To:	**Future Oxfordshire Partnership**
Title of Report:	**Key Partnership Activity and Delivery in the Energy Space**
Date:	**June 2023**
Report of:	**Beth Wilks, Future Oxfordshire Partnership Manager**
Status:	**Open**

Executive Summary and Purpose:
This report, requested by the Future Oxfordshire Partnership, provides an overview of key partnership activity and programmes of work within the Oxfordshire energy space (which one or more of the six local authorities are involved in), aimed at realising net zero ambitions, and/or supporting to tackle local grid constraints. It aims to support increased awareness and join-up within the energy arena, and prevent duplication and wasted resource in efforts to realise the ambitions of the Oxfordshire Strategic Vision for Long Term Sustainable Development, and the Net Zero Route Map and Action Plan.

How this report contributes to the Oxfordshire Strategic Vision Outcomes:
A sustainable and decarbonised energy system is key to the realisation of the outcomes of the Oxfordshire Strategic Vision for Long Term Sustainable Development, including energy efficient and affordable homes, a carbon negative future, and a globally competitive and sustainable economy.

Recommendations:
The Future Oxfordshire Partnership is asked to:

1. 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.
2. 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.
3. 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.

Appendices: None

Net Zero Ambitions & Current Challenges in the Electricity Network

1. 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. It is important to note Oxfordshire's local authorities have committed to varying net zero target dates up to 2050.

2. Significant activity and programmes of work are underway across Oxfordshire to support the transition to net zero, including the rollout of electric vehicle charging points, and the retrofit of properties with poor energy performance ratings.

3. In order to achieve collective net zero ambitions, whilst maintaining inward investment within the county, a sustainable, decarbonised energy system is required. However, grid constraints in both the transmission and distribution elements of the electricity network (Figure 1) are resulting in delays to deliver renewable energy projects, and decarbonisation activity, which includes electric vehicle charger rollout, and heat pump installation, whilst inhibiting inward investment within Oxfordshire. Whilst not exclusive to Oxfordshire, such challenges hinder economic growth and nationally significant Research and Development, and commercialisation opportunities within the county, and slow the pace of activity to deliver collective net zero ambitions.

4. 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. Outlined below are several **key partnership projects and programmes of work within Oxfordshire**, aimed at realising net zero ambitions, and/or supporting to tackle local grid constraints.

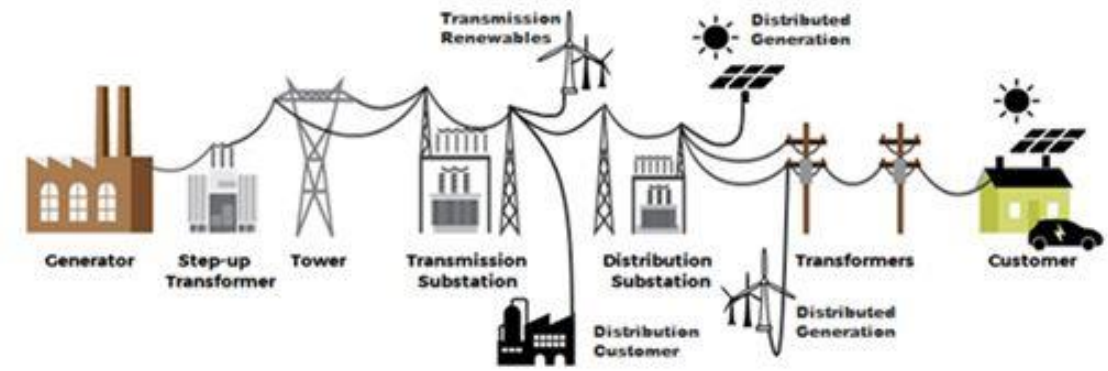

Figure 1: The current electricity network with distributed electricity generation; image taken from National Grid.

Key Partnership Activity & Programmes of Work

5. **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. 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, in pursuit of net zero ambitions. The project ran a series of trials across Oxfordshire to investigate how new technologies and services could balance energy in the local network, enabling increased flexibility in how energy is generated, used, and stored. Delivery of local energy solutions such as those trialled through Project LEO could support in reducing the scale of costly, significant network upgrades. Trial examples include, but are not limited to:

- **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.
- **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.
- **Sandford Hydro Trials:** Aimed to explore how energy generated by the Sandford hydroelectric power plant could be stored by building up excess water upstream.
- **Osney Supercharge:** Sought to understand how households and businesses on Osney Island could generate and store their own electricity to reduce demand on the local distribution network. It further aimed to improve local renewable generation at Osney Lock Hydro (OLH), exploring how a local hydro scheme can provide flexibility to the network, and explored the impacts and opportunities for small dense urban environments to transition to electric vehicles (EVs). Osney Supercharge demonstrates how multiple local carbon technologies (LCT) can operate together to maximise energy supply and demand within a neighbourhood area.

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. Whilst Project LEO came to a close in March 2023 (Project LEO final report), partners of the LEO consortium have subsequently submitted a bid for additional funding to build upon the learning which has developed through delivery of the project. Project Local Energy Oxfordshire Neighbourhoods (LEON) is now in a 3 month funded discovery phase, completing in June 2023.

6. **Local Area Energy Planning Workstream:** 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.

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. The county council is in the process of recruiting two new energy systems posts who will support this work. The Infrastructure Advisory Group will oversee and input into the development of the local area energy planning workstream for Oxfordshire, with updates to the FOP provided.

Funding recently secured from the Net Zero Living Pathfinder Places competition will support the emerging local area energy planning workstream, by developing a data solution which brings together building-level and occupier-level datasets that are geospatially linked to power networks, to facilitate whole systems energy modelling. The project which started in April 2023 is led by Advanced Infrastructure, and is being delivered in partnership with Oxfordshire County Council, Southern and Scottish Electricity Networks (SSEN), Dundee City Council, and Perth & Kinross Council.

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.

7. **Energy Superhub Oxford:** Energy Superhub Oxford (ESO), which completed in March 2023, was developed to eliminate 10,000 tonnes of CO^2 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. ESO has:

    - 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. Furthermore, funding from

the project has enabled the electrification of 40 vehicles from the Council's 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.

ESO offers a model for other cities globally to reduce carbon emissions, whilst improving air quality.

8. **Electric Vehicle Infrastructure:** There is significant activity across Oxfordshire to increase the rollout of electric vehicle (EV) charge points, including the delivery of activity through awarded Local EV Infrastructure funding, to support the uptake of electric transport as we transition to net zero.

9. **Retrofit Activity:** The Oxfordshire councils are working with partners to retrofit both domestic and commercial properties, including the installation of air source heat pumps, to improve energy efficiency and reduce CO_2 emissions. For example, West Oxfordshire District Council has been allocated funding from the Sustainable Warmth Grant to enable upgrades to local homes, which will boost energy performance, and reduce the impact of rising energy bills; it is working with City Energy to administer the work.

   Clean Heat Streets, a UK Government funded project is aiming to install around 150 air source heat pumps in homes of different tenures across the Rose Hill and Iffley area. Project partners include Oxford City Council, Samsung, the University of Oxford, Oxford Brookes University, Oxfordshire County Council, Scottish and Southern Electricity Networks (SSEN) and Alto Energy. The purpose is to overcome barriers to heat pump installation, by exploring solutions on a street-by-street basis, rather than an individual home approach. Oxford City Council has employed a "Zero Carbon Community Engagement Officer" to lead the community engagement aspects of the project and support residents who sign up to have a heat pump installed. The partnership project will contribute to a body of evidence for Oxfordshire and beyond, regarding mechanisms by which to overcome challenges hindering the transition to net zero carbon.

   The Future Fit One Stop Shop (FOSS) partnership project led by Oxford City Council and the Low Carbon Hub, using funded awarded from the Net Zero Living Programme fund from Innovate UK, will explore the creation of a new 'one stop shop' for residents and businesses seeking retrofit services for their homes and premises, whilst strengthening the local supply chain - through an innovative "FutureFit" concept. The 'FutureFit' approach includes utilising smart technology and design, so that it is easier for businesses and residents to make changes to help reduce energy consumption, and reduce the impacts of climate change. The feasibility study will support Oxford to understand how addressing specific

challenges for commercial, industrial, and domestic projects, looking at issues around power, heat, mobility, product manufacturing and usage, can support the transition to net zero.

10. **The Energy Systems Accelerator Pilot:** The Energy Systems Accelerator (TESA) pilot referred to as mini-TESA, was established to enable and develop proactive collaboration between different organisations working across the energy sector, to support the development of innovative approaches which help realise net zero ambitions. Mini TESA is a multi-disciplinary hub and shared workspace at Osney Mead in Oxford, which co-locates representatives from academia, local government, social enterprises, and industry to pool knowledge, expertise, and resource, to enable the development of approaches which accelerate the green energy transition, including innovation in low carbon technology.

    Now operational, mini-TESA plays host to University research groups, the Low Carbon Hub, and a team from SSEN. The pilot space is set to inform the design and operation of a full TESA, which would look to host up to 800 practitioners, further advancing green energy systems thinking, in pursuit of net-zero solutions. The full TESA would be designed to be carbon negative, and located in the new Innovation District of Oxford.

11. **Oxfordshire Energy Strategy:** The Oxfordshire Energy Strategy, which was developed in 2018, provides an ambitious framework aimed at supporting Oxfordshire to be at the forefront of energy innovation to foster clean growth. The Energy Strategy is underpinned by three guiding principles:

    1. Secure a smart, modern, clean energy infrastructure.
    2. Reduce countywide emissions by 50% by 2030 (compared with 2008 levels) and set a pathway to achieve zero carbon growth by 2050.
    3. Enhance energy networking and partnership working.

    Stakeholder engagement sessions focussed on identifying additional opportunities for collaborative working aligned to the ambitions of the Oxfordshire Strategic Vision, have identified the desire to refresh the energy strategy for Oxfordshire alongside the development of a local area energy planning approach, recognising that the current version is somewhat outdated in not reflecting the sum of present energy challenges and ambitions.

12. **Oxfordshire Infrastructure Strategy:** The Oxfordshire Infrastructure Strategy (OxIS) provides a holistic assessment of the infrastructure needs of Oxfordshire, aligned to the priorities of both the Future Oxfordshire Partnership and the district and city councils. An absence of tangible energy infrastructure schemes, which support net zero ambitions and planned development, was identified as a gap in the current version of OxIS. Moving forward there is a desire to ensure greater incorporation of energy infrastructure schemes during updates to OxIS.

13. **Partnership Groups & Engagement**

    - **Zero Carbon Oxford Partnership:** The Zero Carbon Oxford Partnership (ZCOP) brings together representatives from academia, health, local

government, business, and the community to support Oxford city's transition to net zero carbon emissions. The partnership has a number of sprint groups working within the energy domain (energy use, residential retrofit, non-domestic retrofit, and renewable energy). These sprint groups have resulted in a number of activities which include:

- Identifying collaboration opportunities between partners, e.g., low-carbon technologies in industrial and large commercial partners.
- Identifying and addressing barriers to renewable energy, e.g., radar as a barrier to wind.
- Partner knowledge and experience sharing e.g., quarterly energy managers meetings to share and develop energy reduction approaches.
- Engaging partners in policy and council projects, e.g., local plan and EV charging infrastructure strategy (EVIS) engagement meetings, and energy flexibility trials as part of Project LEO.
- Submission of successful funding bids for retrofitting feasibility studies, and leveraging private investment from partners (see Project FOSS).

Planned activities in the coming two years include exploring Power Purchase Agreement (PPA) opportunities, spatial mapping of low-carbon technology opportunities, a whole system network review, and investigating bulk-buying scheme for solar PV and heat pumps. The ZCOP action plan contains further plans up to 2035.

In May 2023, ZCOP responded to the Ofgem consultation on electricity network regulation, highlighting the need for greater flexibility to bring forward new infrastructure based on future expected need.

- **Oxford to Cambridge Partnership:** The Oxford to Cambridge Partnership brings together leaders from local government, Local Enterprise Partnerships (LEPs), the Arc Universities Group, and England's Economic Heartland (EEH), to champion the region as a world leader of innovation and business, acting to achieve environmentally sustainable and inclusive growth that brings benefits to communities now and in the future. The partnership has initiated an environment group, which includes representatives from environmental NGOs and nature partnerships, water and energy groups, central government agencies, local government, LEPs and universities; preliminary activity for the group will include scoping for a regional water and energy strategy, looking at best practice approaches, standards, and tools.

- **Engagement with Distribution Network Operators:** In April 2023, Local Authority Leaders and OxLEP met with the three electricity DNOs which cover Oxfordshire (SSEN, National Grid Electricity Distribution, and UK Power Networks) to understand the causes of infrastructure delays, reinforcement plans, and opportunities to work collectively together to address and find solutions to ongoing challenges in the local energy network. Discussions highlighted concerns as to the reactive nature of electricity reinforcement nationally, the importance of developing a collaborative approach to local area energy planning to help inform future

investment needs, alongside Distribution Future Energy Scenarios, and the need for energy network skills embedded within different local authority teams including economic development, and planning.

Local authorities have the opportunity to input into Distribution Future Energy Scenarios (DFES) on an annual basis. DFES map out the different growth projections for electricity distribution networks across the UK, through forecasting changing electricity requirements; in doing so DFES support network upgrade planning and direct investment.

Recommendation: 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.

- **Engagement with the Central Government:** OxLEP have been in conversation with the Office for Investment regarding inward investment opportunities hampered by ongoing electricity infrastructure challenges and delays in an endeavour to identify solutions. Furthermore, the voting members of the FOP, alongside OxLEP colleagues, are inputting into a call for evidence from the Environmental Audit Committee regarding sustainable electrification of the UK economy. The evidence submission outlines key challenges limiting the speed at which the energy system can be decarbonised, and highlights the necessity to adequately resource local government to enable the development of local area energy plans, alongside key strategic partners including the DNOs.

- **OX to ZERO conference:** The OX to ZERO conference in September 2022 brought together the most-innovative thinkers, investors and entrepreneurs, exploring new ideas and technologies which could enable the acceleration of the transition to net zero carbon. Business leaders and respected sustainability thinkers explored topics ranging from fusion, through to the future of energy storage and the wider energy system, in an endeavour to catalyse collaborative action to deliver shared net zero ambitions.

Recommendation: The FOP is asked to 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.

14. It is important to highlight that in addition to the notable partnership projects and activity listed within this report, Oxfordshire plays host to several of the leading academic institutions and industry specialists working in the energy and climate change sector. For example, Oxfordshire is home to the Harwell Energy Tech Cluster, the Oxford Institute for Energy Studies, and the Low Carbon Hub, all of which are at the forefront of supporting the transition to a renewable and sustainable energy system.

Financial Implications

15. No financial implications emanate from this report.

Legal Implications

16. No legal implications emanate from this report.

Other Implications

17. No other implications emanate from this report.

Conclusion

18. This report provides a high level overview of **key partnership activity and programmes of work within the energy space**, aimed at realising net zero ambitions, and/or supporting to tackle local grid constraints. This report can be developed to include other partnership projects as they are identified. It is important to note individual organisations have their own programmes of work linked to energy, for example, Oxford City Council is undertaking retrofit of 300 council houses supported by funding secured under the Social Housing Decarbonisation Fund, and also completed retrofit of its leisure centres with heat pumps funded through the Public Sector Decarbonisation Scheme – these are not specifically included within this report, but have been captured within a programme tracker, managed by the officer group supporting the Environment Advisory Group, to support join-up, sharing of best practice, and prevent duplication.

19. It is important to reiterate that failure to address grid constraints in both the transmission and distribution network will significantly impact upon the ability to effectively transition to net zero, deliver planned housing developments, and secure investment which supports the economic prosperity of the county.

Background Papers

20. No background papers are included with this report.

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