BOROUGH PLAN BACKGROUND PAPER: Renewable and low carbon energy

Nuneaton and Bedworth Borough Council

2015

Nuneaton & Bedworth
United to Achieve

Contents

1. INTRODUCTION

This paper sets out relevant international, national, regional, sub-regional and local policies and strategies, as well as providing a synopsis and recommendations of relevant evidence base documents to inform policy development for low carbon and renewable energy.

1.1 Climate Change Estimations

Climate change is a significant and lasting change in the statistical distribution of weather patterns over periods ranging from decades to millions of years. Geological records show that the Earth's climate has changed greatly over time from natural causes, such as the interactions with the ocean and the atmosphere, changes in Earth's orbit and volcanic eruptions, and is therefore not unusual. However, current concerns relate to the speed at which global temperature is increasing as a result of burning fossil fuels. Consequently, the term is often used to refer specifically to climate change caused by human activity, as opposed to natural causes. In the former sense, the term climate change today is synonymous with anthropogenic (man-made) global warming, which is concerned with the rising average temperature of Earth's atmosphere and oceans and its projected continuation. The term climate change is used in this meaning by the Inter-Governmental Panel on Climate Change (IPCC), the leading body on climate change.

Warming of the climate system is unequivocal. Many scientists believe that within the lifetime of people living today there will be a 2^0 C rise in global temperature and that this level of rise is the "threshold between 'dangerous' and 'extremely dangerous'". To avoid temperature rises above 2^0 C, steep reductions in global emissions must be made by 2020 in order to have a 2-out-of-3 chance of avoiding global warming in excess of 2^0 C. Moreover, many scientists estimate that if we carry on as 'business as usual' there is a 50% chance of a 5^0 C increase in global temperature by the end of the century, resulting in devastating consequences.

Climate change will not only impact on Earth's natural processes but it will cause a market failure. The Stern Review, for example, estimated that under a 'business as usual' approach to climate change, the full range of economic, environmental and human health costs will reduce consumption per head between 5% and 20%, now and into the future. This is compared to 1%, if carbon dioxide (CO2) emissions can be stabilised at 500ppm – 550ppm (or 2^0 C).

1.2 The Impact Of Climate Change

An increase in global temperature will cause sea levels to rise and will change the amount and pattern of precipitation, and a probable expansion of subtropical deserts. Warming is expected to be strongest in the Arctic and would be associated with continuing retreat of glaciers, permafrost and sea ice. Other likely effects of the warming include more frequent occurrence of extreme weather events including heat-waves, droughts and heavy rainfall events, species extinctions due to shifting temperature regimes, and changes in agricultural yields. In the UK summers are expected to be hotter and drier, with increased flooding and rising sea-levels and coastal erosion, as well as challenges to national prosperity and social cohesion. These are all events that are happening now and are likely to get more severe.

Significantly, the United Kingdom Climate Impact Programme (UKCIP) states that, irrespective of any emission reductions in the short term, mankind has already begun to change the earth's climate and is set on a course towards unavoidable and extreme weather events. However, the actions we take now to reduce carbon emissions will have a positive impact towards the latter part of the century.

2. THE PLANNER TOOLKIT

Nuneaton and Bedworth Borough Council, in partnership with the Coventry, Warwickshire and Solihull Planning Authorities and Advantage West Midlands and the Carbon Trust produced a renewable energy toolkit, the Enplanner in 2011. The toolkit is intended to help planning applicants and planning officers to meet the increasingly common local planning requirements for renewable energy generation and lower carbon development.

The Borough Council will encourage the use of the Enplanner as part of the planning application process.

3. ADAPTING TO CLIMATE CHANGE

The Stern Report recommends there is a need for large scale uptake of a range of clean power, heat and renewable technologies to radically reduce CO2 emissions in the medium to long-term. The power sector around the world will have to be at least 60% and perhaps as much as 75% decarbonised by 2050 to stabilise at or below 550ppm CO2.

3.1 Centralised Power Plants

The energy we use today is supplied in mainly the same way as it has been for the last century. Electricity is generated from burning fossil fuels in large centralised power plants and distributed through the national grid. Centralised power plants typically convert less than a third of the energy in every unit of fuel into energy that is used, with the remaining two thirds released to the atmosphere, rivers or seas as waste heat. Heat is also lost due to the vast distances (often hundreds of miles) the electricity travels from the power plant to towns and cities. This loss is ultimately passed on to the consumers. Consequently, energy generated by centralised power stations and transmitted through the national grid is highly inefficient and wasteful.

Large centralised power plants also produce considerable amounts of pollution (particularly carbon dioxide) responsible for the rapid increase in global temperature. Reducing reliance on gas/coal fired centralised power plants to a more localised energy supply from renewable or low-carbon sources will reduce energy waste and greenhouse emissions responsible for the rapid on-set of climate change.

3.2 Definitions

Renewable energy:

Renewable energy is from flows that occur naturally and repeatedly in the environment, from the wind, the fall of water, the movement of the oceans, the sun and from biomass and deep geothermal heat. Biomass crops are often referred to as being carbon neutral because as well as creating oxygen, carbon dioxide is released into the atmosphere when they are burnt. Renewable energy can provide electricity, space heating and cooling.

Low-carbon energy:

Low-carbon energy is that which produces greenhouse gases but fewer than traditional means of power generation. It includes nuclear power, carbon capture and natural gas.

4. RENEWABLE & LOW-CARBON ENERGY TECHNOLOGIES

4.1 Biomass Energy

Biomass is biological material derived from living, or recently living organisms. There are three major forms of biomass energy: solid, liquid and gaseous. Solid biomass is created from incinerating wood or plant products; liquid biomass are fuels such as biodiesel and ethanol; while gaseous biomass are made from methane and landfills. Any of these types of combustible organic matter can be utilised and turned into energy.

There are five basic categories of biomass material:

- **Virgin wood**, from forestry, arboricultural activities or from wood processing
- **Energy crops**: high yield crops grown specifically for energy applications
- **Agricultural residues**: residues from agriculture harvesting or processing
- **Food waste**, from food and drink manufacture, preparation and processing, and post-consumer waste
- **Industrial waste and co-products** from manufacturing and industrial processes.

4.1.1 Converting Biomass into Energy

The most efficient and sustainable way to change biomass into energy is by:

- Combined heat and power (CHP) (see section 4.5),
- Biomass gasification[1],
- Anaerobic digestion[2].

[1] Biomass gasification—heating biomass in the presence of a carefully controlled amount of oxygen under pressure is converted into a mixture of hydrogen and carbon monoxide called syngas. This syngas is often refined to remove contaminants. The syngas can then be run directly through a gas turbine or burned and run through a steam turbine to produce electricity. Biomass gasification is generally cleaner and more efficient that direct combustion of biomass. Syngas can also be further processed to make liquid biofuels or other useful chemicals.

Figure1: Biomass products (top), and anaerobic digestion plant

4.2 Ground Source Heat Pumps

A ground source heat pump (GSHP) extracts heat from the ground and circulates a mixture of water and antifreeze around a loop of pipe, called a ground loop, which is buried in the garden. Heat from the ground is then absorbed into the fluid and passes through a heat exchanger and into the heat pump, and because the ground stays at a fairly constant temperature under the surface, heat can be captured can used throughout the year.

The length of the ground loop depends on the size of home and the amount of heat needed. Longer loops can draw more heat from the ground, but need more space to be buried. If space is limited, a vertical borehole can be drilled instead.

The benefits of ground source heat pumps:

- Lower fuel bills, especially when replacing conventional electric heating,
- Provide an income through the government's Renewable Heat Incentive,
- Lower carbon emissions, depending on which the fuel is being replaced,
- No fuel deliveries needed,

[2] Anaerobic Digestion--Micro-organisms break down biomass to produce methane and carbon dioxide. This can occur in a carefully controlled way in anaerobic digesters used to process sewage or animal manure. Related processes happen in a less-controlled manner in landfills, as biomass in the garbage breaks down. A portion of this methane can be captured and burned for heat and power. In addition to generating biogas, which displaces natural gas from fossil fuel sources, such collection processes keep the methane from escaping to the atmosphere, reducing emissions of a powerful global warming gas.

- Heat homes as well as water, and
- Minimal maintenance is required.

According to the energy Savings Trust, a GSHP system can help to lower peoples' carbon footprint as it uses a renewable, natural source of heat. Moreover, a GSHP with mid-range efficiency uses a third of the energy needed in an average gas or oil boiler to produce the same amount of heat (http://www.which.co.uk/energy/creating-an-energy-saving-home/guides/ground-source-heat-pumps-explained/how-ground-source-heat-pumps-work/).

Figure 2: Ground loops connecting to a house, and fields being prepared for the ground loops.

4.3 Solar Thermal Energy

Solar thermal energy (STE) is a form of energy and a technology for harnessing solar energy to generate thermal energy for use in the industrial, residential and commercial sectors.

STE works by installing solar panels on the roof of a property to gather energy from the sun. The solar panels are made up of cells which contain liquid. It is this liquid which absorbs solar radiation (energy). The roof solar panels are connected to a hot water cylinder via pipes which allow the heat to be transported. When heat is gathered in the water cylinder it can then be used by the boiler for distribution.

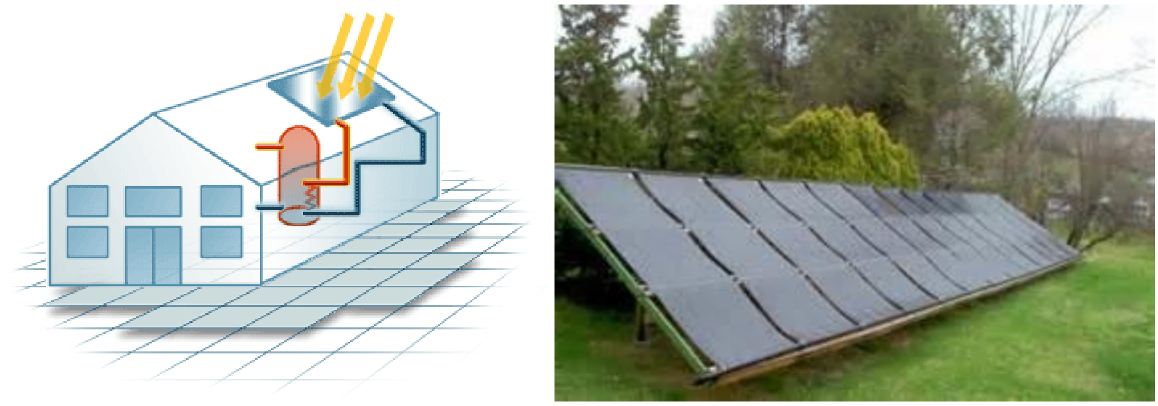


Figure 3: The sun's solar energy is transferred to a boiler to heat water, and panels used to heat a swimming pool.

4.4 Solar Photovoltaic Energy

Solar panel electricity systems, also known as solar photovoltaics (PV), capture the sun's energy using photovoltaic cells. These cells do not need direct sunlight to work, as they can still generate some electricity on a cloudy day. The cells convert the sunlight into electricity, which can be used to run household appliances and lighting.

PV cells are made from layers of semi-conducting material, usually silicon. When light shines on the cell it creates an electric field across the layers. The stronger the sunshine, the more electricity is produced. Groups of cells are mounted together in panels or modules that can either be mounted on the roof or on the ground.

The power of a PV cell is measured in kilowatts peak (kWp). This is the rate at which it generates energy at peak performance in full direct sunlight during the summer. PV cells come in a variety of shapes and sizes. Most PV systems are made up of panels that fit on top of an existing roof, but solar tiles can also be fitted.

The benefits of solar electricity:

- **Reduce electricity bills.** Once the initial installation is paid, the electricity is basically free.
- **Get paid for generating electricity.** The UK Government's Feed-in Tariffs pay households for the electricity generated.
- **Sell electricity back to the grid.** Producing excess electricity can be sold back to the grid.
- **Reduce the carbon footprint.** Solar electricity is green renewable energy and does not release any harmful carbon dioxide or other pollutants. A typical home solar PV system could save over a tonne of carbon dioxide per year – that is more than 30 tonnes over its lifetime.

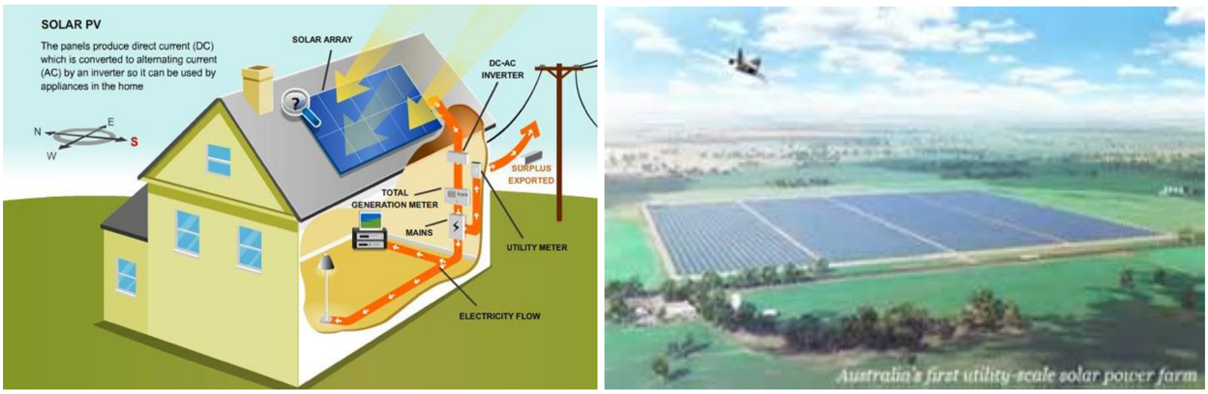


Figure 4: Solar radiation is collected by the panels and converted to electricity, and a solar photovoltaic farm.

4.5 Combined Heat and Power and District Heating

Combined Heat and Power integrates the production of usable heat and power (electricity) in one single, highly efficient process. CHP generates electricity whilst also capturing usable heat (co-generation) that is produced in generating the electricity. (CHP can also provide cooling, referred to as tri-generation.) The waste heat can then be distributed to buildings via district heating pipes. This contrasts with conventional ways of generating electricity, where heat is simply wasted and approximately two thirds of the overall energy consumed is lost. The relative sophistication of CHP means that the overall efficiency can reach in excess of 80% at the point of use.

CHP works well in communities where energy plants can be much smaller, and are extremely quiet and unobtrusive. In Southampton and Woking, for example, CHP plants are located in town centre car parks. Distributing heat from a smaller, ultra-efficient CHP unit within a town cuts consumers heating bills and provides a local source of heating and electricity in the most efficient way possible.

Additionally, CHP technology can connect to existing buildings and new developments. This is important as approximately 70% of the building stock in 2050 will already be built, with the remaining 30% yet to be built[3].

More importantly, from a fuel poverty perspective, financiall savings for the schemes are developed on a whole life costing basis and maintained through long-term contracts by indexing charges to national fuel prices and the retail price index. Estimates of CHP installations can have cost savings of between 10% - 20% on fuel bills[4].

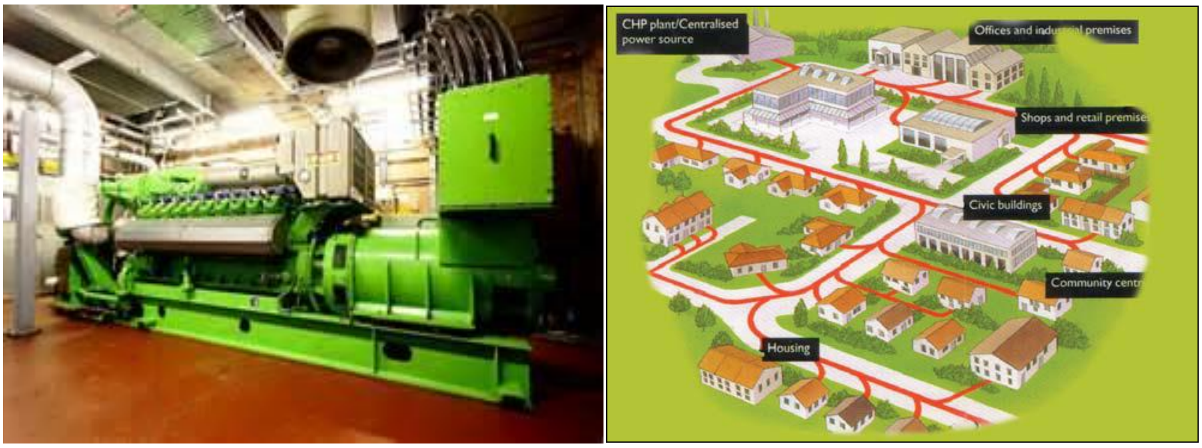


Figure 5: CHP unit and a basic plan of a district heating network.

4.6 Small Scale Wind Energy

The predicted wind resource is a critical factor in identifying sites, as the electricity generated is directly affected by the wind speed. Most turbines require an annual average wind speed of at least 6 metres per second to be considered operationally viable. The amount of electricity generated increases in relation to wind speed. This in turn affects the carbon emission savings and the commercial viability of the site. Wind turbines ideally need to be sited in locations free from obstructions such as buildings, woodland, large trees or other obstacles that affect wind speed or cause turbulence. It would normally be expected that evidence of site suitability is provided in the form of wind speed measurements taken over a 12 month period in advance of any planning application.
Predicting wind resource is an obvious critical factor in locating wind turbines, as the electricity generated is directly affected by the wind speed. However, the UK is one of

[3] Town & Country Planning Association and Combined Heat & Power Association Community Energy: Urban Planning for a Low Carbon Future

[4] Cofeley, available at http://www.cofely-gdfsuez.co.uk/solutions/district-energy/
Get Solutions, available at http://www.getsolutions.co.uk/em-tactics/combined-heat-power-savings/
Gov.UK, available at https://www.gov.uk/combined-heat-and-power

the windiest countries in Europe and is ideal for generating wind power. Moreover most turbines require an annual average wind speed of at least 6 metres per second (m/s) to be considered operationally viable. This is well within the average wind speeds, of 6-6.5 m/s[5], recorded within Nuneaton and Bedworth.

Camco's Renewable and Low Carbon Energy study states that wind energy is limited in Nuneaton and Bedworth. Nonetheless, this is mostly due to other constraints beyond wind speed, such as a 600m buffer between buildings and a large 2.5MW turbine. Regardless, the study also shows that wind speeds in the Borough are consistently above 6 seconds per metre (Fig 24, pg 60), which would be suitable for individual small scale turbines sited on industrial estates, farms and schools.

4.6.1 Small Scale Wind Turbine Sizes

Wind turbines are defined according to their maximum electrical output in kilowatts or megawatts (1000kW). They are also defined by their hub height, tip height and the diameter of their rotor blades (see figures 5 and 6).

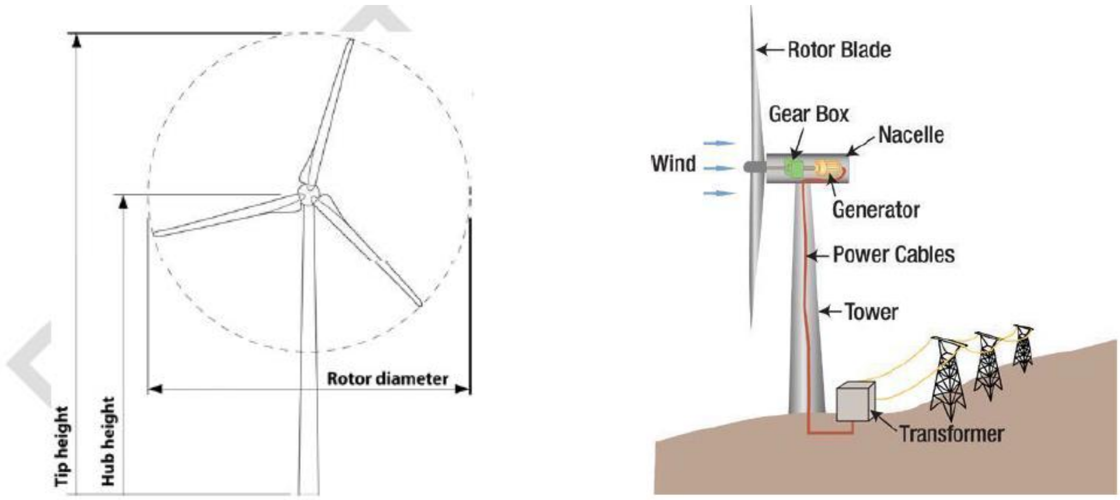


Figure 6: Components of a wind turbine.

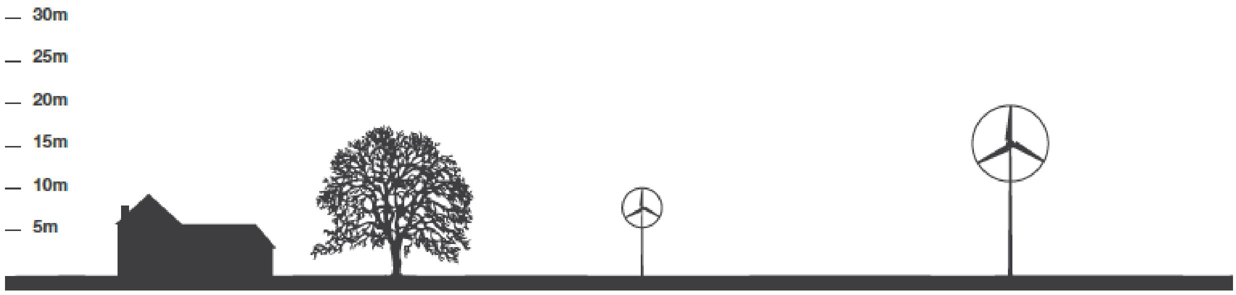
However, these are just guides as there are no universally accepted categories to describe the scale of individual wind turbines. Table 1 is Renewable UK's categorisation of micro, small and medium wind turbines.

Table 1: Definition of micro, small and medium scale wind turbines

Category	Power (kW)	Annual Energy Production (kWh)	Total Height (m)
Micro	0 – 1.5	Up to 1000	10 - 18
Small	1.5 - 50	Up to 200,000	15 - 35
Medium	50 - 500	Up to 1,800,000	25 - 35

These turbines are typically single installations on a farm, domestic property or small business, and primarily provide electricity for on-site usage. These types of turbines are usually no taller than a mature tree (see figure 7).

[5] Camco, Renewable and Low-carbon Resource Assessment and Feasibility Study, 2010.



Size (metres)	2–18	12–25
Capacity (kW)	0–1.5	1.5–15
Typical on-site electricity use	Up to 100% used on-site	Up to 90% used on-site
Typical annual energy production (kWh)	Up to 1000	Up to 60,000
Typically connected to:	House	House or farm

Figure 7: Approximate size in height and kW capacity of a small scale wind turbine.

4.6.2 Economic Case

The UK's small and medium wind turbine sector had been one of the big successes of UK action to decarbonise the economy. The UK has been making and selling smaller-sized wind turbines for over 40 years, and is a world leader in the technology. Thanks to tariff support, falling technology costs and rising energy prices, the sector has grown rapidly. Growth in the UK has been matched by international success, and for every turbine installed here, UK manufacturers export another abroad.

Small and medium wind turbine installations had a total generating capacity of over 102 MW at the end of 2012. Furthermore, for the fourth year in a row, the biggest growth in installed capacity was observed in the 15kW–100kW size band. Significant growth was also seen in the 100kW–500kW bracket, and this is expected to increase in subsequent years. Overall, the number of small and medium wind turbines installed in 2012 grew by 21% compared to 2011. This increase was seen across all size bands of turbine, but as with capacity growth, the increase was most significant in the 15kW–100kW bracket.

The UK is ideally placed to increase the output of renewable electricity from small and medium scale wind developments. Wind is the most widely used renewable technology, and the Government's Feed-in Tariff (FiT) scheme now offers the opportunity for landowners, businesses and communities to take advantage of smaller scale renewable energy generation.

A survey by RenewableUK[6] indicates that 13% of small and medium wind employment figures are from the small onshore wind sector (around 2,464 FTE). This is an increase of 1,864 from the 2010 survey. Moreover, the proportion of manufacturing roles in this sector is even higher than those of large scale onshore wind, owing to a greater emphasis on indigenous manufacturing. Indeed, a strong UK manufacturing industry for micro and small turbines has generated a worldwide export market of nearly 25,000 turbines, with an export revenue of £5.26 million[7].

[6] RenewableUK, Small and Medium Wind UK Market Report, 2013.
[7] RenewableUK, Small and Medium Wind Strategy: The current and future potential of the sub-500kW wind industry in the UK, 2014.

Nonetheless, RenewableUK has raised some concerns in relation to the Feed-in Tariffs. Small and medium scale wind turbines have seen a reduction in the tariffs over the last year. For example, the FiT has decreased by 43% in the 1.5kW to 15kW bracket and 37% in the 15kW to 100kW bracket. As such, householders, businesses and farms are purchasing wind turbines with capacities beyond their need in order to sell back to the grid.

Notwithstanding this, small and medium wind turbines bring many social, environmental and economic benefits to businesses and communities. Apart from the obvious advantages of their carbon-free and limitless fuel source, the nature of the UK climate means that electricity is generated from wind power when it is needed most, i.e. in the cold winter months when electricity demand is high. Small and medium wind turbines offer rural economies the opportunity to diversify income, and they also offer remote communities the opportunity to be self-sufficient in their energy needs.

4.6.3 Ensuring Safety and Quality Performance

The RenewableUK Small Wind Turbine Standard was created by the small wind turbine industry, scientists, state officials and consumers to provide consumers with realistic and comparable performance ratings. The standard provides a method for evaluation of wind turbine systems in terms of safety, reliability, power performance and acoustic characteristics.

The goal of the standard is to provide consumers with a measure of confidence in the quality of small wind turbine products meeting this standard and an improved basis for comparing the performance of competing products.

Planning applicants will be required to demonstrate compliance with this standard when submitting a planning application. The Council will also require a decommissioning scheme to be submitted with their application, as this will be required under planning conditions.

5. INTERNATIONAL LEGISLATION

5.1 The Kyoto Protocol

The Kyoto Protocol committed 37 industrialised nations to reducing emissions of greenhouse gases, principally Carbon Dioxide (CO2), by around 5.2% below their 1990 levels up to 2012. Each country has a different target, relating to its individual socio-economic circumstances. The UK's target was to reduce its emissions by 12.5% by 2012. The protocol is officially the first global legally binding contract to reduce greenhouse gases.

At the 2012 Doha climate change talks, several Parties to the Kyoto Protocol agreed to extend the Protocol to 2020, although several nations pulled out including Canada, Japan and Russia.

5.2 EU Renewable Energy Directive 2009

This Directive sets a target for the UK to achieve 15% of its energy consumption from renewable sources by 2020. This compares to 3% in 2009. While analysis demonstrates it is possible to achieve the target and industry say they have the capacity to deploy at the rate required, the scale of the increase over the next 10 years represents a huge challenge. It will require strong contributions from all three sectors of electricity, heat and transport.

6. NATIONAL LEGISLATION AND POLICY

6.1 The Climate Change Act 2008

This Act provides the legal framework for ensuring that Government meets its commitments to tackle climate change. The Act requires:

- greenhouse gas emissions are reduced by at least 80% by 2050, compared to 1990 levels. This target represents an appropriate UK contribution to global emission reductions consistent with limiting global temperature rise to as little as possible above 2°C.
- legally binding carbon budgets to establish a ceiling on the levels of greenhouse gases that can be emitted into the atmosphere.

6.2 Carbon Budgets

The Committee on Climate Change (CCC) provides independent, evidence-based advice to the UK Government and Parliament and has set out carbon budget benchmarks to ensure regular progress is being made towards the 2050 carbon emissions reduction target. This also ensures a level of predictability for UK firms and households to plan and invest for a low-carbon economy.

The first four carbon budgets (see Table 2), leading to 2027, have been set in law. The UK has made progress in reducing its carbon reductions and is currently in the second carbon budget period.

Table 2: UK carbon budget targets

Budget	Carbon budget level	% reduction below base year (1990)
1st Carbon budget (2008-12)	3,018 MtCO2e	23%
2nd Carbon budget (2013-17)	2,782 MtCO2e	29%
3rd Carbon budget (2018-22)	2,544 MtCO2e	35% by 2020
4th Carbon budget (2023-27)	1,950 MtCO2e	50% by 2025

6.3 National Planning Policy Framework

Relevant NPPF requirement	NPPF sub requirement	Relationship with policy
Core Principle - Support the transition to a low carbon future in		The Renewable and Low Carbon Energy

a changing climate, taking full account of flood risk and coastal change, and encourage the reuse of existing resources, including conversion of existing buildings, and encourage the use of renewable resources (for example, by the development of renewable energy);		policy encourages the use of renewable and low carbon technology. The policy also requires carbon emission reductions at a level above current Building Regulations.
93. Planning plays a key role in helping shape places to secure radical reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to the impacts of climate change, and supporting the delivery of renewable and low carbon energy and associated infrastructure. This is central to the economic, social and environmental dimensions of sustainable development.		The Renewable and Low Carbon Energy policy encourages the use of renewable and low carbon technology. The policy also requires carbon emission reductions at a level above current Building Regulations.
94. Local planning authorities should adopt proactive strategies to mitigate and adapt to climate change, taking full account of flood risk, coastal change and water supply and demand considerations.		The Renewable and Low Carbon Energy policy will contribute towards mitigating and adapting to climate change alongside the Managing Flood Risk and water Quality and Sustainable Design and Construction policies.
95. To support the move to a low carbon future, local planning authorities should:	● plan for new development in locations and ways which reduce greenhouse gas emissions;	The Scale and Location of Growth policy directs development to locations that will offer the greatest potential for using non car modes of travel.
	● actively support energy efficiency improvements to existing buildings; and	
	● when setting any local requirement for a building's sustainability, do so in a way consistent with	The Renewable and Low Carbon Energy and Sustainable Design and Construction policies

	the Government's zero carbon buildings policy and adopt nationally described standards.	take account of the Government's zero carbon policy and Building Regulations standards set by the Housing Standards Review in 2015.
To help increase the use and supply of renewable and low carbon energy, local planning authorities should recognise the responsibility on all communities to contribute to energy generation from renewable or low carbon sources. They should:	● have a positive strategy to promote energy from renewable and low carbon sources;	The Renewable and Low Carbon Energy policy encourages the use of renewable and low carbon technology. The policy also requires carbon emission reductions at a level above current Building Regulations.
	● design their policies to maximise renewable and low carbon energy development while ensuring that adverse impacts are addressed satisfactorily, including cumulative landscape and visual impacts;	The Renewable and Low Carbon Energy policy encourages the use of renewable and low carbon technology. The policy also requires carbon emission reductions at a level above current Building Regulations. The impacts on the landscape will be considered through the Landscape Character policy.
	● consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure the development of such sources;	The CAMCO study identifies types of areas that are potentially suitable for decentralised energy and wind energy. Sites suitable for decentralised energy will be identified in site specific policies. The Renewable and Low Carbon Energy policy identifies general locations suitable for small scale wind energy.
	● support community-led initiatives for	The Renewable and Low Carbon Energy

	renewable and low carbon energy, including developments outside such areas being taken forward through neighbourhood planning; and	policy would support community led initiatives.
	● identify opportunities where development can draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.	The CAMCO study identifies types of areas that are potentially suitable for decentralised energy. Sites suitable for decentralised energy will be identified in site specific policies.

6.4 Housing Standards Review

On 27 March 2015 the government published a ministerial statement to announce a new approach to the setting of technical housing standards in England. This was accompanied by the publication of a new set of streamlined national technical standards. The new Building Regulations will come into effect from 1st October 2015.

The Government announced:

- Its commitment to implementing the zero carbon homes standard in 2016;
- The future strengthening of minimum on-site energy performance requirements;
- It will be introducing powers in the Infrastructure Act 2015 to enable off site carbon abatement measures (allowable solutions) to contribute to zero carbon homes;
- Given, the challenge for smaller home builders there will be an exemption for small housing sites of 10 dwellings or less from the allowable solutions element of zero carbon homes.

LPAs will continue to be able to set and apply policies in local plans requiring compliance with energy performance standards that exceed the energy requirements of the Building Regulations until the commencement of amendments to the Planning and Energy Act through the Deregulation Bill 2015.

From then the energy performance requirements in the Building Regulations will be set at the equivalent level of the (outgoing) Code for Sustainable Homes Level 4. Until the amendment is commenced, it is expected that LPAs will take this statement into account and not set conditions above the Code for Sustainable Homes level 4 equivalent.

The Statement does not modify the National Planning Policy Statement in terms of allowing the connection of new housing development to low carbon infrastructure such as district heating networks.

7. NUNEATON AND BEDWORTH STRATEGIES

7.1 Nuneaton and Bedworth Borough Council's Corporate Plan 2007 - 2021

The Corporate Plan sets out how the Council's services and activities will support the Council's Sustainable Community Plan. It includes a vision, four aims, each supported by several priorities, and key targets.

In relation to renewable and low carbon energy, the most relevant is aim 3: "To provide a pleasant environment for those living, working and visiting the Borough". Under this aim, the priorities are:

- to create a greener and cleaner environment
- to lead in environmental issues addressing climate change and protection of the environment.

7.2 Nuneaton and Bedworth Borough Council's Sustainable Community Plan: Shaping Our Future 2007 - 2021

The Sustainable Community Plan is a blueprint of the Borough's aspirations for the local community between 2007 - 2021. It sets out a vision and a plan to achieve the vision through working together with public sector agencies, communities, voluntary organisations and businesses to tackle major issues such as transport, health, education, employment, housing and community safety.

The Sustainable Community is broken down into four themes:

1) Stronger Borough
2) Safer Borough
3) Healthier Borough
4) Sustainable Borough

Theme four is the most pertinent to renewable and low carbon energy. It aims to "Have a high quality environment with increased biodiversity and a sustainable approach to waste and energy".

8. EVIDENCE BASE DOCUMENTS

8.1 Renewable Energy Capacity Study for the West Midlands (SQW, Maslen Environmental and CO2 Sense)

Consultants carried out a Capacity Study on Renewable Energy for the West Midlands. The project provided analysis and decision making support for Local Authorities to deploy renewable energy in time to meet the UK's 2020 targets.

The project had a specific emphasis on ensuring that this evidence base is consistent with national guidance and other activities in the West Midlands. It built on previous/ongoing studies and applied the methodology published by the Department of Energy and Climate Change (DECC) and the Department for Communities and Local Government (DCLG).

The project focused on land-based renewable electricity and heat, including:

- Onshore Wind (large and small)
- Hydropower (Not relevant to NBBC)
- Biomass
- Micro-generation

8.1.1 Key Points from the Study

The Study found:

- Of the Borough's renewable and low carbon energy capacity:
    - 6.98% could be provided from onshore wind energy.
    - 50.66% could be provided from biomass energy.
    - 42.36% could be provided from micro-generation energy.
- Onshore wind energy and biomass is fully consistent with the Renewable and Low-carbon Resource Assessment undertaken by Camco.
- Local authorities should undertake further work to better understand opportunities and challenges to maximise renewable energy deployment.

It is important to note that this project assessed low and zero carbon energy *capacity*, expressed in MW, whilst the Camco study (below) assessed low and zero carbon energy generation, expressed in GWh.

8.2 Renewable and Low-carbon Resource Assessment and Feasibility Study—Warwickshire and Solihull (CAMCO, 2010)

The Study considers the potential and deliverability of various renewable and low-carbon options within development and as decentralised energy generation. The Study:

- Considers current and future energy consumption;
- Considers existing and potential low and zero carbon energy generation capacity;
- Gives recommends renewable and low carbon policies and targets.

The Study suggests that wind energy offers marginal commercial opportunities across Nuneaton and Bedworth, with most of the viable wind energy opportunities concentrated within Rugby and Stratford-on-Avon (between 130 GWh – 249.7 GWh and 598.1GWh – 1,113.1 GWh, respectively). Other renewable or low-carbon opportunities across the Borough include energy generated from biomass, micro-generation and decentralised sources.

8.2.1 Low and Zero Carbon Energy Generation Estimates

For the Borough, the Study estimates the potential to generate energy from low carbon and zero carbon sources by 2026:

- Wind Energy - Potential to generate between 20.8 GWh and 36.4 GWh (between 1.3% and 2.3% of the Borough's energy demand);
- Biomass Sources – Potential to generate 40.8 GWh (2.56% of the Borough's energy demand);
- Low to zero carbon: new build developments – Potential to capture between 28.4 GWh and 31.5 GWh (between 1.8% and 2% of the Borough's energy demand);
- Low to zero carbon: existing built environment – Potential to generate between 61.4 GWh and 79.8 GWh (between 3.85% and 5% of the Borough's energy demand).

The Borough's projected energy demand to 2026 equates to 1,584 GWh. Therefore, between 9.5% and 12% of the Borough's heat and energy demand could come from low carbon and zero carbon sources. Also, abated (reduced) carbon emissions could reach between 44.9 $ktCO_2$/yr and 57.8 $ktCO_2$/yr.

8.2.2 Modelling Scenarios

The Study models two scenarios, a standard case and an elevated case (best practice), representing a range of renewable uptake, including wind energy, biomass and micro-generation.

8.2.3 Carbon Reduction Targets

The report also sets out minimum and maximum carbon reduction targets. Minimum targets follow Part L of the Building Regulations (BRs) (against the 2006 BRs). The maximum target is an accelerated target above the BRs and would most likely apply best practice standards. In general, the maximum target would apply only to those development sites that can viably incorporate lower cost solutions such as large high density developments, or where low cost energy generation opportunities exist.

8.2.4 Feed-in Tariffs

A Feed-in Tariff (FiT) is a policy mechanism designed to accelerate investment in small scale (less than 5MW) renewable energy technologies. Under the FiT, eligible renewable electricity generators (including homeowners, business owners, farmers, as well as private investors) are paid a cost-based price for the electricity they generate and a tariff for the electricity they export back to the grid (see Table 3). This enables a diversity of technologies (wind, solar, biogas, etc.) to be developed, providing investors with a reasonable return on their investments.

The tariff rates for FiTs are calculated by Ofgem based on legislation set by DECC. Tariffs are listed in tariff tables published on their website www.ofgem.gov.uk/FITs but can change as often as every three months.

Consequently, for larger residential-led development or where costs solutions are available the FiT (and Renewable Heat Incentive) can support renewable energy schemes in a viable way, providing a return on investment of between 5% – 8% per annum (Camco, 92).

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Table 3: Feed-in tariffs (as of 1 April 2015)

Technology	Tariff (p/kWh) between 1 April 2015 to 31 March 2016
Anaerobic Digestion	
Anaerobic digestion with total installed capacity of 250kW or less	10.13
Anaerobic digestion with total installed capacity greater than 250kW but not exceeding 500kW	9.36
Anaerobic digestion with total installed capacity greater than 500kW	8.68
Hydro	
Hydro generating station with total installed capacity of 15kW or less	17.17
Hydro generating station with total installed capacity greater than 15kW but not exceeding 100kW	16.03
Hydro generating station with total installed capacity greater than 100kW but not exceeding 500kW	12.67
Hydro generating station with total installed capacity greater than 500kW but not exceeding 2MW	9.90
Hydro generating station with total installed capacity greater than 2MW	2.70
Wind	
Wind with total installed capacity greater than 1.5kW but not exceeding 15kW	14.45
Wind with total installed capacity greater than 15kW but not exceeding 100kW	14.45
Combined Heat and Power	
Combined Heat and Power with total installed electrical capacity of 2kW or less (tariff only available for 30,000 units)	13.45
Solar Photovoltaic	
Solar photovoltaic with Total Installed Capacity of 4kW or less, where attached to or wired to provide electricity to a new building before first occupation	Higher Rate: 13.39 Middle Rate: 12.05 Lower Rate: 6.16
Solar photovoltaic with Total Installed Capacity of 4kW or less, where attached to or wired to provide electricity to a building which is already occupied	Higher Rate: 13.39 Middle Rate: 12.05 Lower Rate: 6.16
Solar photovoltaic (other than stand-alone) with Total Installed Capacity greater than 4kW but not exceeding 10kW	Higher Rate: 12.13 Middle Rate: 10.92 Lower Rate: 6.16
Solar photovoltaic (other than stand-alone) with Total Installed Capacity greater than 10kW but not exceeding 50kW	Higher Rate: 11.71 Middle Rate: 10.54 Lower Rate: 6.16
Solar photovoltaic (other than stand-alone) with Total Installed Capacity greater than 50kW but not exceeding 100kW	Higher Rate: 9.98 Middle Rate: 8.98 Lower Rate: 6.16
Solar photovoltaic (other than stand-alone) with Total Installed Capacity greater than 100kW but not exceeding 150kW	Higher Rate: 9.98 Middle Rate: 8.98 Lower Rate: 6.16
Solar photovoltaic (other than stand-alone) with Total Installed Capacity greater than 150kW but not exceeding 250kW	Higher Rate: 9.54 Middle Rate: 8.59 Lower Rate: 6.16
Solar photovoltaic (other than stand-alone) with Total Installed Capacity greater than 250kW	6.16
Stand-alone (autonomous) solar photovoltaic (not wired to provide electricity to a building)	6.16

Technology	Tariff (p/kWh) between 1 April 2015 to 31 March 2016
Export Tariffs	
All Eligible Installations	4.85

8.2.5 Renewable Heat Incentive

The Renewable Heat Incentive (RHI) is a payment system for the generation of heat from renewable energy sources. The RHI operates in a similar manner to the FiT system, and was introduced through the Energy Act 2008. The RHI is divided into domestic RHI and Non-domestic RHI.

8.2.5.1 Domestic Renewable Heat Incentive

This is a financial incentive scheme designed to encourage the uptake of renewable heating among domestic consumers (see Table 4). The domestic RHI is targeted at, but not limited to, homes off the gas grid. Those without mains gas have the most potential to save on fuel bills and decrease carbon emissions.

The scheme covers single domestic dwellings and is open to homeowners, private landlords, social landlords and self-builders. It is not open to new build properties other than self-build.

Table 4: Domestic renewable heat tariffs

Technology	Tariff
Air-source heat pumps	7.3p/kWh
Ground and water-source heat pumps	18.8p/kWh
Biomass-only boilers and biomass pellet stoves with integrated boilers	12.2p/kWh
Solar thermal panels (flat plate and evacuated tube for hot water only)	19.2 p/kWh

The tariffs have been set at a level that reflects the expected cost of renewable heat generation over 20 years. Payments will be made on a quarterly basis for seven years.

8.2.5.2 Non-Domestic Renewable Heat Incentive

The Non-Domestic Renewable Heat Incentive (RHI) is a Government environmental programme that provides financial incentives (see Table 5) to increase the uptake of renewable heat. The RHI will provide a subsidy, payable for 20 years, to eligible, non-domestic renewable heat generators and producers of biomethane.

The objective is to encourage a step change in the heat sector by significantly increasing the proportion of heat generated from renewable sources and help the UK meet EU carbon reduction targets. In addition, the Non-Domestic RHI has the wider potential of developing ‘green jobs’.

The Non-Domestic RHI is open to the non-domestic sector including industrial, commercial, public sector and not-for-profit organisations with eligible installations, and to producers of biomethane. This includes, for example, small businesses, hospitals and schools as well as district heating schemes such as where one boiler serves multiple homes. All applications are subject to the detailed scheme rules.

Eligible Renewable and Low-Carbon Heat Technologies include:

- biomass
- heat pumps (ground source, water source and air source)
- deep geothermal
- solar thermal collectors
- biomethane and biogas
- combined heat and power (CHP) systems.

Table 5: Non-domestic renewable heat incentive tariffs

Tariff Name	Eligible Technology	Eligible Sizes	Tariffs (pence)
Small commercial biomass	Solid biomass including solid biomass contained in waste	Less than 200 kWth Tier 1	5.87
Small commercial biomass	Solid biomass including solid biomass contained in waste	Less than 200 kWth Tier 2	1.56
Medium commercial biomass		200 kWth and above & less than 1MWth Tier 1	5.18
Medium commercial biomass		200 kWth and above & less than 1MWth Tier 2	2.24
Large commercial biomass		1MWth and above	2.03
Solid biomass CHP systems (commissioned on or after 4 December 2013)	Solid biomass CHP systems	All capacities	4.17
Water/Ground-source heat pumps	Ground-source heat pumps & Water-source heat pumps	All capacities Tier 1	8.84
Water/Ground-source heat pumps	Ground-source heat pumps & Water-source heat pumps	Tier 2	2.64
Air-source heat pumps (commissioned on or after 4 December 2013)	All Air-source heat pumps	All capacities	2.54
Deep geothermal (commissioned on or after 4 December 2013)	Deep geothermal	All capacities	5.08
All solar collectors (accredited on or after 21 January 2013)	Solar collectors	Less than 200kWh	10.16
Biomethane injection	Biomethane	On the first 40,000 MWh of eligible biomethane Tier 1	7.62
Biomethane injection	Biomethane	Next 40,000 MWh of eligible biomethane	4.47

Tariff Name	Eligible Technology	Eligible Sizes	Tariffs (pence)
		Tier 2	
		Remaining MWh of eligible biomethane Tier 3	3.45
Small biogas combustion	Biogas combustion	Less than 200 kWh	7.62
Medium biogas combustion commissioned on or after December 2013		200 kWth and above & less than 600 kWth	5.99
Large biogas combustion commissioned on or after 4 December 2013		600 kWth and above	2.24

8.2.6 Viable Application of Renewable and Low-carbon Technologies for Various Scales of Development

The Camco Study outlines the general principles for the most appropriate energy supply strategies for different development scales and types (see Table 6).

Table 6: Development types and typical low-carbon energy strategies

Type of development	Density/Mix	Expected Low to Zero Carbon contribution
Rural Infill	Medium density (40dwg/ha), ranging from 1 to 100 units	Integrated micro-renewables, unless there is an existing communal energy system in place or where one is planned near or adjoining site. Difficult to achieve very low or zero carbon development.
Urban Infill	High density (50dwg/ha), ranging from 10 to 100 units	Integrated micro-renewables, unless there is an existing communal energy system in place or where one is planned near or adjoining site. Difficult to achieve very low or zero carbon development.
Settlement Extension	Medium density (40dwg/ha), ranging up to 1,000 units adjoined to existing town or village with a limited mix from other building types.	More suited to communal biomass heating than CHP technology. CHP technology may become more viable in the future. If at a lower density the development is likely to require the addition of micro-renewables. Potential for medium to large scale wind on appropriate sites. Potential to achieve low carbon development.

Type of development	Density/Mix	Expected Low to Zero Carbon contribution
Urban Extension / Major Regeneration Site	Medium density (40 dwg/ha), above 1000 units, adjoining town and mix of other buildings.	Meets indicative criteria for biomass communal and CHP heating in terms of size and mix. Also has potential from medium to large scale wind energy on appropriate sites. Good potential to achieve very low carbon developments.
Large Urban Extension / New Settlement	High density (greater than 50 dwg/ha), up to 4,000 dwellings	Large number of housing units adjoined to existing town with a good mix of other building types. Good potential to achieve very low carbon developments.

The smaller developments that constitute urban and rural infill are typically not appropriate for communal systems (unless they can connect to an adjoining existing, or planned, network) and therefore the optimum energy strategy will consist of highly energy efficient buildings with integrated technologies. The urban extensions are at the larger size and density necessary to support a communal system. Projects over 1,000 dwellings could offer the right conditions to support biomass community heating /CHP serving high density zones.

Although it is recognised that densities are important in determining the viability of CHP and community heating schemes, average density threshold guidelines are indicative. Other characteristics such as scale and mix are equally important in determining viability.

8.2.7 Camco's Recommendations

The Camco Study recommends:

- Developers are required to achieve carbon reduction targets for new development. The study proposes a minimum carbon reduction target of 44% lower than the 2006 BRs standard for new dwellings. This is equivalent to Code for Sustainable Homes Level 4. It also recommends that 20% of the carbon reduction should come from a low carbon or renewable energy source. It is proposed to retain this approach taking account of the Government's statement in 2015 that LPAs do not set carbon reduction targets below the equivalent of Code for Sustainable Homes Level 4. However, it is noted that the most recent Code guidance indicates, for Code level 4, a 19% improvement in the reduction of carbon emissions when compared to the Building Regulations at Code Level 3.
- Where viable, typically on larger residential led developments of 1000 dwellings or more, require developers to provide carbon reductions above Building Regulations, as well as provide an increased level of the carbon reductions from renewable energy sources.
- Require developers to connect to a community/district heating scheme or where such a scheme is not currently in place require developers to financially contribute

to the development of a community/district heating scheme. Contributions could be collected by the Community Infrastructure Levy or Section 106 arrangements. Monies could then be channelled into a Council controlled Carbon Investment Fund.

8.3 Fuel Poverty, Domestic Energy Consumption & Carbon Emissions

8.3.1 Fuel Poverty

A household is said to be fuel poor if it needs to spend more than 10 per cent of its income on fuel to maintain an adequate standard of warmth. This is usually defined as 21 degrees for the main living room and 18 degrees for other occupied rooms. Although the emphasis in the definition is on heating the home, fuel costs in the definition of fuel poverty also include spending on heating water, lights and appliance usage and cooking costs.

Warwickshire Observatory considers that statistics on the amount of energy consumed by households is important because it shows the rising cost of energy has an increasingly significant impact on household budgets and has links between energy use and carbon emissions.

In relation to domestic energy consumption, Warwickshire Observatory States[8]:

- The highest energy consumption rates are generally clustered in four areas; Stratford-upon-Avon, North Leamington, Kenilworth and east Nuneaton. These would all be regarded as the most affluent parts of the county.
- Energy consumption is not determined by housing type, old age or the official indices of deprivation, but is closely related with fuel poverty.
- The issue of energy consumption will become increasingly important for the residents of Nuneaton and Bedworth as prices continue to rise at a faster rate than earnings and fuel poverty becomes an increasingly likely prospect for many households. For example, large areas of the Borough, particularly along the spine of the Borough and to the west, suffer from significantly higher than national and county fuel poverty averages.

Statistics from the Department of Energy and Climate Change (DECC) reveal that 11.9% of households in the Borough are in fuel poverty. However, when analysed at ward level a more dour truth unfolds, as 8 wards have 12% or higher, 4 wards have 13% or higher, 2 wards have 16% or higher and 1 ward has over 18% of households in fuel poverty. Moreover, there are 14 lower super output areas with over 15% of households in fuel poverty and 2 LSOAs with over 20% of households in fuel poverty.

Unless fuel costs are drastically reduced it is difficult to see where impoverished households will begin to experience more comfortable winters in their homes. The obvious solution is further investment in the renewable and low-carbon energy sector to ensure a more secure and cheaper supply of energy.

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[8] http://warksobservatory.files.wordpress.com/2012/04/domestic-energy-consumption.pdf

8.3.2 Energy Consumption and Carbon Emissions

The Borough consumed, per household, the second lowest amount of fossil fuel energy in the County, which may have a correlation to fuel poverty, as suggested by the Warwickshire Observatory.

Table 7: Fossil fuel energy consumption in Warwickshire[9]

Local Authority	Fossil Fuel Energy Consumed (GWh)	Total Households	Energy Consumed per Household (MWh[10])
North Warwickshire	505.2	25203	20.04
Nuneaton and Bedworth	952.9	51526	18.49
Rugby	866.2	40926	21.17
Stratford-on-Avon	985.1	50720	19.422
Warwick	1055.4	57345	18.40
Warwickshire	4364.8	225720	97.522

The latest figures from DECC[11] show that between 2005 – 2012 the Borough reduced its domestic carbon emissions (DCEs) by 29.1 kilotonnes (1000 tonnes) (9.4%). However, the Borough still emits the third highest amount of DCEs in the County. Nonetheless, per household, the Borough has the lowest levels of DCEs across the County.

Table 8: Warwickshire carbon emissions between 2005 and 2012

Local Authority	Borough Wide Carbon Emissions (Ktonnes)		Household Carbon Emissions (tonnes[12])
	2005	2012	2012
North Warwickshire	166.9	151.5	6
Nuneaton and Bedworth	309.6	280.5	5.44
Rugby	245.1	228	5.57
Stratford-on-Avon	331.9	313.3	6.18
Warwick	343.2	313	5.46
Warwickshire	1396.7	1286.3	5.7

9. BOROUGH PLAN CONSULTATIONS

9 Department of Energy and Climate Change, Sub-national total final energy consumption in the United Kingdom, 2005 -2012, available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/360876/Sep_2014_sub_national_total_final_energy_consumption_statistics.xlsx .

10 To calculate: divide the number of households by the fossil fuel energy consumed. For MW multiply by 1000.

11 Department of Energy and Climate Change, 2005 to 2012 UK local and regional CO2 emissions: full dataset, available at https://www.gov.uk/government/statistics/local-authority-emissions-estimates

12 To calculate: divide the number of households by the amount of Ktonne emissions. For tonnes multiply by 1000

9.2 Issues and Options 2009

The Borough Council consulted on an Issues and Options Document in 2009. The document included the following objective:

- To address climate change and encourage sustainability in all new development. In particular:
    - Maximise energy conservation and efficiency and the utilisation of renewable energy

There were no direct objections to the climate change objective. Most of the comments supported the need to have a climate change objective and suggested rephrasing the objective. For example one suggestion was to divide the objective into two objectives: "*one being energy conservation and efficiency, and the other being the utilisation of sources of renewable energy*".

The public response, then, clearly indicates there is a need for low-carbon and renewable energy policies. This objective has since been modified.

9.3 Preferred Options 2013

The Preferred Options Consultation lasted for eight weeks between 5/07/2013 and 30/08/2013. The policy aims to increase the uptake of renewable and low-carbon energy technologies and reduce carbon dioxide emissions.

The Preferred Options consultation raised several issues in relation to renewable and low-carbon energy. In general, there was good level of support for the policy. Nonetheless there were a number of comments that clearly disagreed with or had some concerns with the policy:

- That district heating will be unviable and needs to be viably tested;
- That the Housing Standards Review will abolish the need for planning policies to set carbon reduction targets, as it will be required under building regulations;
- That wind statistics for the borough show there is no business case for wind energy.

9.3.1 Policy Changes as a Result of the Preferred Options Consultation

With respect to district heating the policy is more flexible and is more supportive of a variety of renewable and low-carbon technologies. However, carbon reduction targets are still included in the policy. These targets are in relation to renewable or low-carbon technologies being integrated into the development and as a minimum achieve a 45% reduction in carbon reductions had they not been installed. It is the requirement to integrate renewable or low-carbon sources that is key. Furthermore, it is still unclear, at the time of writing, exactly what the outcome of the Housing Standards Review will be. With regards to wind energy, the Borough has consistent wind speeds whereby wind turbines can be viably deployed. The issue for the Borough is in relation to large scale wind turbines being constrained by buffer distances to existing buildings. Consequently, the wind energy policy has been refined and is limited to small scale wind energy.

10. LINKS TO SPATIAL VISION & OBJECTIVES

The spatial vision, builds on the Sustainable Community Plan and sets out what the Borough will look like at the end of the Plan period.

The relevant part of the vision states that by 2031, Nuneaton and Bedworth Borough will be a place where there are opportunities for sustainable economic growth with diverse job prospects, healthy living and an integrated infrastructure network. Business will want to invest in the Borough as a result of the outcomes of policies in the Plan, which will include creating an attractive environment.

The spatial objectives support the spatial vision and are linked to those of the Sustainable Communities Plan.

Objective 8

To address climate change and encourage sustainability in all new development. In particular:

a) Avoid where possible sites that are at risk of flooding now or in the future.

b) Utilising appropriate sustainable urban drainage systems for flood or surface water attenuation and using water sustainably.

c) Protect and enhance the Borough's ecological network, in particular priority habitats and species and minimising impacts on biodiversity.

d) Maximise energy efficiency and the use of renewable energy, particularly those with greatest potential in the Borough. For example, combined heat and power district energy, biomass energy, ground source heat pumps, solar photovoltaics and solar thermal, along with any future renewable or low carbon technology that may become more suitable for the Borough during the plan period.

e) Ensure development makes links to cycling and walking networks to encourage green travel.

11. POLICY JUSTIFICATION

The following summarises the justification of the renewable and low carbon energy policy:

Climate change is an important issue to tackle. There is irrefutable evidence that if we carry on 'business as usual' there is a 50% chance of a 5^0C increase in global temperature by the end of the century. This will have catastrophic consequences on global economic markets, human health costs and the environment.

Irrespective of what we do now to reduce greenhouse gas emissions – the cause of climate change – the Earth's climate is already set on a course towards unavoidable and extreme weather events. Significantly reducing reliance on carbon-based fuels and instead increasing our uptake of clean renewable and low carbon energy supplies will help to stabilise carbon emissions to manageable levels.

National and European legislation have set targets for increasing electricity generation from renewable energy sources and reducing carbon emissions. Consequently, this policy encourages a wide range of renewable and low-carbon technologies to support a low-carbon economy and contribute towards national and European targets.

Decentralised energy through combined heat and power (CHP) is a proven technology that can be fuelled by both low-carbon and renewable energy sources, such as biomass. The relative sophistication of CHP means that the overall efficiency can reach in excess of 80% at the point of use, compared to centralised power plants that waste 66% of the energy generated. CHP can be used at most development scales. Decentralised energy, on the other hand, is more suitable for:

- Town and city centres.
- Large new urban extensions and settlements.
- Stand alone or connected projects over 1,000 dwellings could offer the right conditions to support biomass community heating / CHP serving high density zones.

Smaller developments of urban and rural infill are typically not appropriate for communal systems (unless they can connect to an adjoining existing, or planned, network). For such development, the optimum energy strategy will consist of highly energy efficient buildings with integrated technologies.

East Nuneaton has levels of energy consumption that are among the highest in the County. At the same time, the Borough has some of the highest levels of fuel poverty. Overall, 11.9% of the Borough's households are in fuel poverty, with several wards over 16% of households in fuel poverty and two LSOAs with over 20% of households in fuel poverty.

The issue of energy consumption will become increasingly important for the Borough's residents as prices continue to rise at a faster rate than earnings and fuel poverty becomes an increasingly likely prospect for many households. District heating networks are known to have the potential of reducing fuel bills by at least 10% and as much as 20%.

The UK is one of the windiest countries in Europe and is ideal for generating wind power. The Borough consistently has wind speeds of 6 to 6.5 metres per second, well within the threshold for viable wind speeds. Moreover, this policy focuses on small scale wind turbines which typically require lower wind speeds to operate optimally.

Furthermore, the scale of wind turbines this policy targets is a globally, economically successful sector which is likely to continue to grow, with suitable markets for businesses, schools and farms, amongst others.

Additionally, by requiring small scale wind turbines to meet the RenewableUK Standard, there will be a level of certainty in the products safety and operational reliability.

To enable low and zero carbon technologies to successfully challenge traditional carbon based energy as the major source of energy generator, two government led schemes have been made available to homeowners and developers. The Feed-in-Tariff (FiT) and the Renewable Heat Incentive (RHI) are aimed to accelerate investment renewable energy technologies. Consequently, for most developments, the FiT and RHI will support renewable energy schemes in a viable way.

Renewable and Low-carbon Energy Policy

General

Renewable and low carbon technologies, including biomass energy, ground source heat pumps, solar thermal and solar photovoltaic, combined heat and power and district heating will be encouraged.

Residential Development

Until zero carbon regulations come into effect, major residential development will be required to improve carbon emission reduction by 19% more than the Building Regulations 2015 with at least 20% of the carbon emission reductions resulting from the inclusion of renewable and low carbon energy sources.

Non-Residential Development

Until 2016, new major non-residential development will be required to improve carbon emission reductions by 25% more than 2006 Building Regulations, with at least 40% of the carbon reductions resulting from the inclusion of renewable energy sources. For the period 2016 to 2019, the improvements to carbon emission reductions will increase to 44%, with at least 45% of the reductions resulting from the inclusion of renewable and low carbon energy sources. This will continue to be applied until zero carbon regulations for non-residential development are in effect.

Where developers consider either the residential or non-residential requirements will make their proposal unviable, an independent viability assessment, at the developer’s cost, must accompany the planning application tojustify why the policy will make the proposal unviable.

Small Scale Wind Energy

One Small Scale wind energy turbine, between 5kW and 20kW electricity power output, with a maximum height of 15 metres to hub, will be appropriate on school premises, industrial estates and farms provided there is:

a. No significant harm to the amenity of and safety of residential areas, particularly in relation to

i. noise pollution, proximity and/or highway safety;
ii. electro-magnetic interference;
iii. unacceptable shadow flicker;
iv. impact on aviation.

b. Certified accreditation or similar evidence of the wind turbine meeting the RenewableUK Small Wind Turbine Performance and Safety Standard should be provided with the planning application prior to the granting of planning permission.
c. A decommissioning scheme is in place. The applicant should expect that the LPA will request that a bond be provided under a Section 106 agreement to cover the cost of decommissioning and/or restoration of the site.

10 DELIVERING AND IMPLEMENTING POLICIES

10.1 Policy Delivery Mechanisms

- Work with developers on the strategic sites to deliver decentralised energy.
- Use the Energy Toolkit to find the most viable carbon reduction solutions and to ensure development proposals are compliant with the Council's energy policies.

10.2 Monitoring

The Council monitor the following through the Annual Monitoring Report:

- Low and zero carbon energy sources under 50 MW which require planning permission.
- Large scale low and zero carbon energy development.
- The amount of carbon dioxide reductions.
- The use of the Enplanner Toolkit

The Council will also seek ways to monitor low and zero carbon developments that do not require planning permission.

APPENDICES

Appendix 1: Southampton

In 1986, Southampton began pumping heat from the geothermal borehole through a district heating network. Over the years, several combined heat and power (CHP) engines and backup boilers for heating have been added, along with absorption chillers and backup vapour compression machines for cooling.

The scheme, which started with a single customer (the Civic Centre) now has thousands of customers. It provides heating and cooling to over a thousand residential properties, several large office buildings, a hospital, a health clinic, a university, a large shopping centre, a supermarket, several hotels, BBC television studios, one of Europe's largest shopping complexes, and a swimming and diving complex, among others.

A 725kWe CHP engine has recently been installed at the Royal South Hampshire Hospital as part of the scheme, which will guarantee the secure operation of the hospital supplying its heat and electricity. Any extra requirement for steam is provided by the district energy network and any excess is fed back into the network, to supply other properties.

Key Facts

- Built on a Joint Co-Operation Agreement with Southampton City Council
- £5.0 M p.a. Energy Sales
- £0.6 M p.a. cost savings to consumers.
- 11,000 tonnes of CO2 saved p.a.
- 8MWe of CHP
- Supplying heating, cooling and electricity
- A network of 14 km of buried pipework
- Project built on 20 year energy supply contracts
- Capital cost to date £12M

Appendix 2: Birmingham

Since its conception in 2003, the Birmingham District Energy Scheme has continued to expand and play an increasingly important role in Birmingham City Council's climate change strategy, which aims to reduce carbon dioxide emissions by 60% by 2025.

The Birmingham District Energy Scheme is owned and operated by Cofely District Energy, working in partnership with Birmingham City Council (BCC), Aston University and Birmingham Children's Hospital, under the name of Birmingham District Energy Company Ltd (BDEC).

Following a feasibility investigation in 2003 two schemes were identified – Broad Street and Eastside. The first 25-year energy supply agreement between the partner organizations was signed in 2006 and the Eastside scheme energy services agreement, also for 25 years, was signed in 2008–2009.

These are tri-generation schemes producing heat, electricity and chilled water – making extensive use of large-scale combined heat and power (CHP) technologies and using conventional boilers for 'top up', standby and increased resilience. The electricity from all the CHP units is used directly via private wire connections into each of the buildings/sites. Chilled water is generated by absorption chillers, powered by heat from the CHP and boiler plant.

Broad Street Scheme

Launched in 2007, the Broad Street tri-generation scheme was the first phase and encompassed a range of buildings in the central business district served by an energy centre at the International Convention Centre (ICC).

Hot and chilled water from these energy centres is distributed through underground pipework networks that connect a range of buildings in and around Broad Street. As the scheme expands, further satellite energy centres will be created in strategic developments connecting the scheme, linking into the networks serving the core buildings along Broad Street. Electrical power generated by the CHP plant in the energy centres is used to offset some of the power consumed from the grid by the buildings in the scheme.

The Broad Street Scheme saves over 3800 tonnes of carbon dioxide per annum, a figure which will increase as new consumers are added to the network. These will include the Library of Birmingham, a new central library for Birmingham currently being developed on land adjoining the Birmingham Repertory Theatre.

The Eastside Scheme

The Eastside Scheme is split into two phases – the Aston University Scheme and the Birmingham Children's Hospital Scheme. The location of the Eastside schemes means both networks can expand into regeneration areas of Birmingham. In addition, the Eastside redevelopment of Birmingham New Street Station has the potential to become a hub for interconnecting the Broad Street and Eastside schemes.

The Aston University Scheme began operations in 2009, with 3 MWe of CHP capacity installed at BDEC's Jennens Road Energy Centre. In 2010 an additional energy centre with 1.6 MWe of CHP capacity was constructed to serve the Birmingham Children's Hospital and Birmingham City Council's Lancaster Circus Offices. This scheme delivers a further carbon dioxide reduction of 3500 tonnes per annum.

In addition, in August 2010, Cosmopolitan Housing Group confirmed that it will take heat from the scheme for its new Birmingham student accommodation. Cosmopolitan's commitment to take energy ahead of the scheme's operation reinforces developer confidence in BDEC and its ability to deliver energy on-time and to consumer's requirements and specification.

Resilience and New Energy Sources

Birmingham's district energy schemes (BDEC) are designed to be at least as resilient as conventional supplies. For example, if a CHP engine is off-line for planned or reactive maintenance, sufficient top-up and back-up plant is in place to meet the demands of the energy network. BDEC achieves this by linking and installing additional boiler/chilling plant, and ensuring there is a grid connection.

The City's district energy networks have also been designed to integrate new, emerging technologies such as fuel cells and renewable heat sources, as overall energy demand and improved efficiencies makes these technologies financially viable. BDEC expects to add substantial renewable energy generation to the schemes as new consumer connections are made. This will not only reduce emissions but will also help to future-proof the scheme against fossil fuel shortages.

Future plans include further expansion and interconnection of the hot water networks to supply heating across the entire city centre. This will enable heat to be added at various locations, provided by alternative sources that can be used across the network. These alternative heat sources could include food waste, general waste and biomass fuels. There is also scope for generating more electrical power at specific points to supply directly to major consumers. The overall target is to increase carbon savings from 12,000 tonnes per annum to 20,000 tonnes by 2015.

Key Facts

- Large commercially developed CHP/district energy scheme Commenced 2006
- 3 Initial Schemes– City Centre, Aston University & Birmingham Children's Hospital
- £6.0 M p.a. Energy Sales
- £0.3 M p.a. cost savings to consumers.
- 12,000 tonnes of CO_2 saved p.a.
- 6.6 MWe of CHP
- Supplying heating, cooling and electricity
- Project built on 20 year energy supply contracts
- Capital cost to date £7M

Appendix 3: Leicester

Leicester District Energy is a £15 million partnership between Cofely and Leicester City Council. The scheme has already seen 7km of insulated pipework laid across the city and when fully complete, it will provide heating and hot water to 15 civic buildings including De Montfort Hall, the town hall and various schools, community centres and libraries. The scheme will also include the University of Leicester and close to 3,000 council homes.

It will use a combination of over 5 MW of low carbon gas-fired combined heat & power (CHP) and biomass boilers to achieve CO_2 emission savings of 12,000 tonnes per annum. The University expects to consume 3.2MW of heating.

The first phase of Leicester District Energy became operational in June 2012, with around 100 homes in Beatty Avenue, Humberstone. This phase involves burning wood pellets (biomass) rather than burning natural gas, and will be one of the largest CO_2 neutral projects in the UK, once in full operation. The scheme will eventually connect St. Marks, St. Matthews, St. Andrews and Aikman Avenue estates across the city.

The Leicester District Energy scheme is being delivered through the Leicester District Energy Company, with an investment of £14M by Cofely and additional funding from the Community Energy Saving Programme (CESP).

Key Facts

- Low carbon heat & electricity generation (using CHP)
- 12,000 tonnes of CO_2 reduction per year
- Use of biomass renewable technology
- Linkage & optimisation of existing smaller schemes to produce cost and environmental savings
- Ability to easily connect new buildings in the future. Designed to allow use of emerging renewable technologies in future years