

Project LEO Quarterly Programme Update September 2019



Maximising prosperity of local energy systems

Overview

Welcome to the first Quarterly Programme Update for Project LEO (Local Energy Oxfordshire), providing an update on activities undertaken within the first six months of the 3 year project. Each quarter, a Programme Update will be posted on the Project LEO website providing insights into the activities, outputs and research being generated as part of the demonstrator project.

Project LEO is redesigning the energy system at a local level to facilitate the transition to a zero-carbon energy future and is a collaboration between 9 project partners and 1 key sub-contractor each operating within very different areas of the wider energy ecosystem.

The LEO Partnership consists of the following parties:

Scottish and Southern Electricity Networks (SSEN) are the current Distribution Network Operator (DNO) for the majority of Oxfordshire and project lead; they are exploring a new Distribution System Operator (DSO) model taking on the role of Neutral Market Facilitator (NMF). The **Low Carbon Hub** are a community energy social enterprise who will develop and manage a portfolio of local energy generation/balancing and demand assets, informing new investment models. Marketplace operators **Piclo**, **Nuvve** and **EDF Energy**, are piloting innovative market platforms which will help deliver value to end users of the energy system through local energy trading, flexibility aggregation and new energy services. **Oxfordshire County Council** and **Oxford City Council** are two leading local authorities when it comes to supporting sustainability and innovation; they manage key infrastructure and local investment which will become important components of a fully integrated energy system. Finally, the **University of Oxford** and **Oxford Brookes University** will provide academic insights for future system planning, stakeholder engagement and project evaluation.

Origami (operating as a sub-contractor to Low Carbon Hub) are also piloting innovative market platforms which will help deliver value to end users of the energy system through local energy trading, flexibility aggregation and new energy services.

Project LEO is exploring how an integrated smart local energy system can be designed and operated to tackle the challenges associated with the transition to a zero-carbon energy system, while delivering value for local people, communities and businesses. LEO will create the market platforms and connectivity required to enable local flexibility services which help maximise utilisation of generation, demand and network assets.

The primary focus of the first 3 months of Project LEO was the completion of the Inception Phase of the project, this has comprised: set up of the governance structure of the project; development of project values and accompanying metrics to measure project success; and development of the requirements of a minimum viable system procedure. This programme update provides details of these key Inception Phase activities.

Launch Event

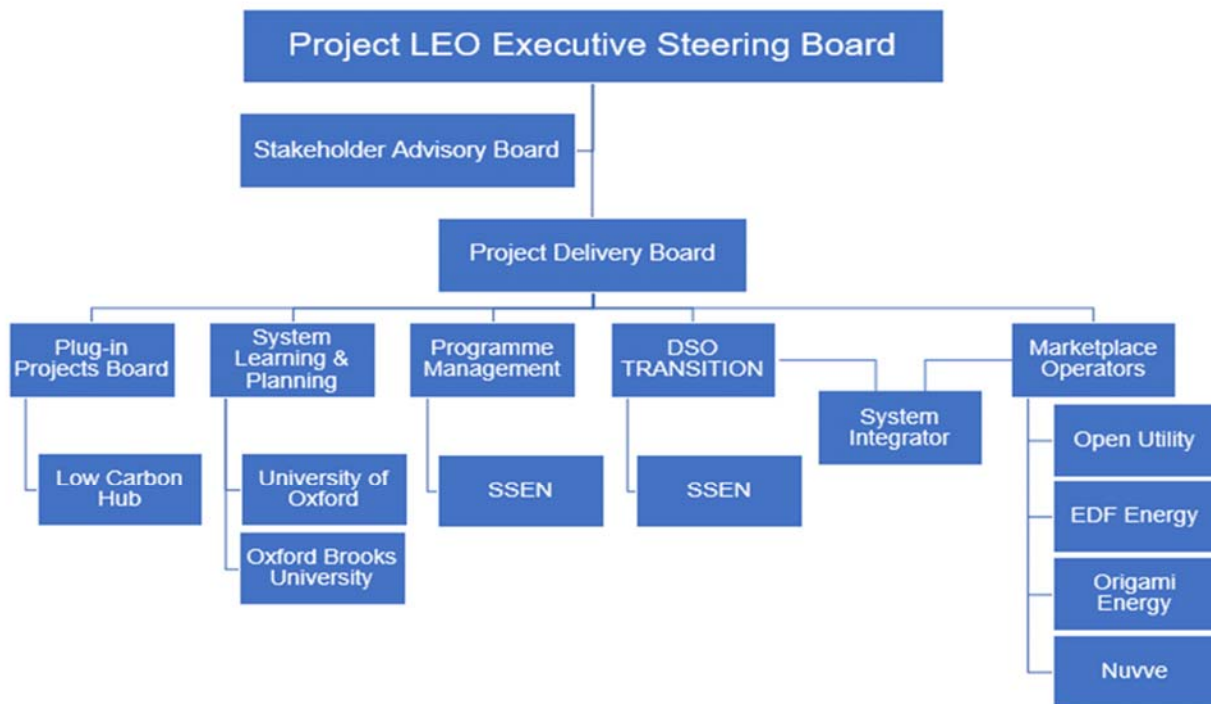
Project LEO was officially launched at a small event held at the Oxford Town Hall on Wednesday 26th June 2019, hosted by the Lord Mayor of Oxford, Craig Simmons. Along with the Lord Mayor, attendees heard from key people involved in the project including Barbara Hammond, CEO of Low Carbon Hub and Mel Bryce, Oxfordshire Programme Director from SSEN. Attendees included councillors, City Council and County Council staff, Project LEO partners and key stakeholders interested in the shift to a zero-carbon energy future.



Governance Structure of LEO

The key function of the Executive Steering Board, meeting on a quarterly basis, is to provide direction and support for the delivery of the LEO programme to maximise benefits from project participants, and alignment with wider policy strategy. The Stakeholder Advisory Board, which comprises a range of industry and community representatives, will meet on a 6 monthly basis and seeks to ensure LEO remains aligned with wider industry initiatives, whilst ensuring that outputs are shared with the widest possible stakeholder group. The Project Delivery Board, who meet on a monthly basis, ensure that the Project LEO work packages are delivered in a collaborative and timely manner.

The governance structure for LEO has been set up as shown below.

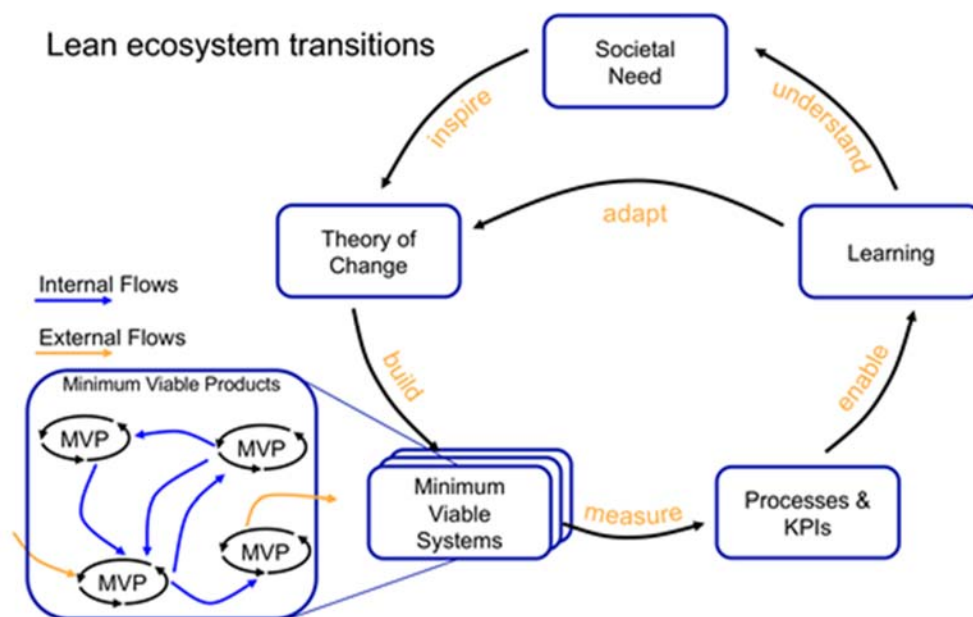


Appointments to all boards have been made, with the first Executive Steering Board meeting held on 25th July, and a provisional date of 22 January 2020 set for the first Stakeholder Advisory Board.

Lean Ecosystem Transition

Over the past 6 months, the University of Oxford in collaboration with project partners, have been developing a process termed 'Lean Ecosystem Transition' (shown in the figure below), using the Lean Start-up method. The process provides a fast, agile and iterative framework to develop new services and systems, along with their associated business models capable of disrupting existing markets and unlocking new value potential. The scale and speed of transition required to a zero-carbon future requires a full system reconfiguration and not just a technical system innovation challenge. It also requires social innovation, new economic thinking, along with changes in culture and practices to develop new socio-technical systems.

Lean Ecosystem Transition aims to identify a societal need and works backwards via Theory of Change to identify key steps that are needed in order to meet the societal need and develops a Minimum Viable System (MVS) for testing. The success of and learnings from the MVS are captured via Key Performance Indicators (KPIs) which are reviewed and feed back into the Theory of Change to determine if the MVS needs to be adapted or if a pivot is required.



Steps of Lean Ecosystem Transition

1. Identification of the **Societal Need**: Group of stakeholders identify and agree on the core societal values which should be generated by the emerging ecosystem.
2. Key steps to meet societal value identified through **Theory of Change (TOC)** process: A strategy to achieving the identified societal values is defined by backcasting to the present, to form a TOC. This backcasting exercise identifies the key steps envisioned

- to meet the societal value and informs the Lean Ecosystem Methodology which is iterative. From the TOC, Key Performance Indicators (KPIs) are used to discover where one is in the process, in addition to testing its effectiveness.
3. Creation of **Minimum Viable Systems (MVSs)**: From the TOC, a minimum stress set of participants and processes are identified and tested. This is likely to include multiple connected Minimum Viable Products (MVPs) undergoing their own iterative sub-development cycles.
 4. Measurement of ecosystem effectiveness via **Processes and KPIs**: The effectiveness of each step within the ecosystem, along with the KPIs, are measured to understand if the societal values are being generated / met.
 5. Understanding the need to adapt and/or pivot through **Learning**: Analysis of the KPIs informs the TOC. TOC is updated (adapt) as necessary for the next iteration. If required, the core ecosystem values are also updated (pivot). From understanding the challenges of the process implementation (and careful consideration of the KPIs), a new MVS is developed and operationalized, thus completing the loop.

Inception Workshop



Co-creating value opportunities

The inception workshop, held on Wednesday 26th June 2019, was the first of three annual workshops with the prime objective to develop an overall collective vision for Project LEO and translate this into actions for the first MVS phase of LEO. The workshop provided an opportunity for all project partners to voice opinions and participate in setting the objectives of the project. A consensus on the shared vision of LEO was achieved utilising the Service Value Method (SVM) system. A World Café approach was taken to develop routes to success and metrics for

measuring the success. Finally, an open discussion concentrating on the requirements of the MVS were discussed. Representatives from nine core and peripheral project partners were present at the workshop.

The values identified as consensus for the overall Project LEO vision were:

1. Local Balanced Energy System;
2. Reducing Inequalities - Affording Energy to Meet All Needs;
3. Positive Ecosystem Benefits - CO₂ and beyond.

Minimum Viable Systems

A significant output of the first quarter of Project LEO has been the development of a Generic Minimum Viable System (MVS) Trial Procedure. This has the aim of demonstrating a proposed additional or modified process or asset (via the Lean Ecosystem Transition methodology) within the LEO ecosystem, by trialing and deploying the minimum version of the proposed change within a pseudo grid problem and to identify the potential value of doing so. Through the Lean Ecosystem Transition Methodology, learnings from the trial will then inform the next iteration of the MVS.

The Generic MVS has led to the identification and development of three groupings of MVS that will be tested within the project and which comprise: A) Flexibility Services, B) Geospatial Planning and C) Influencing Policy.

The first flexibility service MVS procedure has been developed, with the aim of demonstrating dispatch of a Project LEO flexible storage asset (using battery and PV assets at the Oxford Bus Company Cowley Depot) in response to a SSEN advertised flex request through the Piclo LEO Platform and to analyse the value of the service. It is anticipated this MVS will be tested in the next quarter, Quarter 3 of LEO.

Piclo LEO Platform

Through the first two quarters of the project, Piclo have been busy creating an innovation environment on the Piclo Flex Platform. All LEO partners were given accounts to access this LEO environment and provided with a demo on how to use the platform. The LEO environment will allow the partners of LEO to test new online flexibility trading services. Work has been on-going to review new types of flexibility services and analysing the value of different markets.

Piclo hosted the team in their London offices for a workshop to establish the Project's Minimum Viable System (MVS). The half day workshop proved very valuable in setting out an agile and iterative process for testing flexibility within LEO, utilising the LEO Flex Platform, and learning from these tests.

In the coming months, Piclo looks forward to further development and testing of new flexibility services and expects to publish a white paper on its findings on the value of flexibility markets.

Transition Update

SSEN's Ofgem-funded TRANSITION project has now been running for 13 months and is an integral element LEO, in particular Work Package 5, with the aim of demonstrating the integration of a local energy system in the wider national system, through the use of distributed energy resources (DER) in an efficient and effective way to reduce the cost of any reinvestment.

The Energy Networks Association (ENA) Open Networks Project (Open Networks) is focussed on defining the DNO transition to a DSO model and has been endorsed by the UK Government's Smart Systems and Flexibility Plan. Based on the intermediate outputs of Open Networks, TRANSITION will inform the design requirements for a neutral market facilitator platform, develop the roles and responsibilities within the marketplace, develop the market rules required for the trials, and implement and test the concept of such a platform. This Platform will be market agnostic but will provide the information and visibility necessary for a range of markets to operate. To use a very simplistic analogy, the relationship between the DSO and other Market Participants can be considered similar to that between the postal service and online retailers such as Ebay or Amazon.

The following documents have been published by TRANSITION and are available for viewing on the [TRANSITION website](#).

- Neutral Market Facilitator Requirements Specification
- Neutral Market Facilitator Data Exchange and Governance
- Best Practice Report –Market Facilitation for DSO
- Services in a Facilitated Market
- Analysis Of Relevant International Experience Of DSO Flexibility Markets
- Whole System Coordination Requirement Specification

Year 1 Plug in Projects

The Low Carbon Hub, lead of Work Package 3, is working towards the objective of demonstrating how the electricity system can be optimised and balanced from the bottom up: the hypothesis is that optimised and balanced lower voltage branches of the network will deliver optimal and balanced higher voltage branches.

The focus of WP3 in Q2 of the programme has been on the development of tools for dimensioning and simulating the behaviour of combined on-site renewable energy generation and storage, quantifying the potential for individual sites to contribute to alleviating network constraints, and the development of specific projects.

Work has started on the optimisation of Sandford Hydro in preparation for its use both as a means to match generation and local demand, as well as its integration to the wider objective of creating a smart neighbourhood combining multiple forms of renewable generation and demand response.

This wider ambition of the project will be delivered in conjunction with the local communities, which will be active partners in designing and implementing the concept of a smart neighbourhood.



Our first OverSolar project has been commissioned at the Thames Travel depot in Didcot, a constrained area of the network. This first phase will enable the gathering of data which will be used as an input for the dimensioning of onsite storage to be installed in Q2 2020.

Other projects under development include West Witney Primary School, Langford Community Primary School, Oratory School and CTG - all to be completed by March 2020.

Rosehill Microgrid Plug-in Project

Oxford City Housing Ltd, which manages the supply of affordable housing on behalf of Oxford City Council, is re-developing the old scout hut and advice centre in The Oval at Rosehill into two developments of 18 socially rented flats and 25 shared ownership flats. Working in partnership with Oxford City Council and the Low Carbon Hub, solar PV arrays have been specified to maximise the amount of solar generation on the site, which go beyond the minimum planning requirements. Construction of the flats is starting in October 2019. On completion, the Low Carbon Hub will own, operate and maintain the PV installation, with the objective of demonstrating how to make it possible for all tenants in the development to benefit directly from the energy generated onsite, in a peer-to-peer trading model, while at the same time helping to manage constraints in the local electricity network.

Oxford Behind the Meter Plug-in Project

This Plug-in Project intends to look at the flexibility of loads within Oxford City and how assets can be balanced locally as a sub-system behind a virtual meter, in order to manage peaks in demand. Oxford City Council, in conjunction with the University of Oxford, are currently in the planning stages for a workshop (to be held in November) to create a shared understanding between key Project Team stakeholders of the Oxford Behind the Meter concept and will define a Minimum Viable System to trial.

Inception Data Survey

An initial Data Survey was implemented in the form of an online questionnaire and was circulated to all LEO partners in June 2019. The aim of the data survey was to establish an understanding of the available datasets within the LEO Consortium and to identify data gaps. Within a month period, there were a total of 19 responses received to the questionnaire, providing an overview of a minimum of 59 datasets believed to be relevant by the submitting party to the project.

Datasets were submitted by all partners of Project LEO, with 68% of these coming from the Oxfordshire County Council. Of the datasets classed as either 'Temporal', 'Spatial', 'Socio-economic' or 'Power networks', there was an even mix of 'Temporal' and 'Spatial' datasets (9 ea.) with one 'Socio-economic' and 'Power networks' dataset also submitted. Dataset information submitted by the County Council varies widely, with most representing temporal, spatial data and some socio-economic data. Most temporal datasets are single-source and fall under the sectors of either 'Buildings' / 'Networks (energy supply)' (even mix of domestic and non-domestic buildings), or 'Transport' (roads being the main mode). Most spatial datasets fell under the 'Land use' or 'Boundaries' categories.

With respect to the ownership of the data (confirmed datasets), the following lists their classification by submitting parties: Licensed (~39%), Open-access (~32%), Private (~22%), with the remaining datasets having specific ownership given the circumstances under which the data are to be accessed. Most datasets are available in CSV or Shapefile formats, with some open-access datasets having public URL's for the data retrieval from their respective partner platforms. Restrictions for data use within publications are largely done to appropriate referencing, with some privately-owned datasets requiring formal customer approval.

A Data Workshop was held on 30th September 2019, hosted by the University of Oxford with the aim of establishing data management protocols and to identify data gaps, in particular with respect to near term MVS trials. The workshop brought together the LEO Partners, in addition to external interested stakeholders, including representatives from ERIS and EnergyREV. The findings from this workshop will be shared in the next programme update.

Stakeholder interviews

Interviews have been conducted with 13 internal stakeholders as part of WP6, to assist in setting a baseline for evaluation and learning. The interviews were semi-structured and conversational, with a core of questions relating to roles within the project and previous experience, expectations, concerns and early learning. Each interviewee was also asked about their views on the nature of LEO, the role of smart and local elements in developing new values and services, the policy and operational environment for local energy, and the processes and actors that are likely to be most influential in bringing about local energy transition.

There will be a short report on the interviews by the end of the year. Two further rounds of interviewing are planned, approximately a year apart, to track learning in the course of the project.



UK Research and Innovation

