3.0 RENEWABLE ENERGY

3.1 BACKGROUND

Utilising sustainable technologies to exploit our renewable energy resources and generate low carbon electricity and heat has seen substantial growth over the last few years.

It’s becoming increasingly well-recognised that utilising low carbon technologies such as solar photovoltaics (PV), biomass boilers, and wind turbines will not only reduce fossil fuel consumption and associated CO₂ emissions, but also reduce energy bills and potentially provide income generation.

The Department of Energy and Climate Change is committed to increasing the proportion of energy we use that originates from a renewable source. It is recognised that this will not only increase the security of the energy supplies in the UK, but also provide opportunities for investment in new industries and technologies, thus developing a greener economy.

Recognising that the depletion of our domestic fossil fuel reserves, combined with the projected growth in global energy demand, is putting our energy security at risk, the Government’s Renewable Energy Roadmap sets out actions to meet the UK target to generate 15% of our energy from renewable sources by 2020.

Whilst the technologies and capacity to achieve this already exist, it presents a significant challenge over the coming years. However, exploiting our renewable sources now will allow us to be less reliant on others in the future.

3.1.1 SUSTAINABLE ENERGY

The energy hierarchy follows a ‘be lean – be clean – be green’ principle; however, the urgent need to reduce carbon emissions will require the use of all means available. In practical terms, initiatives to minimise energy demand, improve energy efficiency, and develop renewable energy technologies, will need to work in parallel and, in many instances, will be the elements of an integrated approach. The energy hierarchy should therefore not restrict the use of low carbon technologies but be seen as an integrated approach to energy reduction.
3.2 WEST LANCASHIRE ENERGY DEMAND AND SUPPLY

3.2.1 ENERGY DEMAND

In 2009, the total energy consumption of the Borough was 2,753.5 gigawatt hours (GWh), responsible for 723.4 kilotonnes of CO$_2$ emissions (DECC, 2012). In the same year, just 3% of the UK’s energy consumption originated from a renewable source, indicating we have a very long way to go if we are to meet the UK renewables target by 2020.

3.2.2 RENEWABLE ENERGY CAPACITY

To help tackle climate change and reduce our dependency on fossil fuels, West Lancashire Borough Council supports an increase in the use and supply of renewable and low carbon energy. The Local Plan supports the delivery of this objective, provided any proposals can demonstrate that they will not result in unacceptable harm to the local environment.

The use of low carbon technologies depends very much on the surrounding landscapes of an area and what they lend themselves to. The very nature of the landscape in West Lancashire, which is predominately flat and open, lends itself to some technologies more than others.

To investigate West Lancashire’s capacity to deliver low carbon and renewable energy technologies, two studies have been undertaken:

The Liverpool City Region Renewable Energy Capacity Study: Commissioned in 2010, this study considered the viability of different forms of energy generation and identified possible constraints across the Borough. Unsurprisingly, the study concluded that West Lancashire is well-suited to wind power generation due to the large expanses of flat land with relatively high wind speeds.

The study identified areas generally considered to be suitable for large scale wind development. This was achieved through identifying areas with wind speeds exceeding 6.5m/s and giving consideration to other local constraints. These included, but are not restricted to, a 500m address buffer, a 100m buffer from listed buildings, conservation areas, deep peat areas, and sites of ecological conservation, e.g. SSSIs and Green Belt land.

The general area identified to be of least constraint and greatest wind resource is south of Great Altcar, adjacent to the River Alt. A map showing this identified area can be viewed [here](#). However, further detailed appraisals of the broad areas of least constraint will be required before any wind scheme could be considered.

The Lancashire Sustainable Energy Study: Consultants SQW and Maslen Environmental were commissioned by Lancashire County Council to provide a Borough-level interpretation of the North West Renewable and Low Carbon Energy Capacity and Deployment Study (2010) regarding renewable energy potential and deployment.
This assessment estimated that West Lancashire has a renewable energy capacity of 1,630MW, which equates to 15% of the total capacity for Lancashire.

Similar to the Liverpool City Region Study, the technology providing the largest resource is wind, reflecting West Lancashire’s rural characteristics and low population density. Microgeneration was also highlighted but with much smaller amounts of available resource in the form of waste and biomass.

In addition, a planning guide and summary factsheet have also been produced to assist with understanding this topic. These documents can be viewed here.

### 3.2.3 TECHNICAL POTENTIAL VERSUS DEPLOYABLE POTENTIAL

The above mentioned studies provide an estimation of technical potential to deliver renewable energy generation within the Borough. They do not provide an indication of best approach for the Local Authority or provide an indication of whether the renewable technologies they relate to are feasible. Nor do they provide strict criteria that all proposals must meet in order to be considered acceptable in planning terms.

Many other factors need to be taken into account to identify the likely level of deployment over time; for example, economic, environmental, and planning considerations. Whilst an area of least constraint and greatest wind resource has been identified, individual proposals must be considered on their own merits within the specific local context and must have regard to the wider Local Plan. These are discussed further in Chapter 3.5.

### 3.2.4 RENEWABLE ENERGY PLANNING POLICIES

The Council is currently in the process of adopting a new Local Plan for West Lancashire 2012 - 2027. This emerging Local Plan has been produced in line with the National Planning Policy Framework (NPPF) guidance which requires Local Planning Authorities to have a positive strategy to promote energy production from renewable sources while ensuring that adverse impacts are addressed satisfactorily.

Whilst this Strategy document encourages the use of all renewable technologies and makes reference to national and local planning policies, it is not itself a planning policy document. The current Replacement Local Plan 2001 – 2016 and the new Local plan 2012 – 2027 can be viewed here.
3.3 A GUIDE TO RENEWABLE ENERGY INSTALLATION

Whether retrofitting a renewable technology into an existing building or installing into a new build development, there are always considerations that need to be borne in mind and a trusted supply chain with a performance guarantee should always be used.

The design and installation of renewables into new build developments is also considered within Chapter 5: Sustainable Development.

3.3.1 LOW CARBON TECHNOLOGIES

There are various forms of renewable electricity and heat-generating technologies. Over recent years, this sector has seen dramatic growth and is one of only a few given the current economic climate. Significant investment in this area has resulted in the technologies advancing at a rapid rate to achieve greater efficiencies. Additionally, growth in this sector has resulted in these technologies becoming increasingly cost-effective, with installation prices dropping significantly, especially in the case of Solar PV. When coupled with the subsidies available from Government, the installation of renewables is often the most feasible and viable option.

There are a wide range of renewable technologies that utilise natural elements such as the sun, air, and wind to generate energy. There is already a wealth of information available to inform of what renewable technologies do and how they work. These include solar photovoltaics (PV), solar thermal hot water, biomass boilers, wind turbines, air source/ground source heat pumps, combined heat and power (CHP) units, energy from waste, and hydroelectricity to name a few. The links below provides a list of helpful websites:

- Energy Saving Trust
  ‘Generate your own energy’

- CLASP
  ‘Renewable energy factsheets’

- Centre for Sustainable Energy
  ‘Sustainable energy’

- TADEA
  ‘Supporting sustainable’ growth’
3.3.2 MICROGENERATION CERTIFICATION SCHEME

The Microgeneration Certification Scheme (MCS) certifies renewable technologies used to produce electricity and heat. The MCS is also linked to the financial incentives explained in Chapter 3.4, which requires both the products and installers to be accredited to ensure eligibility.

To check if a product or installer is MCS certified, visit the MCS website.

3.3.3 SOLAR KEYMARK

The Solar Keymark scheme is equivalent to the MCS but covers the certification of solar thermal products only. Unlike the MCS scheme, it does not cover installation company certification. Consumers are able to use a CEN Solar Keymark-approved product and still claim the Renewable Heat Incentive, provided the installation has been undertaken by an MCS accredited installer.
3.4 SUPPORT PROGRAMMES AND FINANCIAL INCENTIVES

3.4.1 FEED-IN TARIFF (FIT)

The Feed-in Tariff is a Government incentive to increase the level of renewable energy in the UK and work towards our national target of 15% of energy from renewables by 2020.

The Feed-in Tariff provides the owner of any renewable electricity generating technology with a fixed income for every kilowatt hour (KWh) they generate, making renewable technology a more affordable and feasible option.

If you are eligible to receive FITs you will benefit in 3 ways:

- **The generation tariff**: a set rate paid for every kWh of electricity generated, paid by the energy supplier (tariffs vary between technologies and dates of installation).
- **The export tariff**: a further payment from your energy supplier for each KWh that isn't used on site, which you export back to the electricity grid.
- **Reduced energy bills**: as you use the electricity you generate on site and therefore use less from the grid.

Further information on how FITs work, the generation tariffs for different renewable technologies, and advice on how to sign up to the scheme, can all be found on the Energy Saving Trust website.

3.4.2 RENEWABLE HEAT INCENTIVE (RHI)

The Renewable Heat Incentive is designed to provide financial support to encourage individuals, businesses, and communities to switch from fossil fuel heating to renewable sources such as biomass.

This support comes in 2 phases:

- **Renewable heat premium payments (RHPP)**: an upfront payment to help with the initial purchase of the renewable heating system.

- **Renewable heat incentive**: currently available to the non-domestic sector. The domestic element is due to be launched in Spring 2014, subject to parliamentary approval. Guidance indicates that technologies installed from July 2009 will be eligible.

For further information and eligibility criteria, please visit the Energy Saving Trust website.
3.5 CONSIDERATIONS

There are many hurdles that must be overcome to reach the installation stage of a renewable energy project.

When a homeowner considers investing in renewables it's usually on the basis of either an attractive investment or a reduction in their carbon footprint. In these situations, the benefits of any investment are directly attributable to the owner of the technology and will help to build an appealing project.

However, managing to get the business case to stack up for commercial installations, especially those in multi-occupancy or multi-ownership buildings, can be far more complicated. Issues such as leasing arrangements, tenure contracts, and split incentives often cause complications. Where investments are made, they are usually driven by financial incentive, rather than to improve energy efficiency and reduce carbon emissions. Some of the barriers identified by property and industry professionals are discussed in the following sections:

3.5.1 THE BUSINESS CASE

When presenting the business case in support of investing in renewable energy, it is important to consider the savings that will be made on energy bills alongside any income you may receive from financial incentives such as the Feed-in Tariff or Renewable Heat Incentive.

Other benefits that may help the case to stack up include encouraging existing occupiers to extend their lease and reduce voids, the replacement of existing failing plant or equipment, and to improve green credentials and company image.

3.5.2 DISRUPTION

The installation of renewables can be disruptive, especially if internal pipework is required. Where possible, it's far easier to undertake the works when part or all of the building is vacant. Nevertheless, low-disruption retrofits are possible with careful planning and arrangements for additional heating.

3.5.3 CAPITAL FUNDS

Depending of the type of project you’re implementing, there are different finance models that may be of interest if you are struggling to fund the installation upfront.

The financial income provided by the Feed-in Tariff and Renewable Heat Incentive can make a loan or repayment scheme attractive. Funding aid can also be available for some projects from CESP and CERT, as detailed in Chapter 2.4.
Some commercial projects may be suited to an Energy Services Company (ESCo) model whereby a partnership with an investor is utilised. Further information regarding ESCo’s can be found in Chapter 4.

### 3.5.4 LOCATION AND ORIENTATION

The type of technology you are considering will have an impact on where it can be located. For example, solar technologies such as photovoltaics or hot water systems ideally need to be located on a south facing roof slope to achieve maximum generation. Consider any surrounding vegetation that may cause shading in future years. Localised wind speeds for turbines and local sources of fuel and access arrangements for deliveries to biomass boilers may also need consideration.

### 3.5.5 PLANNING PERMISSION

Depending on the technology you have chosen and the type of project you are proposing, be it domestic or commercial, you may need to secure planning permission prior to installation.

Some technologies, in some circumstances, do benefit from permitted development rights and will therefore not require planning permission, providing certain criteria are met. A factsheet on each renewable technology and all related planning information has been produced by CLASP and can be viewed [here](#). More information on national and local planning policies can be found in Chapter 5; however, it is strongly advised that you check with the Council prior to any works starting.

Applications will need to be considered on their own merits within the specific local context, and must have regard to the wider Development Plan. This is made up of Local Plan policies, the emerging Local Plan policies, and the National Planning Policy Framework (NPPF). The NPPF emphasises the importance of providing for appropriate renewable energy development, which is in keeping with the sustainable development message that runs through the Policy.

This also applies to development within the Green Belt, where renewable and low carbon energy development proposals can demonstrate that the harm to the Green Belt is outweighed by the wider benefits of the development.

### 3.5.6 GRID CONNECTION

Larger electricity generating installations must have permission to connect to the grid from the Distribution Network Operator (DNO), which in West Lancashire is [Electricity Northwest](#). Application can be a lengthy process so it's advisable to make contact with the DNO as soon as possible into the project. Location and access to the nearest sub stations also need to be considered.
3.5.7 IMPACTS ON LANDSCAPE CHARACTER AND VALUE

The impact of any development on the landscape character and value is a primary consideration, especially in the case of wind turbine installations.

Local Supplementary Planning Guidance (SPG) ‘Natural Areas and Areas of Landscape History Importance’ was adopted in accordance with the current West Lancashire Replacement Local Plan. This document identifies and designates areas of importance for landscape history. These areas are designated on a scale of local, county, and regional importance and will need to be given due consideration against any development.

The Borough has also been divided up to represent the different areas of landscape character across West Lancashire. There are thirteen landscape character areas in total, each listed with their key characters and mechanisms for minimising environmental impact.

Photo montages are required with wind turbine applications to help determine the impact on visual amenity.

The Borough also has 28 conservation areas and various buildings listed for their historical importance. Further information on West Lancashire heritage is available on the Council website.

3.5.8 IMPACTS ON LOCAL AMENITY

The proximity and impact on nearby local residents is always a principal consideration for any installation, mainly in terms of noise impacts from technologies such as air source heat pumps and wind turbines. Visual impact on the living conditions of neighbouring properties, with regards to outlook, is also considered.

Air source heat pumps generally do not cause an issue provided they are located away from openable windows to habitable rooms; wind turbines, however, need far greater assessment to ensure nearby residents are safeguarded. In many cases, a noise consultant is required to undertake an assessment over a given radius around the proposed site; this increases with distance in relation to the size of the installation.

Shadow flicker can also occur, albeit infrequently, when the rotating wind turbine blades periodically cast shadows through windows of neighbouring properties. This does need to be given consideration during the planning stages of a wind turbine development.
3.5.9 ECOLOGICAL IMPACTS

Local wildlife and biodiversity must also be given due consideration, again predominantly to wind turbine developments, but this issue can also be applicable when siting a large boiler house for example.

The migratory route of birds is usually a key issue, depending on the height of the proposed structure, and is particularly relevant in West Lancashire with reserves like Martin Mere attracting species such as the pink-footed goose. A qualified ecologist should be consulted prior to any wind turbine development.

3.5.10 IMPACTS ON AVIATION NAVIGATION SYSTEMS

Wind turbine developments can create problems for aviation organisations, causing radar interference and obstruction to low flying air traffic. Local and national aviation authorities such as National Air Traffic Services (NATS) are consulted through the planning process to ensure such impacts are avoided. NATS also provide a pre-planning application advice service on their website.
3.6 CASE STUDIES

The Council is piloting a number of renewable technologies on its buildings and housing. Information regarding our experiences implementing these schemes and the savings we have seen are detailed in the case studies below, along with some other independent case studies from across the Borough. We hope these will be of benefit to those considering similar schemes in the future.

3.6.1 AIR SOURCE HEAT PUMPS

There are currently 69 Council properties in West Lancashire heated by air source heat pumps. The properties are located within the sheltered housing schemes on Beechwood Court, Skelmersdale and Church Road/ Stockley Crescent, Bickerstaffe, both of which home elderly tenants, vulnerable to fuel poverty and the associated health risks of a cold home.

With no connection to the gas grid, these properties were previously heated by electric storage heaters, an inefficient and expensive form of heating which often couldn’t provide an adequate level of warmth during the winter months.

The heat pumps installed at Beechwood Court have successfully delivered efficient, controllable heating, on demand, even with outside temperatures as low as -15°C.

Continual monitoring since completion of these projects in 2011/12 has seen significant savings in energy consumption, electricity bills, and carbon emissions.

Other benefits of the installations include:

- Easy to install with minimal disruption to residents.
- Low maintenance.
- Elegant modern radiators replace storage heaters.
- Temperature controls ensure an adequate level of warmth is maintained.

A recent press article regarding the Beechwood Court installation can be found overleaf.
Energy efficient future for tenants

Installation Summary

42 warden-assisted flats

Ecodan chosen to lower the building's energy rating, improve efficiency and reduce tenants energy bills

Originally heated by electric heaters connected to an Economy 7 circuit

One 5kW unit installed for every 2 flats

14kW unit installed to service communal areas

Installed over a period of weeks with tenants in situ

The tenants of 42 warden-assisted flats owned by West Lancashire Borough Council, are looking forward to enjoying reliable, energy efficient heating thanks to the installation of a number of Ecodan air source heat pumps which provide them with low carbon, renewable energy.

In a move to increase the energy rating for the flats in Beechwood Court, Binsing, Skelmersdale, the Council has replaced its old heating system which was run on a number of direct electric heaters connected to an ‘Economy 7’ circuit, with Mitsubishi Electric’s energy efficient, Ecodan system.

Following a review of the old system the Council called in Accredited Ecodan Installers, Dalism Ltd. to advise on an energy efficient, cost effective, low carbon replacement. Taking into account energy calculations from a survey of the building, Dalism’s Managing Director, Bill Tyrer, and his team set about designing a new system.

“We know that people are often afraid to use their heating because of the cost, but these residents are vulnerable and need to keep warm when the weather conditions are poor. Our priority was to provide them with a reliable, effective heating and hot water system that was also affordable,” said Mr Tyrer.

“The new system not only provides that, but has also lowered both the energy rating and the carbon emissions for the building, thereby fulfilling the Council’s brief.”

One 5kW Ecodan unit was installed for every two flats, providing heat via a radiator circuit fitted with independent lockable heating stats and thermostatic radiator valves, further helping to save energy costs.

A 14kW Ecodan unit has also been installed to provide heating and domestic hot water to the warden’s accommodation and the communal dining area, and hot water for use in the kitchen, hair salon and guest rooms.

The replacement project has been carried out over several weeks and some of the units that were installed towards the end of last winter have already been given a thorough testing with the onset of bitterly cold weather, which saw temperatures dipping down as far as -17°C. During this time, however, the tenants remained warm and cosy as the new system maintained a constant temperature of 24°C.

Councillor Val Hopley, portfolio holder for Landlord Services at West Lancashire Borough Council, said:

“We are incredibly impressed by the Ecodan system. In fact, during the very severe weather last year, when we compared Beechwood Court with other Council buildings using gas boilers, it was the only one that did not fail in some way in its heating and hot water.”
3.6.2 SOLAR PHOTOVOLTAICS (PV)

To date, the Council has installed a total capacity of 41KW of solar PV technology on five sheltered housing schemes and two Council offices. The electricity generated from these systems is used on site, reducing the Council’s energy bills and carbon footprint.

The systems also generate an income from the Feed-in Tariff for the next 25 years. The funding from this contributes to a Community Energy Fund for recycling into other energy saving projects.

All installations have been in place for over a year now and the energy generation from the systems has exceeded our expectations. Table 3.6.2 below details the KWh generation, savings on energy bills, income from the Feed-in Tariff, and CO₂ savings over the last 12 months.

<table>
<thead>
<tr>
<th></th>
<th>1st year’s generation (KWh)</th>
<th>Savings on energy bills (£)</th>
<th>FIT Income (£)*</th>
<th>CO₂ Savings (kg/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beechwood Court</td>
<td>2538</td>
<td>228</td>
<td>1,182</td>
<td>1,376</td>
</tr>
<tr>
<td>The Dell</td>
<td>2363</td>
<td>212</td>
<td>1,100</td>
<td>1,283</td>
</tr>
<tr>
<td>Victoria Court</td>
<td>2480</td>
<td>223</td>
<td>1,155</td>
<td>1,338</td>
</tr>
<tr>
<td>Crosshall Court</td>
<td>7918</td>
<td>712</td>
<td>3,231</td>
<td>4,291</td>
</tr>
<tr>
<td>Bath Springs Court</td>
<td>4354</td>
<td>391</td>
<td>1,793</td>
<td>2,359</td>
</tr>
<tr>
<td>52 Derby Street</td>
<td>7006</td>
<td>630</td>
<td>2,747</td>
<td>3,797</td>
</tr>
<tr>
<td>61 Westgate</td>
<td>6962</td>
<td>626</td>
<td>1,301</td>
<td>3,773</td>
</tr>
</tbody>
</table>

Table 3.6.2: Solar PV generation, savings, and FIT income

* Please note: These systems were installed prior to the FIT review and are receiving the higher FIT rate of 43.3p/KWh. These rates were correct at the time of installation but are index-linked and increase year on year.

CASE STUDY: DOMESTIC SOLAR PV SYSTEM IN TARLETON*

A resident invested in a 2.5KW system for his four-bedroom detached property in Tarleton in May 2011. The system comprises 14 panels and manufacturer’s guidance predicted generation around 2,170KWh of electricity a year.

The system has been monitored closely over the first year and has actually generated a total of 2,100KWh, pretty much matching expectations. On a bright, sunny day, the owner has recorded the system generating approximately 12 - 14 KWh, which just about covers the daily consumption of the home. Typically, an average unit of electricity costs around 12 pence per KWh, resulting in savings of around £252 off the property’s energy bill.

The owner also receives 43.3pence* for every KWh the system generates from the feed-in tariff, plus an additional 3p* for every KWh he doesn’t use and sells back to the national grid. This is deemed to be 50% of the amount generated as the system isn’t fitted with an export meter. This provided an income of approximately £940 in the first year.

Whilst undoubtedly, the efficiency of the system will drop off over future years, these statistics predict a payback period of around 9-10 years; however, the owner will continue to benefit from the feed-in tariff for 25 years.
3.6.3 SOLAR THERMAL HOT WATER

Solar Thermal Hot Water

Marlborough Court sheltered housing scheme benefits from a solar thermal system that helps provide hot water to its residents. Part funded by the Low Carbon Buildings Programme, this system helps provide reductions in gas consumption, energy bills, and carbon emissions.
## 3.7 FUTURE ACTION

### 3.7.1 OBJECTIVE 3: INCREASE RENEWABLE ENERGY GENERATION ACROSS THE BOROUGH

<table>
<thead>
<tr>
<th>ACTION:</th>
<th>MECHANISM:</th>
<th>POTENTIAL PARTNERS:</th>
<th>TIMESCALE:</th>
</tr>
</thead>
</table>
| Investigate opportunities to encourage take-up of low carbon technologies. | - Provide an advice service to residents, businesses, and community groups.  
- Educate and raise public awareness, to aid installation, and finance models where possible. | WLBC Energy Saving Trust/Referral agencies | Ongoing |
| Investigate barriers preventing take-up of renewables and how these can be overcome. | - Establish a network of local contacts to provide a greater confidence in renewables and share local knowledge.  
- Promote successful installations, details of their performance, and benefits provided to owners. | WLBC Local installers, contractors, energy generators | Ongoing |
| Investigate the opportunities provided by Energy Services Companies (ESCo's) and potential finance models. | - Gain experience from operational ESCo's in the Northwest.  
- Investigate the opportunities an ESCo could provide for Council projects. | WLBC Potential ESCo partners | Long term |
| Continue to investigate feasibility of renewable technologies for social housing located off the gas grid. | - Continue to investigate options to reduce the number of dwellings with electric heating systems.  
- Install renewable heating technologies where feasible and economically viable.  
- Monitor performance and report on savings.  
- Provide leadership and promote successful projects. | WLBC Potential funding partners | Ongoing |
| Investigate the potential for renewable energy generation on Council estates. | - Identify areas of least constraint for potential energy generation.  
- Investigate interest from private investors to develop any identified sites. | WLBC Potential private investors/developers | Medium term |
| Implement policies/guidance to promote renewable energy. | - Develop local plan policies, in line with relevant planning guidance, to promote the use of renewable technology through the Development Control process. | WLBC | Short term |
| Continue to report on Borough-wide energy use and carbon emissions. | - Identify and promote progress towards reducing the Borough’s energy use and carbon footprint on a local area basis. | WLBC DECC | Ongoing |
| Develop the Council’s Community Energy Fund | - Investigate the use of the CEF for community energy projects. | WLBC | Medium term |
(CEF) to incorporate private investment where possible. | Establish whether the CEF can be utilised to aid feasibility/implementation of district heating systems through Local Plan policy, or link to the Allowable Solutions framework.