A toolkit to assist rural communities with the development of renewable energy projects in North-East England

Who is this toolkit for?

This addresses the unique energy challenges of North-East England, a region with a population of 2.5 million, predominantly residing in towns and cities, and encompassing rural communities spread over expansive areas. The North-East's historical reliance on local solutions and self-sufficiency will become increasingly vital amid the heightened volatility in energy prices and mounting concerns over medium- to long-term security of supply. In light of the UK Government's commitment to Net Zero emissions by 2050, the region's resilience will also leave it well-placed to contribute towards this longer-term goal.

This toolkit offers practical principles and guidance for individuals and communities interested in developing renewable energy projects in North-East England. It focusses on actions at local and regional levels, prioritising individual farms and/or landholdings, rather than larger-scale or national contexts. It takes into account the region's diverse energy needs, considering not only electricity generation, but also heat, energy efficiency, and energy storage. It offers a first port of call to find out more about developing renewable energy projects in the region.

How was the toolkit developed?

This toolkit was co-designed with regional stakeholders from a range of sectors and backgrounds, all of whom have worked to enhance the resilience of local communities in the context of shifts in energy and environmental policy. The toolkit is the product of a series of online and in-person workshops held during Spring and Summer 2023 to discuss the challenges and opportunities of developing renewable energy projects in the region. The toolkit provides answers to a series of frequently asked questions on the topics that came up most often as knowledge gaps. But it is important to recognise that it does not represent everything one would need to know about the renewables sector more generally- it is more of a signposting document to further (and more detailed) sources of information.

Why get involved in renewables?

The prices of heating oil, fuel for vehicles and generators, and natural gas, are becoming more expensive and more volatile. These increases, coupled with the pressing need for greater energy security overall, mean that rural communities are increasingly considering a switch to alternative forms of energy. Given the longer-term context of strengthening climate change impacts, and wider policy shifts away from fossil fuels and towards renewables, the question of making a switch is more a case of when, not if, and of course we share some of our stakeholders' learning regarding the key aspect of timing this switch where we can.

The shifts in energy policy align with broader trends towards green growth and income diversification for farming businesses. The evolving landscape of energy policies reflects a growing

emphasis on environmentally sustainable practices, while also providing opportunities for farmers to explore alternative revenue streams. The recent Agriculture Act (2020) and 25 year Environment Plan (2018) outline a greater emphasis on sympathetic management for wildlife on agricultural land. Although the details of the new English Land Management System are yet to be finalised, projects that achieve a win-win for nature and for energy security/sustainability- so-called 'stackability'- are likely to receive the most incentives. We identify a number of locally-relevant opportunities to stack projects and achieve multiple goals below.

Which sources of renewable energy can be developed in the North-East?

The Department for Energy Security and Net Zero (DESNZ) has created an interactive Renewable Energy Planning Database map (REPD map) which tracks the progress of renewable energy production projects that generate over 150kW of electricity. The map provides a snapshot of current and planned renewable energy projects that are ongoing and available in the UK, and is a useful first port of call for exploring what might be possible for local projects. The map can be tailored to provide a detailed overview of any past, present, or future renewable energy production projects in specified regions across the UK, including the North-East.

The REPD map identifies 99 renewable energy projects currently operating in the North-East region. These include solar, wind, geothermal, hydro, and biomass energy projects, all of which are feasible and economic in the North-East. More information about these sources can be found at the following hyperlinks: solar panels, onshore wind turbines, ground source heat pumps, hydroelectricity systems, and anaerobic digesters. Financial incentives are also available to make improvements in energy efficiency and storage- such as smart energy management systems.

Top ten frequently asked questions on developing renewable energy projects in North-East England

1) How can animal co-products be effectively utilised to produce electricity as an alternative to diesel? What are the requirements for implementing bioenergy solutions?

Animal co-products such as manure and slurry, together with waste food, can be used to produce heat and/or electricity through the process of Anaerobic Digestion (AD). AD is a biological process in which organic matter is converted into useful products by micro-organisms in the absence of air. The process produces biogas, which is burned to generate electricity or heat, or refined into biomethane for integration with natural gas networks. The solid and liquid by-product that is left behind is known as digestate, and can be used as a nutrient-rich fertiliser in agriculture.

The requirements for implementing an anaerobic digester can be found on the Official Information Portal on Anaerobic Digestion. To gain approval for the anaerobic digester, the plant operator must demonstrate technical competence by participating in recognised schemes such as the CIWM/WAMITAB scheme or the ESA/EU Sector Skills scheme. These schemes ensure that the AD plant operator possesses the necessary skills and knowledge to effectively manage and operate the AD plant to the required standard.

Handling waste permits are essential, and can fall under specific levels such as T24 Permit, a T25 Permit, a Standard Rule Permit SR2012 No.12, or unless exempt, where a bespoke permit is required. Additionally, compliance with the Animal By-Products Regulations (ABPR) permit is necessary for dealing with the AD Plant feedstock. Permits to spread the digestate are also required, namely a U10 Permit, a U11 Permit, or a SR2010 No.4. Standard Permit. The official Information Portal on Anaerobic Digestion provides information on which permit you require for your operational Anaerobic Digestor. A plant will also have to comply with the government's health and safety guidance for the animal by-product industry. Seeking advice before applying for a permit is advisable.

2) How do I get involved in local anaerobic digestion projects?

Begin with an initial feasibility study to see if AD is suitable for you and check out the AD solution guide and checklist. In August 2023 the government also published the biomass strategy and action plan and an Official Biogas Map of UK. A guide to finance and support is also available, alongside economic assessment tools such as SADEAT tool, biogas calculator and the AD enterprise budget calculator. Speak to experts that provide guidance on the bioeconomy and financial advice. More widely, business support on diversification and renewables is available.

The Local Government Association is a good first step in discovering more information about the community anaerobic digestion projects already underway.

3) What subsidies or financial incentives are available to support small-scale energy projects?

The following list is a good introduction to what's available:

- *Government grants finder - The 'Find a grant' service aims to make it simpler and faster for civil society organisations and small and medium-sized enterprises (SMEs) to find and apply for funding, including for renewables projects.*
- *Funding Opportunities | Community Energy England - A range of ongoing and time-limited funding from a wide range of sources and regions, all relevant to community energy organisations in England.*
- *Grants - Grants Online - A comprehensive and up to date source of information for organisations looking for grant funding (subscription required).*
- *Other sources of funding | Arts Council England – List of funding available from the Arts Council and the National Lottery.*
- *Finance and support for your business – Searchable database of live Department for Business and Trade funding schemes.*
- *Green Investment Bank - A specialist green investor focused on net zero projects.*
- *Smart Export Guarantee (SEG) – Generate electricity and export it to the National Grid.*
- *Ofgem Feed-in Tariffs (FITs) - The Feed-in Tariffs (FIT) scheme promoted the uptake of renewable and low-carbon electricity generation (currently closed to new applicants).*
- *What are the government grants for renewable energy? – Information page listing funding available for homeowners to install renewable energy technology in their properties.*

- *Ofgem Environmental and social schemes – These programmes focus on renewable heat, renewable electricity, energy efficiency and fuel poverty.*
- *Ofgem business energy efficiency grants and schemes - This guide will help you find small business energy grants, schemes and advice to lower your carbon emissions and get more efficient with your commercial energy use.*
  Salix - Salix is a non-departmental public body that administers funds on behalf of the Department for Energy Security and Net Zero, the Welsh and Scottish Governments and the Scottish Funding Council
- *NFU funding schemes - Funding and grant schemes available for farm and rural businesses, communities and local authorities.*

4) How can rural households navigate the planning process to implement renewable energy initiatives?

Start off an energy efficiency audit to see where, when and how energy (electricity and heat) is used, and could potentially be saved. If you have mains electricity, find out your capacity limit with the national grid network operator in the area- who will have a capacity register that will help to determine which renewable energy projects might be suitable. Government guidance on renewable and low carbon energy incorporates key points to consider with renewable energy initiatives. Develop a comprehensive contingency plan to address potential disruptions, such as supply interruptions to the national grid.

A plain English guide to the planning system and the planning permission portal provide information on planning rules, permitted development limits, and building regulations. An overview guide to installing renewables from the Energy Saving Trust covers the important steps. Each form of renewable energy has specific planning requirements and regulations, guides to the planning process include: Solar panels, Onshore wind turbines, Heat pumps, Hydropower, and Anaerobic digestion.

5) How can rural projects on renewable energy also contribute to biodiversity net gain and other incentives for nature-friendly farming, such as Environmental Land Management Schemes (ELMS)?

Renewable energy projects can also target improvements in biodiversity, and thus qualify for incentives such as biodiversity net gain and the new Environmental Land Management Scheme. Guidance on how to do this on solar farms has been developed by Solar UK. Renewwables projects can also fall within the scope of Sustainable Farming Incentives. More widely, Climate friendly farming strengthens business resilience against climate change by improving the health of the surrounding environment.

6) Do you need a mains grid connection to pursue a renewables project in a rural area?

The short answer is no, you do not need a mains grid connection to the national grid to pursue a renewable energy production project in a rural area. Many renewable energy technologies that generate electricity can operate independently off the national grid. Energy generated by

renewable energy initiatives- both heat and electricity- can be stored in energy storage systems, most commonly electric batteries, heat batteries and thermal energy stores.

An off-grid renewable energy project in a rural area needs to take into consideration the inevitability that more energy will be generated than used at times of high supply and low demand. Review energy storage or connection options to ensure that your renewable energy project operate as efficiently as possible. Consider if community charging hubs are feasible for the project. The North East Community Energy Study provides guidance for creating a community charging hub that generates renewable energy from solar panels and shares the output among community batteries. 'Energise Barnsley' provides a useful example of how to reduce peak solar output onto the electricity networks when there is low local demand.

7) I'm told that upgrading a grid connection is quite a lot of work. Is this process described in detail anywhere?

The Distribution Network Operator (DNO) is responsible for delivering electricity across the local electricity network, and its first step would be to conduct a feasibility study to see if an upgrade is possible. There are different DNOs for different areas of the United Kingdom: find out the DNO responsible in the region. Each DNO has a dedicated team to provide technical advice and application support. An energy network operator can help provide guidance on the process of upgrading the grid connection.

8) How can I calculate the return on investment of a renewables project? Are there any tools available?

Calculating the return on investment (ROI) of a renewables project involves assessing the financial performance and profitability of the project over its lifespan. Here is a general overview of the process and specific calculation tools for different types of renewables:

General Overview:

Initial Investment: Determine the total upfront cost of the renewables project, including equipment, installation, permits, and any associated expenses.

Annual Cash Flows: Estimate the annual revenue generated from selling renewable energy and subtract the annual operating expenses (e.g., maintenance, insurance, and other costs).

Project Lifespan: Determine the expected lifespan of the renewables project.

Discount Rate: Assume and apply a discount rate to adjust future cash flows to their present value.

ROI Calculation: Use the formula: ROI = (Total Net Profit / Initial Investment) x 100.

Specific Calculation Tools:

For Solar Photovoltaic (PV) Projects:

- *Solar Energy calculator*
- *Solar Investment calculator*

For Wind Energy Projects:

- *Return of investment of a wind turbine*

For Anaerobic Digestion Projects:

- *SADEAT tool*
- *Biogas Economics calculator*
- *AD enterprise budget calculator*

Please note that while these tools provide estimates, real-world project performance can vary based on location, market conditions, policy incentives, and other factors. It's essential to conduct a more detailed feasibility study and/or financial analysis specific to your project's circumstances for more accurate results. Seeking guidance from renewable energy experts or financial advisors is likely to enhance the accuracy and reliability of your ROI calculations.

9) I've been told geothermal has high potential for the North-East. How do I find out more on what might be possible on my land?

There is potential for geothermal energy in the United Kingdom and its application across the nation is under review. Currently the Coal Authority is working to harness mine water in energy production from the coal mines in Britain. The policy and regulatory frameworks for geothermal energy dictates that the Coal authority is the governing body in charge of monitoring geothermal energy and any energy production initiatives. To find out if geothermal energy might be possible, you are advised to contact them directly.

10) I am an individual/community interested in developing small-scale renewable energy projects. Where can I access further resources and help with getting started?

Here are some further resources and support available to get you started:

- *Small Scale Renewables Practical Guide: This guide offers insights into opportunities for providing heat or energy to a farm, along with further information available and details on current networks and projects.*
- *Community energy help projects – Energy Saving Trust webpage on getting started with community energy projects- e.g. energy storage hubs for batteries in electric vehicles, such as cars and tractors.*
- *Community Energy England: This organisation supports community energy projects by connecting practitioners, sharing best practices, and exchanging knowledge.*
- *Rural Community Energy Fund (RCEF) Resource Bank information - The Rural Energy Community Fund was a national scheme established by the Department of Business, Energy & Industrial Strategy in recognition of the importance of community energy in England. RCEF was delivered by five regional Net Zero Hubs, and has supported over 200 new community energy projects since its inception in 2019.*
- *Invest in North-East – Information on the energy sector in the North-East region of the UK.*

- *LEP network growth hub finder - LEP Growth Hubs support local businesses facing the current cost-of-living challenges. The network of 38 Growth Hubs are local public/private sector partnerships led by the Local Enterprise Partnerships (LEPs). They join up national and local business support so it is easy for businesses to find the help they need.*
- *Net Zero North East England - Net Zero North East England is a new collaboration between local government, business, education, the public sector, and civil society to drive a comprehensive regional approach to tackling the climate emergency.*

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The toolkit was co-developed with a wide range of stakeholders from agriculture, environmental consulting, local authorities, industry associations, academic institution, and nonprofit organizations. This diverse group of contributors played integral roles in the project's development and success.