

Title of Report	RENEWABLE AND LOW CARBON ENERGY STUDY	
Presented by	Ian Nelson Planning Policy and Land Charges Team Manager	
Background Papers	National Planning Policy Framework	Public Report: Yes
	National Planning Practice Guidance Zero Carbon Roadmap Renewable and Low Carbon Energy Study	Key Decision: Yes
Financial Implications	The cost of the study is met from existing budgets which are reviewed as part of the annual budget setting process.	
	Signed off by the Section 151 Officer: Yes	
Legal Implications	None from the specific content of this report. In due course the planning policy implications of any climate change evidence will be incorporated in a consultation document for the Substantive Local Plan Review. The Local Plan Review process as a whole must accord with the legal requirements set out in legislation and guidance.	
	Signed off by the Monitoring Officer: Yes	
Staffing and Corporate Implications	None identified	
	Signed off by the Head of Paid Service: Yes	
Purpose of Report	To inform Members that a Renewable and Low Carbon Energy Study has been undertaken and how its findings relate to the council's Zero Carbon Roadmap.	
Recommendations	THAT THE COMMITTEE: (I) NOTE THE COMPLETION OF THE RENEWABLE AND LOW CARBON ENERGY STUDY; (II) NOTE THAT THAT THE RENEWABLE AND LOW CARBON ENERGY STUDY SUPPORTS THE FINDINGS OF THE ZERO CARBON ROADMAP IN RESPECT OF RENEWABLE ENERGY TARGETS; AND (III) NOTE THAT A FURTHER REPORT GIVING CONSIDERATION TO POSSIBLE POLICY OPTIONS WILL BE BROUGHT TO A FUTURE MEETING OF THIS COMMITTEE	

1. BACKGROUND

- 1.1 North West Leicestershire District Council made a climate change emergency declaration on 25th June 2019 which set out the council's commitment to support the Governments net zero target to 2050 and its aim to achieve carbon neutrality for the council's own emissions by 2030.
- 1.2 Following the council's climate emergency declaration, the Zero Carbon Roadmap and Action Plan for the district were commissioned and subsequently adopted in March 2020.
- 1.3 Whilst the Roadmap identifies the potentially significant role the Local Plan will have in terms of formulating policies that support the transition to zero carbon, the assessments that underpin the targets in the Roadmap are not necessarily robust enough for the purposes of the Local Plan. Therefore, additional evidence was commissioned from consultants (AECOM).

2.0 WHAT IS THE PURPOSE OF THE RENEWABLE ENERGY AND LOW CARBON ENERGY STUDY

- 2.1 The purpose of the Study is to produce evidence on the likely technical potential for different forms of renewable energy and low carbon energy in North West Leicestershire having regard to best practice, planning policy guidance, National Planning Policy and which will be sufficient to inform policies and/or targets in the new Local Plan.
- 2.2 The study sought advice on a number of matters as summarised below:
 - A technical assessment of the potential for renewable and low carbon energy generation within the district.
 - Identify other approaches (energy performance and design related) that could be used in the Local Plan to adapt to and mitigate climate change
 - In regards to new employment development, an assessment of the potential for including solar panels as part of new developments including the identification of any technical issues associated with such installations.
 - Establish whether there is potential for industry within the district to use Bio-Energy with Carbon Capture Storage (BECCS).
 - Establish the potential for introducing a Carbon Offset Fund, the mechanisms for doing so as well as identifying any potential associated viability issues.
 - An estimate of what the potential energy needs might be for new development to incorporate charging points for electric vehicles.
- 2.3 The study builds on previous analytical work such as the Renewable Wind Study undertaken in 2016, and local targets and commitments such as those laid out in the Zero Carbon Roadmap (2020).
- 2.4 The Renewable Energy Study assesses the findings of the Zero Carbon Roadmap and identifies whether there have been any significant changes since the Roadmap was published. The Roadmap provides context for the Renewable Energy Study.
- 2.5 The Study also provides a technical review of existing studies including the 'Low Carbon Energy Opportunities and Heat Mapping for Local Planning Areas Across the East Midlands: Final Report' (2011) produced by the Centre for Sustainable Energy (CSE), SQW and Land Use Consultants (referred to as the CSE study); The 2016 Renewable Wind Energy Study and associated constraint maps produced by ASC Renewables.
- 2.6 The Study identifies baseline data for fuel consumption, emissions, number of ultra-low emission vehicles (ULEVs), and electric vehicle charging points as well as low and zero carbon (LZC) installations within the district.

- 2.7 This study will form part of the technical evidence base to support the substantive review of the Local Plan.

3.0 STRUCTURE OF THE RENEWABLE ENERGY STUDY

- 3.1 The Renewable Energy Study is structured as follows:

- **Section 1: Introduction**, purpose and structure of the report
- **Section 2: Background and Context** provides an overview of some key drivers for introducing climate change mitigation measures such as building design standards, ultra-low emission vehicle (ULEV) infrastructure and Low and zero carbon (LZC) provision.
- **Section 3: Establishing the Baseline** describes the current baseline and recent trends in regard to fuel consumption, CO₂ emissions, ULEV uptake and LZC deployment in North West Leicestershire.
- **Section 4: Renewable Energy Assessment** presents the assessment of the potential to deliver additional LZC energy technologies in North West Leicestershire.
- **Section 5: Energy Performance and Design Approaches to Mitigate Climate Change** outlines various options for introducing higher performance standards in planning policy and describes sustainable design measures that could be implemented as best practice to contribute towards North West Leicestershire becoming a Zero Carbon District.
- **Section 6: Carbon Offset Fund** discusses the potential to establish a carbon offset fund for developers to make contributions in lieu of on-site carbon savings, outlining practical implications and potential next steps for NWLDC.
- **Section 7: Electric Vehicle Infrastructure Provision** provides a rough estimate of the potential change in fuel use that might arise due to ULEV uptake, along with broader commentary on future transport trends and actions that NWLDC can take to promote a shift towards sustainable transport modes.
- **Section 8: Conclusion** summarises key findings, recommendations, and next steps.
- Relevant supporting information is provided in the **Appendices**.

- 3.2 This report focuses on sections 4 of the Renewable Energy Study. A further report will be prepared for a future meeting of the Local Plan Committee when officers have had an opportunity to consider the Study in more detail.

4.0 RENEWABLE ENERGY ASSESSMENT (SECTION 4 OF THE STUDY)

- 4.1 As well as considering the potential to deliver additional LZC energy technologies in North West Leicestershire, a key component of the study was to review some of the LZC energy targets set out in the Zero Carbon Roadmap and assess whether they are likely to be achievable within the specified timescales.
- 4.2 The Roadmap itself identifies targets for both solar and wind energy generation within the district. The Renewable Energy Study supports the targets set out in the Roadmap and identifies that they could be exceeded. The key findings are presented in the table below.

Table 1: Achievability of the Targets set out in the Zero Carbon Roadmap

Technology	Zero Carbon Roadmap Target	Is the target considered achievable?	Comments
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Wind energy	Expand wind energy capacity to 75 MW by 2050	Yes	This target could potentially be exceeded
Solar Photovoltaics (PV)	Expand PV capacity to 140 MW by 2050	Yes	This target could potentially be exceeded
Hydroelectric power	Up to 3.2 MW based on five potential sites	See section 4.2.4 of the Study	This may be technically possible but would require detailed feasibility studies
Biogas	Expand use of biogas to 21 GWh by 2050	See section 4.2.7 of the Study	Not recommended based on present technologies

- 4.3 Overall, the Renewable Energy Study suggests that the targets in the Zero Carbon Roadmap for wind and solar energy are likely to be achievable. There may be opportunities to deliver hydropower in a small number of locations, but although these could potentially generate a large amount of electricity, this cannot be determined without site-specific feasibility studies. The use of biomass (either for combustion or conversion to biogas) is not recommended for widespread adoption at this time due to uncertainty related to the sustainability of the supply chain. It is considered likely that the main opportunities going forward will be solar PV, wind energy and heat pumps.

Solar PV

- 4.4 The Renewable Energy Study identifies that there is significant potential for both building-integrated and stand-alone PV installations within the district.
- 4.5 Roof-mounted PV, although not the cheapest way to generate renewable electricity, could be a key opportunity for North West Leicestershire, both because it arguably has a smaller visual impact on the wider landscape than large-scale PV or wind turbines, and because the total amount of roof space, considered cumulatively, is relatively large.
- 4.6 Estimates suggest that, based on the number of existing buildings and potential Local Plan development projections, it may be possible to install approximately:
- 81 MW of roof-mounted PV on existing buildings
 - 14 MW on new dwellings; and
 - 3.2 MW on new employment sites.
- 4.7 This would not require every square meter of roof space to be covered but is based on rules of thumb for the amount of typical roof area that is available for different building types.
- 4.8 Large non-domestic buildings, such as those that contain industrial facilities, can provide significant opportunities for installing roof-mounted solar energy technologies. The quantitative estimate in the Study suggests that, based on roof areas, orientation, and typical installation sizes, industrial buildings could theoretically accommodate more PV than all domestic buildings combined, despite there being far more domestic buildings.
- 4.9 Large-scale ground-mounted PV farms are among the most cost-effective ways of generating renewable electricity and can be installed more flexibly than many other LZC technologies. The study suggests that, this should be considered a key opportunity that can provide renewable energy for North West Leicestershire at a strategic scale.
- 4.10 As with building-mounted PV, from a planning perspective, visual impact is generally the key issue. Solar farms also have significant spatial requirements, which raises the issue of competing land uses. Therefore, the Government has recommended that priority should be given to installations on brownfield sites and lower grade agricultural land – or, alternatively,

that PV should be incorporated into the existing built environment (e.g. on the roofs of commercial and industrial buildings).

Wind

- 4.11 Onshore wind is currently one of the most cost effective LZC technologies available and could deliver a significant portion of the District's energy demands; however, it should be noted that this is currently somewhat restricted by national policies.
- 4.12 From a technical perspective, there is considerable potential for wind energy across the District. The Zero Carbon Roadmap sets a target of expanding from the current 3.3 MW capacity to 75 MW by 2050. However, a constraints-based assessment carried out by the Centre for Sustainable Energy (CSE) in 2011 assessed opportunities for commercial turbines of three different sizes, which in combination were found to offer up to 140 MW of capacity.
- 4.13 The Study suggests that this may be a conservative estimate. The 140MW figure is based on applying a 400-600m buffer around all residential properties, depending on the size of turbine, which is used as a proxy for addressing both safety concerns as well as amenity concerns (e.g. noise, shadow flicker, visual impact). Those factors are highly site-specific and can potentially be mitigated depending on site conditions, so in principle it may be possible to locate wind turbines closer to residential buildings in some cases.
- 4.14 The districts Wind Energy Opportunities Map produced as part of the Renewable Wind Energy Study (2016) only applied a safety buffer around residential properties. It indicates there is up to 191 km² of land area in the District that is 'potentially suitable' for medium and large-scale wind turbines, which likely represents a maximum theoretical limit. Using the rules of thumb set out in Department of Energy and Climate Change (DECC) (2010), which takes account of the need for spacing between turbines, if all of this land was used to deliver wind farms, this would offer over 1,700 MW of wind energy capacity - ten times more than the CSE estimate and far more than would be needed to meet the annual electricity demands of the District. It is important to note that this does not mean that it would be desirable, practical, or financially viable to deliver this amount of wind energy – only that there is, in principle, enough physical and spatial resource in the District to do so.
- 4.15 The Study identifies that the actual target figure could fall somewhere between these two estimates (140MW and 1,700MW), although probably would be closer to the CSE estimate when considering the need for wind energy developments to gain community support. However, the key point is that the available evidence suggest that the targets identified in the Zero Carbon Roadmap are potentially achievable.
- 4.16 Small-scale wind turbines can be installed on or near buildings, although they tend not to perform very well in urban areas where there is more disruption to wind flow. Therefore, it is usually assumed that these will be more suitable for rural locations where there are fewer obstacles and wind speeds are higher. They may also be suitable for industrial sites and business parks where there is less concern about visual impact.
- 4.17 Due to their lower output, small-scale turbines are significantly more expensive than large-scale turbines in terms of cost per unit of electricity generated. Furthermore, it would take dozens of smaller turbines to match the output of a single large-scale turbine, which would result in cumulative impacts. For these reasons, the study suggests that if wind energy is planned within North West Leicestershire, it may be preferable to install fewer, larger turbines.

Heat Pumps

- 4.18 Heat pumps are expected to be crucial for decarbonising the heat sector by 2050 as they can be powered with renewable electricity and operate with much higher efficiencies than either boilers or direct electric system.

- 4.19 A heat pump is a device that extracts heat from the natural environment (e.g. the air, ground or water), compresses it, and then uses it to provide space heating or hot water. Heat pumps do not generate heat or electricity, but instead *use* electricity to transfer heat from one place to another using refrigerant liquids.
- 4.20 At present, heat pumps offer the best opportunity to decarbonise the heat supply in North West Leicestershire; most new and existing buildings can, in principle, accommodate either an air or a ground source heat pump. Due to the efficiency of these technologies, their use can also help to mitigate against electricity price increases when compared with direct electric heating.

General

- 4.21 In relation to renewable energy the Study recommends that any policies relating to existing buildings should emphasise the importance of carrying out energy efficiency upgrades. The study suggests that the council should consider issuing a Local Development Order or extending permitted development rights for measures such as roof-mounted PV, air source heat pumps and external wall insulation to promote uptake. Officers will consider this matter further as part of the report to a future meeting of this Committee.
- 4.22 The Study also recommends that any guidance should emphasise the importance of following the energy hierarchy and, in particular, support a shift away from the use of gas boilers towards the use of low carbon heating systems. Guidance should also encourage applicants to undertake a whole-building approach to retrofitting, and in particular, to carry out condensation risk analysis if any changes are proposed that would impact either insulation or ventilation levels in the building. Again, this matter will be given further consideration by officers.

5.0 NEXT STEPS

- 5.1 The study provides an important evidence base to help inform the Local Plan review. In particular, it has established that the targets for renewable energy generation set out in the Zero Carbon Roadmap appear to be realistic. There is now a need to develop policies that can help support the achievement of these targets through the planning system, although it should be appreciated that the planning system is not the only means by which the targets will need to be addressed.
- 5.2 As outlined earlier in the report, the study also includes a range of recommendations on other aspects including the providing advice regarding a possible carbon offset fund and approaches to mitigation. A further report will be brought to this Committee setting out how the Local Plan might seek to address these issues.

Policies and other considerations, as appropriate	
Council Priorities:	Developing a clean and green district
Policy Considerations:	None
Safeguarding:	No issues identified
Equalities/Diversity:	An Equalities Impact Assessment of the Local Plan review will be undertaken as part of the Sustainability Appraisal.
Customer Impact:	No issues identified
Economic and Social Impact:	No issues identified at this stage
Environment and Climate Change:	The decision itself will have no specific impact. The Substantive Local Plan Review as a whole will deliver positive environmental and climate change benefits and these will be recorded through the Sustainability Appraisal.
Consultation/Community Engagement:	None
Risks:	A risk assessment of the review has been undertaken and is reviewed at the officer Project Board meetings.
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