

Photo: Visit Isles of Scilly (Islands' Partnership © Rob Lee)

Isles of Scilly could be “a blueprint for the future of UK energy”

The Smart Islands Partnership’s flagship energy project, led by Hitachi and supported by the European Regional Development Fund, was hailed as a demonstration of how the UK could meet its future energy demand at lower costs at Lisbon’s *websummit* conference in November. The project is taking advantage of huge technological opportunities and changes in the electricity market – on a scale not seen since the late-19th century.

Hitachi has recently completed a prototype of the system to be used on the Isles of Scilly in its Maidenhead laboratory. It is mimicking the islands’ energy system and feeding additional solar power into it, just like the Smart Energy Islands project plans to do in real life.

“New ways to use and store energy and decentralised energy generation systems – such as those being created on Scilly – are a fundamental break with the past”, says John Whybrow, Hitachi Europe’s Programme Manager. “The energy sector is going through a technological and regulatory transformation as electricity becomes an increasingly

dispersed and flexible form of energy. We are moving towards a digital, smart energy world, offering the prospect of lower costs from cleaner energy.”

The UK was the first country in the world to set a long-term, legally binding target for carbon emissions reduction. The Climate Change Act commits the UK to reduce emissions by at least 80% by 2050 whilst ensuring security of supply of energy, in the most cost-effective way. Many Government initiatives, such as banning the sale of diesel and petrol cars and vans from 2040 and the phasing out of coal power stations by 2025, not only tackle pollution but also reduce greenhouse gas emissions.

To manage an islands-scale energy control system, the Smart Energy Island partners – Hitachi Europe, Moixa and PassivSystems – are building an Internet of Things-based technology platform to enable more efficient use of locally-produced energy. Ready in October 2018, it will fine tune home energy use and exchange data between producers and consumers of electricity, balancing demand and supply across the existing energy network.

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Smart Islands update:

At the heart of the Smart Islands Partnership is the Islands Futures' vision for the Isles of Scilly: 'A thriving, vibrant community rooted in nature, ready for change and excited about the future.'

The Smart Islands Programme is set of that will address the sustainability of energy, transport and water on the islands. Domestic household electricity use is the highest in the British Isles due to the high relative cost and low availability of gas, oil and coal alternatives for heating plus a more humid climate than the mainland UK. Yet only a small proportion of energy is generated locally from abundant renewable sources.

Together with the Council of the Isles of Scilly, the Duchy of Cornwall, Tresco and the Islands' Partnership Smart Energy Islands' first aim is to deliver more efficient use of locally-produced energy. Many buildings on the Isles of Scilly will soon support new solar PV panels. When these are connected to the Internet and the benefits shared through a community venture, reliance on mainland power and local energy costs should be reduced. The resulting local energy market and local control of the energy system will see many householders becoming producers as well as consumers of energy during 2018.

The next round of projects that have applied for funding will focus on creating energy from waste, installing solar PV for non-Council properties and shared on-islands transport.

Smart Islands Partnership targets

40% reduction in average electricity bills within ten years

40% renewable energy within ten years

40% electric vehicles and installation of charging infrastructure

Improved energy-efficiency in hard-to-treat homes

Smart Energy Islands

Locally-produced renewable energy generation is currently about 270kW of renewable power on the islands, mainly solar PV on rooftops. The Smart Energy Islands project will increase this by 250% - installing a further 450kW. The Internet of Things platform on the Isles of Scilly will monitor electricity loads in houses, as well as electric vehicles, home batteries, smart heating technologies and other infrastructure, to optimise local energy use.

Electric Vehicles

The Islands have seen an upward trend in car ownership, and by 2014, the number of vehicles on the islands had grown to 1,253, almost one car per two people. Travel distances remain low with the average resident's commute estimated at 1km (about a half mile). The relatively short travel distances and potential for shared ownership make electric vehicles a very suitable way to get around. Furthermore, using their batteries to both store and supply locally-generated electricity could pioneer, in the long term, a zero-carbon transport system.



Energy share on Scilly

A new community venture is being set up to make sure that the benefits of new, publicly-funded energy generation are shared across the community, particularly lowering energy bills and targeting fuel poverty.

When the Smart Energy Islands partners have finished installing renewable energy systems and built the technology platform that will manage the distributed energy network, all of the solar PV and other equipment installed will be gifted to the community venture. Set up in 2017 as a not-for-profit company, it has one simple aim – to share the benefits of

local renewable power generation across the islands. Jim Wrigley, General Manager, said:

“The Smart Energy Islands project will transfer its legacy to the community venture to ensure that the benefits can be shared with the community for years to come. The first benefit to be launched to the community will be a local electricity tariff that we will provide in partnership with a licenced energy supplier to meet the requirements of Ofgem, the Office of Gas and Electricity Markets.”



Business support for energy efficiency – more than fifty percent allocated

Smart Energy Islands was funded by the European Regional Development Fund to deliver energy efficiency business support to 200 local small and medium businesses. So far, 108 local businesses across five islands have signed up to the project. These businesses are receiving completely free professional energy efficiency consultancy, a building survey and energy monitoring equipment to identify all possible measures to improve their energy efficiency.

Ben Robbins, Hitachi's business support officer, said: "Energy advisers from experts Anthesis have already helped eighty-four local businesses understand, manage and reduce their energy costs. I would urge any business to get in touch with me, if they want to see what kinds of saving that they might be able to make."

These businesses have received:

- Free energy audit
- Free energy monitor and tablet computer
- Free analysis of energy use
- Free report containing analysis results, recommendations and next steps
- A free training community designed to help businesses act on the survey report and make the most of their energy monitor.

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Business support in numbers

2019 Target:

200 local
businesses

108 Signed up to
the project at
Nov 2017:

12 New businesses
supported at
Nov 2017

84 Energy reports
provided
at Nov 2017



Picture: Anthesis providing energy advice to Coastal View Kitchen.

Generating local energy to share

Four hundred and fifty kilowatts of solar photovoltaic (PV) energy is going to be installed on the islands, the majority before summer 2018, to provide locally-sourced energy for the islands. This production will be mainly introduced on St. Mary's where up to 100 suitable Council of the Isles of Scilly homes will get solar PV panels and home energy management systems. The Council is 20% match-funding the home energy improvements which is why the focus is on Council-owned properties for this project.

Typically, a home will have three to four kilowatts of PV installed and the value of the energy produced will be

shared through an energy tariff available to all. The panels will be carefully chosen and we're working closely with the Local Planning Authority to ensure the panels respect Scilly's environment.

In addition, eight of these solar homes that are suitable, will get air source heat pumps and five will have Moixa home energy storage systems fitted in order to test the potential benefit of these technologies on the local energy balancing system.

David Kingston, the Hitachi manager responsible for the solar PV installation contract said:

"The new renewable energy that will be generated will be managed by our ICT platform. As well as enabling energy to be consumed in the traditional, one-way system from the grid, our platform will enable energy produced locally to be optimised in the home that produced it – and share the value of that energy with other households on the island that are signed up to the local energy deal."



SOLAR (PV) PANELS

Solar panel electricity systems, also known as photovoltaics (PV), capture the sun's energy using photovoltaic cells. The cells convert the sunlight into electricity, which can be used to run the household or for export to the grid. These cells don't need direct sunlight to work – they can still generate some electricity on a cloudy day.



AIR SOURCE HEAT PUMP

Air source heat pumps absorb heat from the outside air in the same way that a fridge extracts heat from its inside. Unlike an oil boiler, heat pumps deliver heat at lower temperatures over much longer periods. During the winter they may need to be on constantly to heat your home efficiently but they are cheap to run.



HOME ENERGY STORAGE

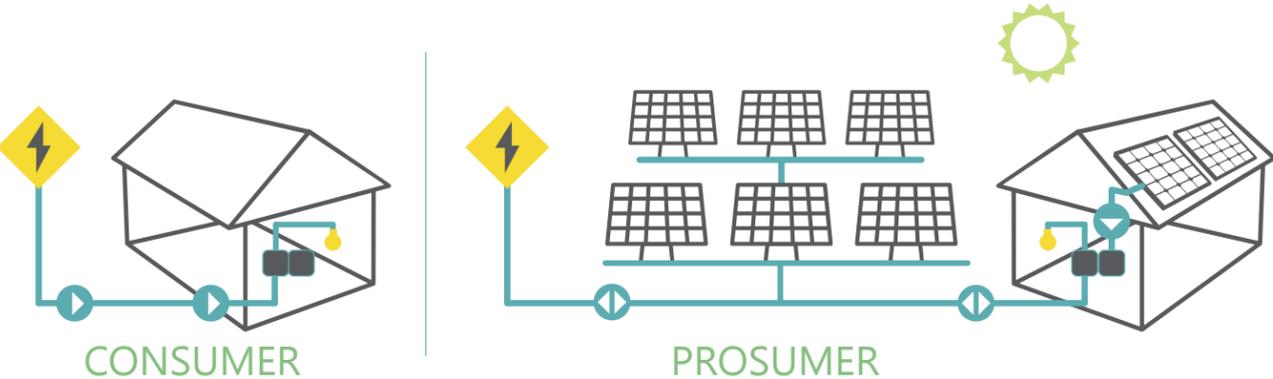
Home batteries collect and store electricity when it's cheap (either off-peak from the national grid or from solar panels) for you to use when you like or redistribute where it is needed. Storage also means that energy generated during the day, when the sun is shining, can be used to power your home at night.



CONSUMER VS PROSUMER

Most of us have been consuming electricity from the grid the same way for more than a century. But that's starting to change. A new buzzword is signalling a growing shift in how we power our homes and communities – 'prosumers'. Simply put, a prosumer is someone who both produces and consumes energy – a shift made possible, in part, due to the rise of new connected technologies and the steady increase of more renewable power, like solar, to our electric grid.

In addition to the home renewables to be installed, one solar PV 'garden' (about the size of a tennis court) and three to five roof arrays on Council-owned industrial properties are planned to bring the installed capacity up to 450 kilowatts.





Sylina Self Catering, St. Mary's

Sylina is a newly-refurbished 4* Gold Award self-catering holiday property, sleeping up to six, run by Sam and Paul Mallon. Sam is using their OWL energy monitoring equipment to create a competition between guests as to who can be the most energy efficient whilst on holiday. The winner will receive a box of local flowers.

"I must confess to being rather addicted to the device that shows our electricity usage!"

Lunnon Farm Holiday Cottages, St. Mary's

Lunnon Cottages are two, traditional granite, self-catering farm cottages run by Peter, Penny and Matthew Rogers.

"Thank you for the survey which was very helpful. Duncan made some useful practical suggestions, which can be put into practice quickly, as well as discussing longer-term goals with us. We hope the survey can help individuals like us but also contribute to a much more energy-aware Isles of Scilly, resulting in positive practical actions."



St. Agnes Stores

St. Agnes Stores is the most south-westerly shop in Britain. Nicki Hicks has been using her OWL energy monitor to become more energy efficient. She has switched one of her freezers off completely for the winter period and used it to decide which was the most energy efficient one to leave on. She also discovered that the light in the drinks fridge used a surprising amount of energy and so has switched that light off! She is currently replacing all the light bulbs in the shop with LEDs, as recommended in her report – with estimated savings of £162 per year on lighting alone.

"I'm really pleased to be taking part – we have found it really useful."

The Island Bakery, St. Martin's

The Island Bakery is run by Barney and Ella McLachlan and is open for the season from Easter until October. During the winter, Barney bakes to order once a week. All produce is handmade on the premises.

"I used to get in at about 4.30am and put the ovens onto 3, the maximum, to get them hot as soon as possible before turning them down to 2 when they were up to the correct temperature. With the energy monitoring equipment, I could see the difference in cost between the two settings. Now, I put the ovens on 2 and leave them to get up to temperature – I have enough time to do that – and I've saved myself at least £100 a year."



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The Department for Communities and Local Government is the Managing Authority for European Regional Development Fund.

For more information visit
<https://www.gov.uk/european-growth-funding>

Established by the European Union, the European Regional Development Fund helps local areas stimulate their economic development by investing in projects which will support innovation, businesses, create jobs and local community regenerations.



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