

Key Partnership Activity & Delivery in the Energy Space



Net Zero Ambitions & Challenges in the Electricity Network



The Oxfordshire Strategic Vision for Long Term Sustainable Development articulates the Future Oxfordshire Partnership's (FOP) net zero ambitions, with the desire that by 2050 Oxfordshire will have achieved carbon neutral status, and be accelerating towards a carbon negative future, removing more carbon than it emits each year. Significant activity and programmes of work are underway across Oxfordshire to support the transition to net zero.



In order to achieve collective net zero ambitions, whilst maintaining inward investment within the county, a sustainable, decarbonised energy system is required. Grid constraints in both the transmission and distribution elements of the electricity network are resulting in delays to deliver renewable energy projects, and decarbonisation activity.

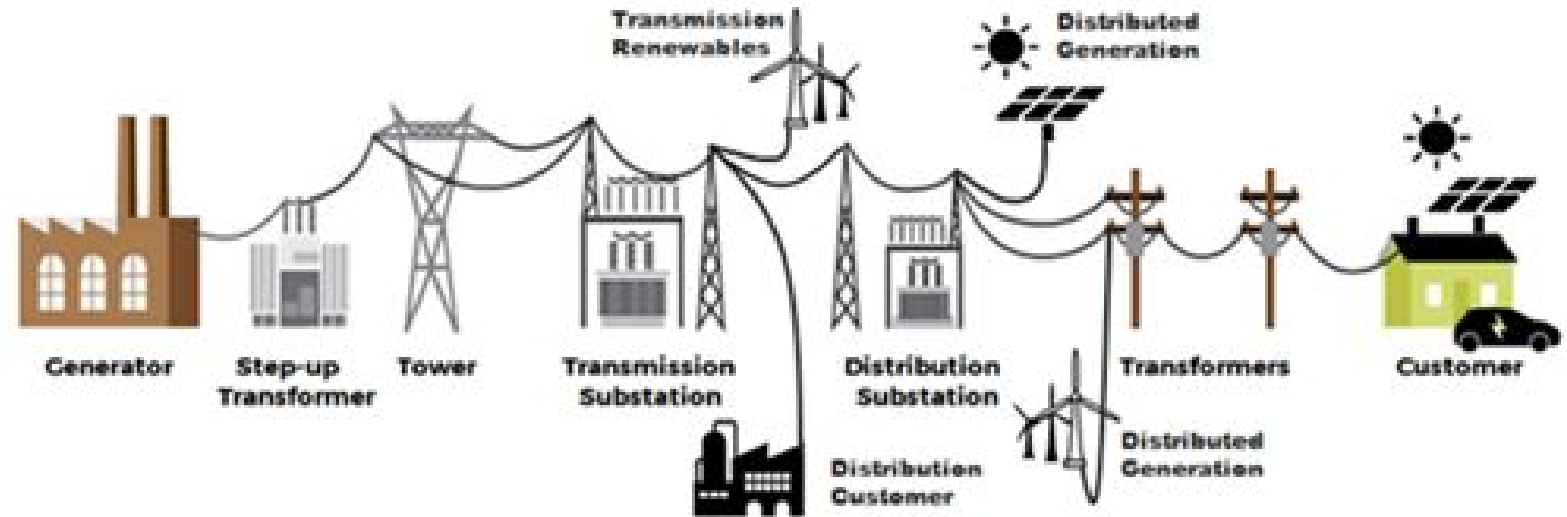


Whilst tackling national constraints in the electricity network will require significant investment and action by Central Government, Oxfordshire partners are working collaboratively to identify local solutions and activity which support in addressing network challenges → the report highlights several key partnership projects and programmes of work within Oxfordshire, aimed at realising net zero ambitions, and/or supporting to tackle local grid constraints.

Snapshot of the Electricity Network

The current electricity network with distributed electricity generation; image taken from National Grid.

Transmission Network: Most of us commonly call the transmission system “the National Grid”. It’s the high-voltage system designed to move electricity from large power stations around the country to where it is needed. It is made up of transmission lines, pylons and substations.



Distribution Network: This part of the electricity network reduces the higher voltage energy that is delivered to your area by the Transmission Network and uses power lines and other infrastructure to send it to homes and businesses where it is needed. The Distribution Network is also playing an increasingly important role in connecting local distributed energy resources (DERs) to the network.

Distribution Network Operators: Three Distribution Network Operators (DNOs) cover Oxfordshire – Scottish and Southern Electricity Networks (SSEN), National Grid Electricity Distribution (NGED), UK Power Networks (UKPN).

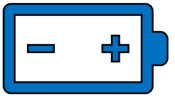
Project Local Energy Oxfordshire



One solution for managing the increased demand for electricity as we transition to net zero would be to rely on large generators to provide more energy, however such reliance would require costly upgrades to both the transmission and distribution networks, which can take many years to deliver.

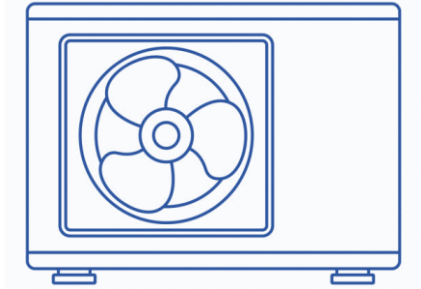


Project Local Energy Oxfordshire (LEO) instead sought to understand how decentralised, local energy solutions, where energy is balanced (supply meets demand) at the grid edge closest to consumers, as opposed to in the transmission network, could accelerate the transition to a zero-carbon energy system



The project ran a series of trials across Oxfordshire to investigate how new technologies and flexibility services could balance energy in the local network → delivery of local energy solutions such as those trialled through LEO could support in reducing the scale of costly, significant network upgrades.

Project Local Energy Oxfordshire



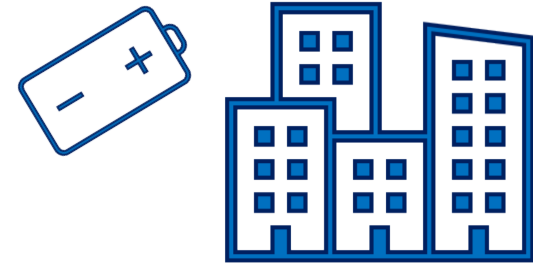
Smart Flex Heat Pump Trial:

Aimed to explore whether domestic heat pumps, controlled using smart technology, could deliver flexibility to the local energy network, whilst delivering cost-savings to homeowners.



Sandford Hydro Trials:

Aimed to explore how energy generated by the Sandford hydroelectric power plant could be stored by building up excess water upstream.



Buildings as Batteries: Sought to understand whether buildings such as Oxfordshire County Library, could be used as a battery to deliver flexibility to the energy network, by altering electricity usage during grid congestion.

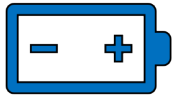
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In addition to place based and energy asset trials, a data mapping tool referred to as LEO LAEP+ (LAEP: Local Area Energy Planning) has been developed and trialled through Project LEO to identify, triage and model deployment locations for low carbon technologies e.g., public electric vehicle charge points, retrofit, heat pumps, and solar PV.

Local Area Energy Planning



The Oxfordshire Net Zero Route Map and Action Plan and Project LEO have both highlighted the critical need for a local area energy planning approach to be developed in Oxfordshire, in order to ensure net zero ambitions can be realised.



Local area energy planning is a data driven, whole system approach, which maps out the changes required to transition a localities' energy system to net zero carbon within a defined timeframe, and includes consideration of the most cost efficient technologies to achieve net zero for different carbon emitting assets and processes.



The LEO LAEP+ mapping tool developed through Project LEO, provides key data and insight to inform local area energy planning, whilst insights from the various LEO trials offer ideas for innovative decentralised, local energy solutions, which can be incorporated.

Local Area Energy Planning



In March 2023, local authority and Oxfordshire Local Enterprise Partnership (OxLEP) representatives came together for an initial exploratory session, to explore the role and need for local area energy planning in Oxfordshire, and considered different options regarding scales of delivery, and associated pros and cons.



Following the exploratory session, a multi-agency working group, which brings together council representatives (planning, climate action etc.), Distribution Network Operators (DNOs) both electricity and gas, and other key strategic partners, is in the process of being formed, in order to better scope out the scale and approach for local area energy planning in Oxfordshire; it is anticipated this group will convene for its first meeting in June 2023.



Recommendation: *The FOP is asked to ensure respective organisations are actively engaged in work alongside key stakeholders to develop and deliver a local area energy planning approach for Oxfordshire, to support in realising net zero ambitions, as outlined in the endorsed Oxfordshire Net Zero Route Map and Action Plan.*



Energy Superhub Oxford

Energy Superhub Oxford (ESO), which completed in March 2023, was developed to eliminate 10,000 tonnes of CO² emissions annually. Since its inception in April 2019, the project has focussed on the deployment of innovative technologies which deliver greener energy solutions in the pursuit of reducing carbon, and improving air quality.

- Developed Europe's most powerful electric vehicle charging hub, located at Redbridge Park & Ride. The site is connected directly to the National Grid transmission network, relieving local pressures on the constrained distribution network. The charging hub delivers up to 10MW of power, enough to charge up to 400 cars at once. A connection has also been installed at Oxford Bus Company's Watlington Road depot, ready to support the electrification of the city's bus fleet.
- Installed the UK's first transmission-connected battery storage (EDF Renewables), located at National Grid's Cowley Substation. The battery will enable increased renewables into the system, and improve grid resilience and energy balancing, creating a more flexible energy system.
- Implemented low carbon heating in over 60 homes across Blackbird Leys, with the installation of innovative ground source heat pump systems combined with smart controls and dynamic energy pricing (developed by Kensa Contracting), providing a renewable heating solution, which delivers cost savings to the occupier.

Recommendation Snapshot



Note the report, and take advantage of opportunities to proactively raise awareness of activity currently underway in the energy space within Oxfordshire, to support collaboration and join-up, and prevent duplication.



Ensure respective organisations are actively engaged in work alongside key stakeholders to develop and deliver a local area energy planning approach for Oxfordshire, to support in realising net zero ambitions, as outlined in the endorsed Oxfordshire Net Zero Route Map and Action Plan.



Ensure respective organisations are contributing to annual Distribution Future Energy Scenarios (DFES), to ensure Distribution Network Operator (DNO) modelling of generation, storage, and demand, takes into account planned housing and business development, as well as decarbonisation plans and ambitions.

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