub>) issues
  - Health and well-being: indoor and external issues affecting health and well-being
  - Pollution: air and water pollution issues
  - Transport: transport-related CO<sub>2</sub> and location-related factors
  - Land use: greenfield and brownfield sites
  - Ecology: ecological value conservation and enhancement of the site
  - Materials: environmental implication of building materials, including life-cycle impacts
  - Water: consumption and water efficiency
- 6.3.2 Credits are awarded in each category according to performance. A set of environmental weightings then enables the credits to be added together to produce a single overall score. The building is then currently rated on a scale of PASS, GOOD, VERY GOOD or EXCELLENT, and a certificate awarded. An

OUTSTANDING rating is due imminently. BREEAM's success stems from its unique ability to cover a wide range of environmental issues within one assessment, and to present the results in a way that is widely understood by those involved in property procurement and management.

- 6.3.3 BREEAM assessments are available for a wide range of buildings including domestic dwellings (more commonly referred to as Eco-Homes), industrial, retail, commercial, multi-residency, office and retail buildings.
- 6.3.4 Technical Advice Note 8: Renewable Energy states that the standard established under the 'Eco homes' scheme for residential development and the BREEAM schemes for non-residential development "*form a useful framework for energy efficiency considerations*".
- 6.3.5 The energy white paper (2003) states that all new developments should reach BREEAM 'Excellent' or equivalent in line with national requirements. The Welsh Assembly Government currently requires BREEAM 'Excellent' or equivalent standards to be met for all funding projects and land disposal as a core condition, with this to become standard requirement for all new buildings in the future.
- 6.3.5 A countywide policy has been included within the LDP that makes specific reference to the use of BREEAM ratings when developing all new build developments. It could be argued that this is national guidance, and as such should not be included. However, it is felt that the 'Excellent' rating is currently too inflexible and does not allow for certain constraints and as such the rating required has been lowered to 'Very Good' to reflect local circumstances such as locational constraints and the pressure for growth in certain areas and housing apportionment figures that may not be realised if the county borough is too stringent with the BREEAM rating required for all new developments. The policy does however, stipulate "at least 'very good'" and does encourage wherever possible an increase on this standard.
- 6.3.6 In an ever policy context coupled with the legislative drivers altering, it is likely that during the lifetime of the plan the BREEAM ratings are going to change. As a consequence the standards may not reflect the current government legislation or BREEAM ratings available. However, these standards can be reviewed at each review stage of the LDP and amended accordingly and there is a consistent local approach to achieving our sustainable development aims.

#### **6.4 The Code for Sustainable Homes**

- 6.4.1 The code for sustainable homes is a new tool to assess the environmental performance of new build homes. The code contributes to the achievement of sustainable development, which aims to provide a better quality of life, now and for future generations. The code assists this by reducing the environmental impacts of the construction and use of our new homes, particularly the reduction of CO<sub>2</sub> emissions and climate change.
- 6.4.2 The Code measures the sustainability of a new home against nine categories of sustainable design, rating the 'whole home' as a complete package. The Code

uses a 1 to 6 star rating system to communicate the overall sustainability performance of a new home, 6 being zero carbon. The code rates new homes on criteria including energy and water efficiency, use of sustainable construction materials and features such as recycling facilities, cycle spaces and home offices.

- 6.4.3 The code for sustainable homes assessment has now been introduced in England and Wales, and is a mandatory system from 1<sup>st</sup> May 2008 onwards. The code for sustainable homes came into effect on the 1<sup>st</sup> April 2007 with all housing associations needing to comply with the code. They will need to reduce carbon emissions by 25% on all new homes built (equivalent to level 3). Private developers have been given a further two years to achieve the cut.
- 6.4.4 The fact that the Code for sustainable homes is now mandatory, makes it national guidance. However, in an attempt to continue to drive sustainable development forward, local targets have been set within the countrywide policy in the LDP. These include the county boroughs own self-imposed targets working towards zero carbon within the plan period, and as such is a local interpretation of national guidance.

## **6.5 Energy Statements**

- 6.5.1 Energy statements provide detailed information on how a development will address energy supply and incorporate energy efficiency and renewable energy technologies. The statement should include calculations for base-line energy usage, assessments of energy efficiency, measures and suggestions for on-site renewable energy generation to minimise CO<sub>2</sub> emissions.
- 6.5.2 Energy statements are not currently a statutory requirement of the planning application process, but many councils are now requiring an energy statement with every planning application including Reigate and Banstead Borough Council (required as of 31<sup>st</sup> March 2008), The London Borough of Hackney, Stratford on Avon District Council, Runnymede Borough Council and Powys County Borough Council (referred to as design statements – see “*Designing Energy Efficient Developments*”, Jan 2008”).
- 6.5.3 Requesting energy statements as part of planning applications will benefit the Caerphilly Council by ensuring that we are meeting renewable energy and/or energy efficiency requirements set by the LDP and statutory building regulation requirements. The submission of the energy statement along with the planning application will mean that the energy supply and efficiency of the building is a key determining factor of the application and these things are not being left to condition and potentially omitted at a later stage.

## **6.6 Design**

- 6.6.1 Good design is considered fundamental in providing and utilising sustainable resources and energy. By making the most of design through the prudent use of natural resources, incorporating sustainable energy use, water control measures, the provision of renewable energy technologies and resource efficient layouts, the

efficient and long term management for sustainable resources and energy consumption can be achieved. Many of these issues are recommended for inclusion within Supplementary Planning Guidance (TAN8, para 5.7) due to their technical nature.

- 6.6.2 Sustainable design solutions to energy production, use of resources and energy efficiency can often be overcome by appraising a site and identifying the possibilities that the site has to offer, as well as its constraints. The site's potential sun and wind power generation, its topography and existing landscaping are all assets that should be identified and incorporated, where possible, into all aspects of the design of the development.
- 6.6.3 Technical Advice Note 8 states that "*Design and Energy should be considered when development plan policy is produced*" (para 4.1). Local Planning Authorities should "*actively consider the inclusion of design guidance in their development plans or Supplementary Planning Guidance*".
- 6.6.4 When preparing policies for the Local Development Plan, the advice of Technical Advice Note 8: Renewable Energy (2005) should be taken account of, which requires Local Development Plans to "*promote high standards of energy efficiency, energy conservation and the use of renewable energy as part of the national and international response to climate change*". Local Authorities are required to "*consider the local availability of renewable energy resources and develop suitable policies that promote their implementation...and the specific requirements of individual renewable energy technologies...which are likely to come forward during the plan period*" (Para 5.2).
- 6.6.5 The One Millions Sustainable Home campaign and document recommends, "*Every housing project should have a clear statement of sustainability which outlines what is to be achieved and how it is to be achieved*". This design statement is included within a general design statement, which is to be a requirement in the LDP under a countywide design policy.

## 7. Summary

- Wales has signed up to the EU 2020 target of 20% energy requirements coming from renewable sources;
- From 2011 onwards there should be an annual reduction of 3% of greenhouse gas emissions (based on 1990 base levels) in Wales;
- Renewable energy targets of 7TWh per annum by 2020 in Wales.
- By 2011 all new buildings in Wales should be built to zero carbon standards;
- BREEAM 'Excellent' or equivalent standards must be met for all funding projects and land disposal as a core condition, with this to become standard requirement for all new buildings in the future;
- 100,000 microgeneration heating units installed by 2020;
- 200,000 micro-electricity units installed by 2020;

- 50 combined heat and power and/or district heating systems in place by 2020;

## **8. Key Recommendations for the Local Development Plan**

- 8.1 Planning Policy Wales requires local authorities when preparing the LDP to assess the potential and opportunities for:
- All renewable energy resources;
  - Renewable energy technologies;
  - Energy efficiency and conservation measures;
  - The integration of energy efficiency and conservation objectives into the planning and design of new development.

Currently, the authority has carried out no assessment work to establish any of the above opportunities for sustainable energy or resources.

- 8.2 As set out in the energy white paper, the Local Authority should set an aim to be producing at least 20% of its energy from renewable energy by 2020. The Welsh Assembly has also set a target of reducing greenhouse gas emissions by 3% per year from 2011, which is transposed to the local authority.
- 8.3 A phased approach to setting to renewable energy targets may be the realistic approach to achieving results, rather than require 20% from the beginning of the plan period. 15% renewable energy generation by 2015 and 20% by 2020 would be consistent with national targets as set out in the Energy White Paper. The inclusion of microgeneration as an on site renewable energy resource should be mentioned to decrease the county boroughs reliance of large scale energy production such as wind farms whilst fulfilling the renewable energy generation target of 20% by 2020.
- 8.4 All new developments should reach at least BREEAM 'Very good' or equivalent in line with national requirements. Not all sites will be able to obtain the BREEAM 'Excellent' standard due to specific constraints, as such the achievement of 'very good' standards would be acceptable as a minimal standard with aspirations for 'excellent' rating where the site or the development allows for it. Justifications as to why 'very good' is being used rather than the 'excellent' standard to ensure the best quality BREEAM than can be achieved for the site/ development is being achieved.
- 8.5 A Welsh Assembly Government target of Zero carbon buildings by 2011 is currently aspirational rather than a statutory obligation. Setting targets in the plan that seek to obtain as close to zero carbon as possible would be seen as the council striving to meet WAGs aspirational target, and as such fulfilling our international, national, regional and local statutory sustainable development obligations and targets.
- 8.6 Energy efficiency is currently dealt with in the Part L of the Building Regulations and BREEAM and the Code for Sustainable Homes. However, energy efficiency is a simple and free approach to reducing greenhouse gas emissions, and as such fulfilling WAG targets. The authority should seek to improve energy efficiency standards over and above the current building regulation standards as

to make the full and beneficial use of free energy efficiency measures through the BREEAM and Code for Sustainable Home ratings, which more than adequately address energy efficiency.

8.7 In conclusion, the following should be included as strategic policies within the LDP:

- Renewable Energy targets for the plan period including onsite microgeneration;
- Resource efficiency requirements.

8.8 The following should be included within the countywide policy section;

- BREEAM rating requirements;
- Code for sustainable homes.

## **9. Supplementary Planning Guidance**

9.1 Technical Advice Note 8: Renewable Energy (2005) confirms that a large amount of detail relating to renewable energy and energy efficiency is not appropriate in Local Development Plans. As such, LPAs should consider producing complementary Supplementary Planning Guidance to cover the detailed technical guidance relating to renewable energy and energy efficiency (para 5.6).

9.2 Supplementary planning guidance covering sustainable energy and resource issues will be produced to support the local development plan. The following topic's are considered necessary to be covered by the SPG;

- Sustainable construction and resources;
- Sustainable design including layout, materials and resource efficiency;
- Renewable energy options, suitability of location etc;
- Microgeneration;
- Energy efficiency.

## **10. Further work**

10.1 As part of the ongoing local development plan work that will continue throughout the lifetime of the plan, the following work will initially need to be completed to inform the first review of the plan;

- A study to inform the potential for and suitable sites for renewable energy within the county borough.
- The completion of the *Sustainable Energy and Resource Supplementary Planning Guidance*.

**Glossary**

BRE	Building Research Establishment
BREEAM	Building Research Establishment Environmental Assessment Method
CCBC	Caerphilly County Borough Council
CCW	Countryside Council for Wales
CIRIA	Construction Industry Research and Information Association
CO <sub>2</sub>	Carbon Dioxide
DDG	Development Design Guide
Dti	Department of Trade and Industry
EC	European Commission
ESW	Environment Strategy Wales
EU	European Union
GDP	Gross Domestic Product
HOV	Heads of the Valley
LDP	Local Development Plan
LDS	Local Development Strategy
LPA	Local Planning Authority
MIPPS	Ministerial Interim Planning Policy Statement
MSW	Municipal Solid Waste
PPW	Planning Policy Wales
PV	Photovoltaic
RO	Renewable Obligation Order
SPG	Supplementary Planning Guidance
SSA	Strategic Search Area
TAN	Technical Advice Note
UDP	Unitary Development Plan
VRP	Valleys Regional Park
WAG	Welsh Assembly Government
WLGA	Welsh Local Government Association
WSP	Wales Spatial Plan
WTB	Wales Tourist Board

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### **Specialised terms and abbreviations**

<b>Watt (W)</b>	The basic measure of electrical power – e.g. A human climbing a flight of stairs is doing work at the rate of about 200 watts. An automobile engine produces mechanical energy at a rate of 25,000 watts (approximately 30 horsepower) while cruising. A typical household incandescent light bulb uses electrical energy at a rate of 40 to 100 watts, while energy-saving compact fluorescent lights, which are beginning to replace incandescent bulbs, typically consume 8 to 20 watts.
<b>Kilowatt (kW)</b>	One thousand watts of electricity – e.g. The power consumption of a 1-bar electric fire.
<b>Kilowatt-hour (KWh)</b>	One thousand watt-hours - The normal unit of electricity supply for domestic purposes.
<b>Megawatt (MW)</b>	One million watts of electricity - A large residential or retail building may consume several megawatts in electric power and heating energy.
<b>Megawatt-hour (MWh)</b>	1 megawatt acting over a period of 1 hour. One megawatt-hour is equal to 1,000 kilowatt-hours or 1 million watt-hours. The primary difference between a megawatt and a megawatt-hour is that “megawatt” measures the capacity of an electric generator and “megawatt-hour” measures the actual amount of electricity it produces over a certain period of time.
<b>Megawatt-Electrical (MWe)</b>	One million watts of electric capacity.
<b>Gigawatt (GW)</b>	One thousand megawatts (1,000 MW) or, one million kilowatts (1,000,000 kW) or one billion watts (1,000,000,000 watts) of electricity. One gigawatt is enough to supply the electric demand of about one million average California homes.
<b>Gigawatt-hour (GWh)</b>	One million kilowatt-hours of electric power.