

Northhill Neighbourhood Plan

Community Renewable Energy Report

“It is time to build the energy system we need for the 21st Century and to stop sitting and waiting, expecting somebody else to do it.”

(Howard John, Author: Energy Revolution)

The scope of this report is in providing an overview of the possibilities of generating power within the parish for the benefit of parishioners and local businesses.

Different technologies are described and considered but no attempt has been made to conduct any detailed local assessments. Notice has however been taken of Central Bedfordshire Council’s (CBC’s) Guidance on Wind and Solar power installations.

1. Background information

1.1 The UK government has committed to cutting greenhouse gas emissions by 80% from 1990 levels by 2050. Under the Paris Agreement on Global Climate Change, the UK is one of 150 countries to sign up to instituting measures that will limit temperature rises to well below 2°C by 2030 and will attempt to limit rises to 1.5°C. These measures were ratified by Parliament in November 2016.

1.2 An essential component in achieving these targets is a decarbonisation of electricity generation. In practice this means a dramatic reduction in fossil fuel energy generation in favour of renewables and greater dependency on these for providing current and future energy needs.

1.3 This commitment is also supported by a government agreement to increase the place of renewables in our total energy demand to 15% by 2020. In the UK approx. 25% of our electricity was generated from renewable sources in the year from April 2015-March 2016.

1.4 Renewable energy is a broad term covering a range of sustainable energy sources which cannot be depleted. Sources include wind power, solar power, the movement of water (tidal and other flows), combustion or digestion of materials such as biomass (crops and wood) and waste products and ground source heat.

1.5 As well as large commercial schemes much of the progress to date in increasing electricity generated through renewables is accounted for by initiatives at the local level.

There are currently **in excess of 5000 community projects** for the generation of electricity from renewable sources across the UK.

1.6 The government targets to reduce greenhouse gas emissions are not devolved to local authority areas, but **Neighbourhood Plans must have policies which are designed to contribute to climate change mitigation and adaptation. This is a legal obligation.**

2. The National Planning Policy Framework (NPPF)

2.1 The National Planning Policy Framework places a responsibility on local planning authorities to support the inclusion of sustainable energy in new buildings. It also promotes the upgrading of existing buildings to incorporate energy use reduction initiatives **and most significantly advocates the community generation of renewable energy at a local level.**

In section 97 of the Framework it states that LPAs should:

help increase the use and supply of renewable and low carbon energy, and recognise the responsibility on all communities to contribute to energy generation from renewable or low carbon sources.

Specifically, in order to support this objective Local Plans should:

- have a positive strategy to promote energy from renewable and low carbon sources;
- 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;
- consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure the development of such sources;
- **support community-led initiatives for renewable and low carbon energy, including developments being taken forward through neighbourhood planning;**
- 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.

3. CBC Local Plan

3.1 How is the national planning directive being interpreted by CBC?

In its 2009 Local Development Plan CBC states in policy DM1 that:

The Council will consider favourably proposals for renewable energy installations. Proposals should satisfy the following criteria:

- Have good accessibility to the transport network;
- Not be harmful to residential amenity, including noise and visual amenity;
- Be located and designed so as not to compromise the landscape and scenic beauty of the Chilterns Area of Outstanding Natural Beauty (ONB);

- In other areas identified through the Landscape Character Assessment as having high sensitivity, be located and designed so as to respect the character of the landscape.
- Proposals for all new development of more than 10 dwellings or 1,000 square metres of non-residential buildings should contribute to renewable energy targets by incorporating on-site or near-site renewable or low carbon technology energy generation. Developments should achieve 10% or more of their own energy requirements through such sources.

3.2 The emerging CBC Local Plan based on the 2014 withdrawn plan also makes a strong commitment to the development of renewable energy at the local level.

Policy 46 lays out their intention to support renewable and low carbon energy development through working with developers to locate installations with no adverse impact on heritage sites, noise, pollution or visual assets.

As well as stating the intention of scoping where large-scale renewable power developments within the authority may best be located as an addendum to their policy, CBC also recognises the importance of local schemes that fall outside their scoping exercise in reducing the overall carbon footprint.

3.3 Their subsequent guidance notes, published in March 2016, further develop the details of this policy and para.1.22 re-affirms their commitment to community-led projects. It lays out how developers of such schemes are expected to work with communities to ensure impacts are mitigated and direct benefits are understood.

3.4 Additionally they have produced further dedicated guidance on the different technologies. These are available to enable developers and communities to consider alternatives and evaluate the most suitable technology for them. They provide guidance on the suitability and optimum size of the technologies for different land areas in the authority and contain useful local environmental and other impact criteria for determining the suitability of any proposal. Land character assessments are included to give initial assessments of the suitability of different areas of land for these technologies throughout the authority.

The first two of these reports on Wind Power and Solar Farm developments in Central Bedfordshire are currently available and reference will be made to them in section 8 of this report.

4. The case for community generation of electricity

4.1 As well as the environmental benefits in reducing carbon emissions, there are additional well-reasoned arguments for local communities to set up or support community-led projects to generate electricity for their homes and businesses.

As stated in the government's own Community Energy Strategy 2014:

- Community-led action can produce energy, reduce energy use, manage energy demand and purchase energy.
- It can often tackle challenges more effectively than government alone, developing solutions to meet local needs, and involving local people.

- Putting communities in control of the energy they use can have wider benefits such as building stronger communities, creating local jobs, improving health and supporting local economic growth.
- **Community energy can unlock opportunities for lower energy bills and carbon emissions saving, that would otherwise be missed.**

4.2 In addition, schemes currently operating provide evidence that where a community-led initiative encourages local share-holding; shareholders tend to be able to make a secure investment in a community enterprise which produces a good rate of return on their investment.

4.3 The government are currently operating a “**Rural Community Energy Fund**” which allocates grants and loans to help scope and set up projects which can prove that they are worthwhile to their local community. **The grant includes £20,000** to undertake a scoping study with a specialist consultant to look at the most economically viable methods, suitable sites and productivity of competing sources of generation concomitant with the scale and location of the community. Following the completion of the feasibility study further funds are available to kick start the initiative and encourage further investment.

5. Supporting Communities

5.1 There is a growing body of expertise to advise interested groups in setting up community led-initiatives (e.g. PlanLocal, Gamlingay Ecohub Management Group, Brighton Energy Cooperative) covering such aspects as the financing and management of community-led energy generation projects as well as scoping and technological advice.

5.2 To upgrade local knowledge there are low cost courses run by organisations such as the Centre for Alternative Technology in North Wales which provide a detailed background understanding of different technologies and can be very useful for awareness -raising before embarking on considering making proposals.

5.3 There are also registers of professionally accredited advisers, financial partners and approved installation engineers to provide a source of accredited individuals, organisations and commercial companies to undertake project scoping and planning and commissioning installations. They should meet prescribed accreditation standards.

6. Evidence of local interest

6.1 From the local issues and aspirations for the parish identified by parishioners in the consultation workshops, there were 15 comments in support of exploring the possibility of community alternative energy generation and 9 indicating objections or reservations.

6.2 Of the objections, 6 were concerned with the possible scale of solar or wind technologies and their impact on the environment or parishioners themselves (e.g. noise levels, spoiling views), 4 just stated objections without any reasons being given and other

comments related to the size of the parish to sustain such technologies and one questioned the motives of the landowner in offering a location for possible projects!

6.3 4 comments drew attention to the need for careful siting of installations. Suggestions for the siting of wind farms or solar farms emphasised the need for land where installations would have low visibility and low environmental impact and be away from settlements.

Particularly favoured were possible sites where there was current industrial usage. An example given was the Vinegar Hill industrial units.

Another suggestion was siting installations in the open countryside where possible sites could be screened and not be seen from the road, the example given was next to the reservoir on the fields between Ickwell Road and Hitchin Road.

Another location option mooted was on farms where existing roof space could be used to advantage (e.g. Franklins Farm has a solar panel array on its shop and storage facilities.)

A further suggestion for siting was above car parks.

6.4 Types of provision identified as relevant of further investigation were, wind, solar, water and power from anaerobic digesters.

6.5 A number of comments recognised that potential schemes should have a positive benefit for the Parish. Income generation that could be used for community projects and reduction of fuel costs leading to a better quality of life were identified as two such benefits.

In respect of anaerobic digestion being the preferred technology there could also be positive gains in reducing the wastage of degradable material throughout the parish.

6.6 In the household questionnaire there were no direct questions relating to the community generation of electricity, however there were two additional comments made relating to this topic; one suggesting that community projects for renewable energy should be considered and the other favouring discretely placed solar panels on industrial roofs or well-hidden farmland as appropriate.

6.7 Answers to the question as to whether houses should generate their own electricity evoked 51% approval from 184 respondents.

6.8 In addition to these comments a question was raised at the Parish Council Annual Parish Meeting March 2016 asking for reassurance that renewable energy generation was on the agenda of consideration for the Neighbourhood Plan.

7. Available Technological Options- A brief overview

7.1 What are the options for the sustainable generation of electricity?

In all technologies, if appropriately scaled and located, sufficient electricity can be produced at a far lower cost to the consumer than that generated by fossil fuel or nuclear generators and excess electricity can be sold to the grid.

In addition the FIT (Feed in tariff) schemes enable a government payback tariff to be claimed for electricity generated by sustainable means. Although currently these tariffs are reducing

over time, so too is the cost of manufacturing, installing and maintaining sustainable electricity generation equipment.

In addition CIL payments may be made available to the local community from the development.

Note that all of the examples given below are taken from Bedfordshire projects.

7.2 Wind turbines

Wind energy is very site specific. Average wind speeds need to be sufficient for turbines to operate at their maximum efficiency level. The size and capacity, spread and height of turbines all need to be factored in to any feasibility study to ensure adequate generation potential and a return for money invested. Turbine technology has advanced substantially in the last few years. This has resulted in noise problems being reduced and better aerodynamic sail design permitting faster rotation and therefore greater generating capacity. As efficiency has improved, life expectancy has also increased from an average of 15 to an average of 25 years plus.

The 10 turbines of the Langford Wind Farm are currently producing sufficient electricity to source the projected needs of over 11000 homes per year. The site also donates £24000 to the local community per annum under section 106(CIL).

7.3 Solar

Solar photovoltaic (PV) panels can be installed in array or in many different types, dimensions and configurations to suit the space available. Maximum exposure to available sunlight is essential to maximise generation. South facing installations are ideal but west and east facing panels can also be viable. Sun tracking systems can also be installed. Roof mounted panels do not usually need planning permission as they fall within "permitted developments". "Solar farm" arrays can maintain the agricultural use of the land if sheep are grazed or other permitted agricultural activities are conducted. The effective life expectation of panels is now in excess of 30 years.

The recently installed Langford Solar Farm is west facing and has a 13MW capacity

A smaller scale example locally is of course Jordans Mill where rooftop photovoltaics supply the electricity needs of the visitors centre and the example mentioned earlier at Franklin's Farm.

7.4 Anaerobic Digestion

Anaerobic digestion is the process by which organic matter such as animal waste or food waste is broken down to produce biogas and bio fertiliser. This process happens in the absence of oxygen in a sealed oxygen free tank called an anaerobic digester. The biogas

crated in the sealed tanks is used as a fuel in a combined heat and power (CHP) unit to generate renewable electricity and heat.

The production of energy (via methane gas) from anaerobic digestion of sewage sludge might be possible from a small water pollution control plant treating domestic sewage.

Bedfordshire pioneered the use of this technology in the UK with the Bedfordia plant at Twinwood. It was set up in 2003 to solve the problem of dealing with the considerable amounts of pig slurry on the group's farms.

CBC uses an aerobic reprocessing plant set up by Biogen to recycle food waste collected from domestic households in a similar way, creating fertiliser for local farms and generating electricity to sell back to the grid.

The government are currently considering what additional support they can offer rural communities for setting up such schemes of their own.

7.5 Biomass –Combined Heat and Power Systems

Biomass refers to biological material derived from living, or recently living organisms. In the context of biomass for energy this is often used to mean plant - based material, but biomass can equally apply to both animal and vegetable derived material. Biomass can originate in a locally produced source or as a crop (e.g. maize) or wood pellets derived from sustainable timber or imported from commercial providers.

Biomass is burned in super-efficient boilers which reduce heat loss when compared with traditional systems. Thus up to 90% of the heat generated can be used to heat buildings and power generators to produce electricity.

A combined heat and power waste wood burning facility is under construction at Thurleigh in North Bedfordshire and is set to start providing heat and generating electricity in the near future.

7.6 Hydro

Hydro power uses the power of water flow to generate electricity. Long before the National Grid there was a tradition of early forms of electricity being generated by this means through mill races and being stored in batteries which were then transported by horse and carts to the landowners' houses! However things have moved on and small scale microhydro turbines can be designed and scaled to meet local needs. Such installations can be relied on to produce a steady rate of electricity across the year providing the rate of flow is maintained by natural or artificial means.

The Bedford Park Project converted a boat ramp joining an upper and lower section of the River Ouse to a hydroelectric plant. The means of generation is through two Archimedean

Screw generators which provide electricity for the lighting of the park and feed in a substantial amount of electricity each year to the Grid.

Over the two years of the project electricity to the value of £65000 approx. has been fed into the grid.



Note: Ground Source Heating has not been considered here because of the high cost installation implications and limitations of providing heating rather than generating electricity.

7.7 Potential benefits and challenges

It is worth considering potential benefits and challenges of each technology and the potential and relevance to the resources in the parish.

It is taken as read that all the systems considered below have the potential to reduce CO2 emissions, produce cheaper energy for householders and businesses and create potential income for the community.

Challenges taken as read are being able to convince and work with landowners and obtaining the buy in of parishioners and local businesses.

7.8 Wind turbines

Potential Benefits	Challenges
<ul style="list-style-type: none"> • Natural source • Parish probably has sufficient wind • Identifiable locations offering high point advantage • Community investment/ownership possible • Technological improvements reduce noise • 25 year plus lifetime • High overall generation potential • Could serve whole parish • CBC scoping study and guidance can shortcut research 	<ul style="list-style-type: none"> • High visibility factor • Landmark status • Installation and ongoing maintenance costs • Fear of possible damage to birds • Intermittent generation • Site needs a high wind speed • Ensuring generation can be drawn down for local needs and not just sent into the grid

7.9 Solar

Potential Benefits	Challenges
<ul style="list-style-type: none"> • Natural resource • Relatively cheap and quick to install • Adaptable to size of site • Suitable sites can be identified • 30 year plus lifetime • High overall generation potential • Could serve whole parish or individual settlements • CBC scoping study and guidance can shortcut research 	<ul style="list-style-type: none"> • Screening to reduce visibility • Possible damage if field array • Bad weather • Intermittent generation • Ensuring generation can be drawn down for local needs and not just sent into the grid

7.10 Anaerobic Digestion

Potential Benefits	Challenges
<ul style="list-style-type: none"> • Suitable for farms • Clean removal and storage of unpleasant waste • Domestic food waste can be used locally 	<ul style="list-style-type: none"> • Careful choice of systems to avoid leakage • Regular feed ,control and maintenance requirements can be significant

<ul style="list-style-type: none"> • Bi-products can be sold or used locally (compost, biogas) • Sealed system • Possible government aid • Could use sewage sludge 	<ul style="list-style-type: none"> • Needs to be installed for specific feed components • Associated transport costs for feed and bi-product distribution •
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7.11 Biomass (CHP)

Potential Benefits	Challenges
<ul style="list-style-type: none"> • Fuel can be locally sourced • Produces both heat and power • Installation can be large or small scale • More suitable for small communities or clusters. 	<ul style="list-style-type: none"> • Some carbon emissions • Needs regular attention for feeding • Can be high maintenance until system operates at capacity • Keeping up regular supply of biomass

7.12 Hydro

Potential Benefits	Challenges
<ul style="list-style-type: none"> • Constant water supply • Technically simple system • Low maintenance • Easy testable site suitability-flow rate. • Reliable technology • Controlled continuous generation • More suitable for a particular facility 	<ul style="list-style-type: none"> • Low output if flow rate inadequate • Power distribution from source • Safeguarding against flow blockage • Ensuring no damage to river ecology • Amount of power generated is worth the investment

8 Power for the community, in the community, by the community?

There are different options in how communities can engage with generating their own electricity, using it and earning money from it.

Initial research to determine possibilities, identify suitable sites and negotiate the means by which projects can be set up and supported financially is an essential pre-cursor to scoping and planning any project. Landowners need to be consulted and engaged from the outset.

The suitability of technologies for the place in which we live and the environmental advantages and sensitivities it presents must be paramount.

8.1 Suitability of Solar for Northhill Parish

There are already ad hoc electricity generation schemes subscribed to by individual householders and businesses, the most prevalent in our community, as in many, being the installation of PV cells. The growing efficiency of PV cells and tools to help with the calculation of outputs can assist individual households in seeing whether they can generate sufficient for their own needs.

However such small-scale systems rarely combine efficient opportunities for storage of excess production which usually is fed back into the grid. Amounts of power generated cannot be guaranteed to supply all domestic needs as and when required and are usually supplemented by drawing down from the grid when generating capacity falls below usage demands.

Where communities or landowners invest in larger-scale field or roof array systems, arrangements for the storage and distribution of electricity generated to community members who buy into the scheme, can be put in place. The steady flow of electricity generated to meet used needs is therefore much better regulated.

Siting of field arrays is crucial for maximum sunlight capture and particularly where sufficient screening can be erected to ensure visual and environmental enhancement are protected.

In terms of nationally recognised land character, parts of the parish are deemed to be within the Clay Vales of East Bedfordshire and a swathe is within The Greensand Ridge which is considered a more environmentally sensitive area for such developments.

The CBC guidance document notes that:

This area offers opportunities for medium to large-scale solar farms. The fairly level clay vale, *Lower Ivel Clay Valley*, to the east and south of Biggleswade has varied enclosure but would be able to accommodate solar farms if they were well integrated with screening hedgerows.

There is no direct mention of the Clay Valley land in Northhill Parish but it is not excluded.

Further investigation could reveal whether there are optimum sites within the parish which in their positioning could advantage settlements whilst mitigating the challenges identified above.

Once a suitable site has been found and planning permission obtained, installations can be set up quickly and the average time for a field array to be set up and start generating can be less than a month.

8.2 Suitability of Wind for Northhill Parish

Small-scale domestic wind systems are rarely effective for generation as nearby buildings can interrupt airflow and cause them to operate below capacity even when wind speeds are high. We have not noted any such devices currently generating within the parish.

Wind-powered turbine generation is becoming increasingly used in the areas surrounding the parish. As well as the large scale scheme at Langford, the RSPB at Sandy have recently installed a single generator to serve all their onsite needs at their head office.

A local example of wind being used for community generation is the single turbine at the Gamlingay Eco-hub which started generating in June 2016 and produces enough electricity to power 150 homes, about 10% of the total village needs.

CBC guidance notes that within the parish we have areas of low and moderate sensitivity to the siting of wind farms but limits judgements on suitability to the size of the installation and the positioning within the clay valley area of the parish. Greensand Ridge environments are not deemed suitable.

Basically three or less turbines are deemed suitable for the types of available environments we find within the parish. There are areas with the open aspect and sufficient wind velocity to warrant further investigation.

Planning permission and impact assessments are likely to take more time than solar to set up but as with solar very clear guidance is available from CBC and their advance environmental appraisals will assist the process.

8.3 Suitability of other technologies for Northhill Parish

Other technologies may be suitable for powering small scale installations or particular sites but are more difficult to scope for wider community benefit.

Hydropower could be of limited use if powered from one of the infeed rivers to the Ivel or the Ivel itself. It is unlikely that sufficient flow rates could be obtained from a single installation to be of use to the wider community. Flow could be increased by artificial means but the likely power needed to generate the required flow could offset the advantages.

Anaerobic digesters and biomass systems could be set up but would require transporting costs and have implications for existing road use in order to ensure sufficient infeed of raw materials. Site management and plant servicing costs would also have to be factored into any scoping plan which would have to be offset against generating potential, outreach and output.

8.4 Financing and Setting Up Community Electricity projects

The Centre for Sustainable Energy has produced guidance for Neighbourhood Planning groups on Low Carbon Neighbourhood Planning. In section 3 "Mitigating Climate Change through Renewable Energy" they outline four actions which could be employed to explore

the possibilities of generation, setting up suitable projects and appropriate financing models.

- a. A starting point could be to set up a local energy group to carry forward project ideas. The NP could include the objective to set up a community energy group. Their activities could focus on renewable energy for the benefit of the community but also look at energy efficiency, raising awareness and behaviour change to save costs on power.
- b. An alternative would be to include an objective in the NP to explore the feasibility of setting up a community renewable project using the support of PlanLocal materials and tools and preparing to apply for a government grant to conduct a feasibility study
- c. Once a project has been scoped there are benefits in communities setting up Community Renewable Energy Companies as formal entities that can drive forward project ideas and deliver renewable energy projects at appropriate scales if they have the appropriate expertise to draw on.
- d. A fourth option is to establish a shared ownership renewable energy project with a private developer. A partnership with a commercial renewable energy company where the community owns part of commercial renewable energy project could be an alternative.

A further alternative once a scheme has been agreed in principle is to finance the project through invited share subscription (e.g. crowd funding). This is the approach that has been adopted in the Gamlingay ecohub wind turbine installation project. Community subscriptions are usually given priority and a reasonable return on investments is guaranteed. It has also enabled them to seek matched funding in the form of additional grants. There are many other examples of this approach being viable and successful.

9 Conclusions

- 1 Central and local government are in favour of local communities generating their own power through renewable sources and offer support in doing so.
- 2 By including policies/projects to mitigate climate change in our Neighbourhood Plan we are fulfilling our legal obligation to do so.
- 3 Given sufficient community support and interest from landowners there are possible ways forward in investigating the options for local power generation in the Parish.
- 4 There are clear benefits for the parishioners in Northill Parish in terms of reducing expenditure in electricity costs and exercising more local control over power generation and use.
- 5 Further investigation is needed but there are probably sites within the parish that would be suitable for wind and solar installations and possibly farms that could house anaerobic digesters.
- 6 There are grants available for scoping possibilities and producing a feasibility study which could be drawn upon to kick-start the process
- 7 Local expertise is available in setting up power generation partnerships, choosing appropriate technology and scoping suitable sites.

- 8 There are a number of alternatives for financing such projects and where investment is required, investors can currently receive good rates of return on their investments.

10 Recommendations

- 1 The NP should include a policy/project on the generation of power in Northill Parish
- 2 A group be set up , either independently or under the auspices of NPC to investigate possibilities further and if viable put together a strategy for implementation
- 3 Parishioners and landowners should be consulted and informed of progress at all stages
- 4 CBC reports should be used to inform the investigation and as a source of local expertise in setting up and managing schemes.
- 5 If a decision is made to proceed then within the lifetime of the NP Northill Parish should aim at generating at least 50% of power needs for local use from relevant technologies and achieve independence in doing so.

11 Possible Policy and Projects

Policy

The NP will support applications for community renewable energy projects where:

- a rigorous scoping study has been undertaken showing benefits to parishioners, challenges and impact and risk assessments and
- the local community has opportunities to be consulted on proposals and their views taken into account and
- cooperation of landowners is secured and
- environmental sensitivity is a prime consideration and
- opportunities for community investment/ownership have been considered.

Additional Housing and commercial development Policy

- Subject to the proposed development being found to be acceptable when judged against the Housing Policies in the NP, innovative approaches to the construction of low carbon homes which promote energy efficiency and renewable energy generation and encourage compliance with BREEAM excellence ratings will be supported.

Project:

- To set up a community energy group to look at options working with landowners and interested parishioners to produce a report on renewable energy generation in the Parish.

References

- 1 UK Government Community Energy Strategy 2014
- 2 UG Government Community Energy Strategy update 2015

- 3 UK Government Rural Community Energy Fund WRAP 2016
- 4 Community Energy England www.sco-res.uk
- 5 Low Carbon Neighbourhood Planning : Centre for Sustainable Energy
www.cse.org.uk
- 6 NPPF
- 7 CBC Local Development Plan 2009
- 8 CBC emerging Local Plan based on 2014 submission (withdrawn)
- 9 CBC Guidance Notes : Wind Power 2013
- 10 CBC Guidance Notes : Solar Power 2014
- 11 CBC Renewable Energy Guidance Notes 2015
- 12 Energy Revolution by Howard Johns 2016