

Cutting edge £31m energy innovation project in West Sussex

What is the project?

The SmartHubs project will create and demonstrate an innovative low-carbon energy system of the future in West Sussex. It will introduce new ways of generating and storing low-carbon heat, electricity and energy for transport and demonstrate how these can be integrated to balance energy supply and demand and deliver cost and carbon benefits for project partners, including businesses and residents.

Why was the project developed?

The development of smart energy systems represents a huge market opportunity for the UK with around \$2 trillion estimated to be invested in global energy infrastructure each year.

The Government is providing funding for four demonstrator projects, including SmartHubs, through Innovate UK, part of UK Research and Innovation. The other projects are The Energy Superhub Oxford, ReFLEX Orkney and Project Leo. The 'Prospering from the Energy Revolution' challenge is an overall £102.5 million investment to develop smart systems that support the global move to renewable energy.

These integrated systems will provide cheaper and cleaner household and commercial energy, while creating high value jobs for the UK, enabling the UK government to meet the priorities set out in the Clean Growth Strategy, the Smart Energy Systems and Flexibility Plan, and the Industrial Strategy's clean growth pillar. This will help the UK to meet air quality targets at lower investment costs, avoid power cuts and contribute to meeting the fifth carbon budget (from 2028).

What does the project involve?

The implementation phase of the project will see the installation and smart management of solar panels, electric vehicle chargers, domestic air source heating, commercial marine source heat, domestic and commercial energy storage and hydrogen refuelling for transport.

The project will integrate and optimise these systems to provide a range of efficiency, financial and environmental benefits to residents and commercial organisations. West Sussex County Council are supporting deployment of all assets within the county in order to meet their carbon goals and commitment to renewables.

What will the project demonstrate?

The project will deliver decarbonisation and grid balancing benefits for the regional West Sussex community but will also, by using field data and validated modelling work from consortium member Newcastle University, ultimately provide guidance on how similar smart energy systems can be replicated on a UK-wide scale. As part of this work the team will be analysing several future scenarios to determine which combination of technologies could assist the Net Zero emission economy that the UK has committed itself to by 2050, and how this transformation can also assist UK communities by generating demand for new skills and products.

Who is involved in the project?



Lead partner providing battery storage systems, which use second-life battery packs.

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Sustainable heating from recycled heat using a marine source heat pump.

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Generation of zero carbon hydrogen fuel for transport.

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Solar PV, energy storage and electric vehicle charging systems, all optimised through Moixa's GridShare software, to deliver cost savings and reduced carbon emissions to homes, schools, public sector and businesses.

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Hybrid low-carbon home heating systems using air source heat pumps to complement gas and oil boilers.

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Data analysis and system modelling for the project.

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Supporting deployment of all assets within the county in order to meet their carbon goals and commitment to renewables.

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Project	Description	Project Lead
Marine Source Heat Pumps	A marine source heat pump will be installed to transfer heat from sea water in Shoreham Harbour to heat adjacent buildings of the Shoreham Port Authority using a district heating system.	 ICAX INTERSEASONAL HEAT TRANSFER
In-front-of-the-meter Battery Energy Storage System	A 12 MW in-front-of-the-meter battery energy storage system will be installed in Sompting, West Sussex. The battery, using second-life electric vehicle batteries, will allow the grid to source more energy from renewable sources which can fluctuate regularly due to weather conditions.	 CONNECTED ENERGY
Behind-the-meter Battery Energy Storage Systems	Up to nine 300 kW behind-the-meter battery energy storage systems will be installed across the region. In addition to providing grid balancing these battery storage systems, which use second-life battery packs, will help reduce energy bills for their sites and provide an alternative to costly grid import increases.	 CONNECTED ENERGY
EV Solar Carport	Up to five EV charging hubs with integrated photovoltaics and battery energy storage will be installed across West Sussex. The sites will have a total electric vehicle charging power of 243 kW and an estimated 865 kW of solar PV.	 CONNECTED ENERGY
Hydrogen Fuel	ITM Power will investigate the feasibility of integrating electrolyser based hydrogen refuelling systems into a localised energy system. Hydrogen generated from renewables can provide zero carbon fuel for transport and support the local energy system with a 2 MW load which can be switched on or off, enabling better management and control of the electricity system.	 ITM POWER Energy Storage Clean Fuel
Domestic Air Source Heat Pumps (ASHP)	Up to 250 ASHP will be installed in domestic social and private residences both on and off gas grid. The smart systems will learn algorithms and analyse data points within the homes to learn their thermal properties. Weather information and user behaviour will then be overlaid to predict user demand and optimise the efficiency and aggregate to respond to demand side response (DSR).	 passivSYSTEMS®
Photovoltaics, Battery and smart EV charging Home and Light Commercial Network	To deliver sustainable, low-carbon energy to social housing, schools, businesses and the local public sector in West Sussex, up to 350 solar and battery systems will be installed. 250 of these are aimed at the residential market, and 100 will be larger-scale installations for commercial or public sector sites. 250 electric vehicle charging points will be installed and optimised by Moixa's GridShare software, to show how smart charging can break down the cost barriers of transitioning fleets of traditional diesel and petrol vehicles to electric.	 moixa
Data Analysis	Mathematical methods will be used to evaluate the whole series of network management techniques used in the project. Modelling expertise will be used to provide a detailed technical understanding of how each technology has performed.	 Newcastle University
Virtual Power Plant	A Virtual Power Plant (VPP) will be created to aggregate and manage the large fleet of hybrid systems across transport, heat and power. This VPP will deliver flexibility services into ancillary markets ensuring system reliability and delivering a stronger, cheaper, cleaner network.	 moixa

