

Press release: Four leading edge demonstrators to jumpstart energy revolution

Four smart energy systems demonstrator projects across the UK have been announced today by Energy and Clean Growth Minister Claire Perry. From charging electric vehicles and managing heating and power through machine learning to storing power with lithium ion batteries and using heat pumps, these projects show how the very latest in energy innovation can be put together to provide cheaper, cleaner energy for users.

The projects are:

- The Energy Superhub, Oxford, led by Pivot Power LLP
- ReFLEX Orkney, Orkney, led by the European Marine Energy Centre
- Project Leo (Local Energy Oxfordshire), led by Scottish and Southern Electricity Networks
- Smart Hub SLES, West Sussex, led by Cloud Infinity Projects

These demonstrators will show how businesses can develop local energy approaches at scale that will create better outcomes for consumers and promote economic growth for the UK. By the early 2020s, these demonstrators aim to prove that smarter local energy systems can deliver cleaner and cheaper energy services.

Energy and Clean Growth Minister Claire Perry said:

We are at the start of a green revolution, as we move to more digital, data-driven smart systems that will bring us cleaner and cheaper energy. These projects, backed by government funding, are set to spark a transformation and change the way we interact with energy for the better as part of our modern Industrial Strategy.

We're excited to see how these businesses and project partners reveal how innovative tech, such as energy storage, heat networks and electric vehicles, can set us on the path to a smarter energy future. This is tomorrow's world, today.

Rob Saunders, Deputy Challenge Director, Prospering from the Energy Revolution, UK Research and Innovation said:

We all need energy systems that are cheaper, cleaner and consumer-friendly. We have a great opportunity with these demonstrators to show just how innovation can deliver this energy ambition for the future. Supported by the Industrial Strategy Challenge Fund, these projects can drive investment, create high-quality jobs and grow companies with export potential.

As part of the Industrial Strategy Challenge Fund, the £102.5 million Prospering from the Energy Revolution Challenge will develop cutting-edge capabilities in local systems that deliver cleaner, cheaper and more resilient energy for consumers, while also creating high-value jobs for the UK.

The challenge brings together businesses working with the best research and expertise to transform the way energy is delivered and used. This includes providing energy in ways that consumers want by linking low-carbon power, heating and transport systems with energy storage and advanced IT to create intelligent local energy systems and services.

The funding is awarded competitively by UK Research and Innovation, the new organisation that brings together the UK Research Councils, Innovate UK and Research England into a single organisation to create the best environment for research and innovation to flourish.

Projects must demonstrate new, smarter, local energy approaches at scale, which can:

- provide cleaner, cheaper, more desirable energy services for the end user
- lead to more prosperous and resilient communities
- prove new business models that are suitable for investment and can grow and replicate in the 2020s
- provide evidence on the impacts and efficiency of novel energy system approaches by the early 2020s

Notes for editors

The projects in detail:

The funded projects are:

1. The Energy Superhub Oxford

Project lead – Pivot Power LLP

Consortia: Habitat Energy Limited, Kensa, Oxford City Council, RedT Energy and the University of Oxford

- The installation of the world's first transmission-connected lithium ion and redox-flow hybrid battery – 41 other UK sites have already been identified as potential sites for replication
- A network of 320 ground source heat pumps, targeting social housing premises and operating smart controls with community engagement

Cloud hosted software and AI powered software taking an algorithmic approach to forecasting and energy demand/supply optimisation, management of battery degradation

2. ReFLEX Orkney

Project lead – European Marine Energy Centre

Consortia: Aquatera, Community Energy Scotland, Doosan-Babcock, Heriot-Watt University, Orkney Islands Council and Solo Energy

- The ReFLEX (Responsive Flexibility) Orkney project will demonstrate a first-of-its-kind Virtual Energy System (VES) interlinking local electricity, transport, and heat networks into one controllable, overarching system. The project aims to create a 'smart energy island', demonstrating the energy system of the future, which will reduce and eventually eliminate the need for fossil fuels
- Orkney has high levels of renewable penetration relative to the rest of the UK, but struggles to maximise usage of this generation amid limited grid capacity. Whilst there is no shortage of renewable generation assets in Orkney, demand-side flexibility assets are only now developing and the ReFLEX project will deliver an extensive new pool of flexible demand technologies at regional scale, including domestic and large-scale batteries, vehicle-to-grid chargers, electric vehicles, flexible heating systems
- Orkney has a well-established energy system in place enabling a FlexiGrid software platform to be implemented to charge flexible assets during periods of peak local renewable generation, and release stored energy during times of peak demand
- This will inform the creation of a peer-to-peer trading service and new business models that incentivise the consumption or storage of energy when generation is high, and encourage uptake of low carbon heating and transport

3. Project Leo (Local Energy Oxfordshire)

Project lead – Scottish and Southern Electricity Networks

Consortia: EDF Energy, Nuve, Open Utility, Origami Energy, Oxford Brookes University, Oxford City Council, Oxfordshire County Council, The Low Carbon Hub C.I.C. and the University of Oxford

- Project LEO will take a Distribution System Operator approach to implementing new energy projects across the city, and to facilitate future forecasting and planning
- A local energy marketplace will be created which will enable virtual aggregation of loads and the ability to dispatch flexibility across a range of projects, as well as execute local peer-to-peer trading. A data interface with the DSO will enable better active network management and visibility/forecasting of local constraints
- The project takes a very community centric approach and has a large portfolio (~90) of low carbon energy projects which could be on-boarding to the distribution network. The local energy marketplace and the exchange of information between that and the DSO will facilitate this process. A collection of projects from the larger portfolio will be used to demonstrate feasibility and provide learning towards BAU. Priority projects as part of WP3 will include a community hydro project, an EV transport hub and heat network proposals

4. Smart Hub SLES

Project lead – Cloud Infinity Projects

Consortia: Connected Energy, Flexitricity, Honda Motor Europe, ITM Power, ICAX, Moixa Technology, Passiv- Systems, Switch2 Energy, The Carbon and Energy Fund and West Sussex County Council

- Smart Hubs SLES will be demonstrated in West Sussex and the project will integrate energy management across council housing, private residential properties, transport infrastructure and commercial properties
- The proposed project is will deploy a number of innovative technologies (a hybrid hydrogen/electric vehicle filling station and mesh networks for power management) alongside more established but not widely deployed technologies such as heat networks
- A Virtual Power Plant will be established by integrating several platforms which can dynamically monitor and respond to energy demand and generation. Another important element of the project is designing an

innovative procurement framework. This could be widely replicated and could enable public sector organisations to include flexible energy assets in, and engage with local flexibility markets

About the Prospering from the Energy Revolution Challenge:

- Smart systems can link energy supply, storage, and demand patterns across power, heating and transport to dramatically improve efficiency
- New smart energy systems will be able to take advantage of some of the \$2 trillion a year that will be invested in global energy infrastructure over the next decades
- The scope of this challenge is to provide solutions that integrate multiple technologies, infrastructures and market, finance and societal systems in real-world settings to create investable and scale-able models for the future
- This will create new high value local jobs across the country, and export business associated with design, testing, finance, installation, and operation of new energy products, systems and services
- The novel approach in this programme is to undertake whole-system approaches at scale in real-world settings. Government support is needed to coordinate a very complex stakeholder and technology landscape
- The winning projects will bring together the latest low carbon power, transport and heating, with storage and smart systems using advanced IT to create intelligent local energy systems and services that cut bills, improve system efficiency, reduce the need for expensive new infrastructure and create high value local jobs

About the Industrial Strategy:

- The Industrial Strategy sets out the Government's plan to help businesses create better, higher-paying jobs with investment in the skills, industries and infrastructure of the future
- The Industrial Strategy Challenge Fund is designed to ensure that research and innovation takes centre stage in the Industrial Strategy, bringing together the UK's world-leading research with business to meet the major industrial and societal challenges of our time

About UKRI:

- Operating across the whole of the UK with a combined budget of more than £6 billion, UK Research and Innovation brings together the seven Research Councils, Innovate UK and Research England
- We are an independent organisation with a strong voice for research and innovation, both to government and internationally, we are supported and challenged by an independent chair and board
- We are principally funded through the Science Budget by the Department for Business, Energy and Industrial Strategy (BEIS)