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Renewable energy

Charging ahead: Welsh battery scheme may aid growth of green energy

One of the UK's largest battery storage schemes, built next to a windfarm, will offer vital services to the National Grid

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The Pen y Cymoedd wind energy project near Swansea. Photograph: Vattenfall

Nestling alongside rows of conifers and wind turbines in a Welsh valley, a pioneering project will materialise this summer that could prove a blueprint for unlocking Britain's renewable energy potential.

The Upper Afan Valley near Swansea is already home to the biggest windfarm in England and Wales, but in July work will begin there on one of the UK's largest battery storage schemes.

Built by Swedish energy company Vattenfall, the facility will involve six shipping containers stuffed with lithium-ion batteries made by BMW's electric car division.

The project is seen as a crucial part of the jigsaw for helping wind, solar and other renewable sources go from the 25% of UK power they provide today, to the much greater share the government needs to hit its climate change targets.

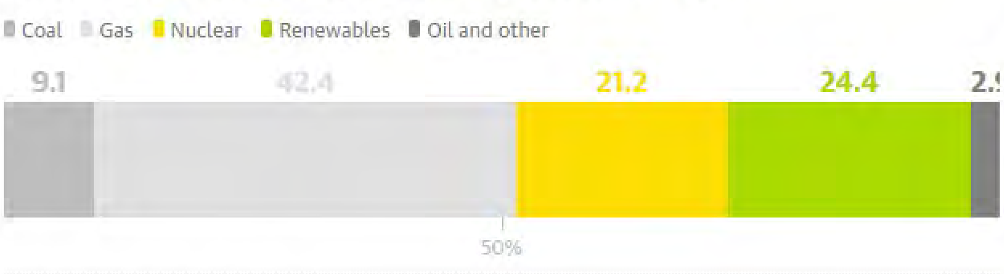
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The batteries will not store the electricity generated by the Pen y Cymoedd windfarm with which they share a site, but will offer vital services to the National Grid to cope with the fluctuations that come from renewable power.

Colocating the plant with the windfarm was key to making the economics of the scheme work. Vattenfall said that the site's existing infrastructure, such as connections to the grid's transmission network to take power around the UK, meant it was about £5m cheaper than building it on a standalone site.

"To connect a battery project to the transmission network would be prohibitively expensive, but because we have the windfarm already in place, we can share the assets. It's a huge cost-saving," said Frank Elsworth, who is managing construction of the 22MW plant, the battery equivalent of 450 BMW i3 electric cars.

Renewables generated a quarter of UK electricity in 2016



Guardian graphic | Source: BEIS/ONS

Solar power has grown rapidly in the last seven years, going from almost nothing to 11GW of capacity, meaning it now regularly provides more power than Britain's last coal plants. There is also 15GW of wind power, a figure that will climb this year as major offshore windfarms come online.

That has posed a new challenge to National Grid's task of keeping energy supply and demand in balance, which is essential for keeping the system's frequency at 50Hz.

It responded last year with a tender for services to keep the frequency constant, which, along with new contracts for providing backup power, has encouraged major companies such as Centrica and EDF to embark on building utility-scale battery schemes.



The 22MW Vattenfall plant will be the battery equivalent of 450 BMW i3 electric cars. Photograph: PR image

"It's that extremely rapid enhanced frequency response that renewable technologies currently can't provide," said Elsworth. "Battery technology is a good thing for the system and a good thing for bringing more renewables on."

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Experts said that more energy storage was vital for increasing renewable energy penetration.

Dr Robert Gross of Imperial College said: "Storage can aid the growth of renewables in a number of ways. First, as in this case, storage offers very fast response, which can help to keep the system stable over very short timescales. Small amounts of storage capacity can help to provide this rapid response."

He added that in the future, it may be possible to use storage in larger amounts to help smooth the outputs of renewables.

But he said batteries were unlikely to solve the "greatest long-term" challenge of storing energy across seasons, such as between summer when demand is low but solar generation is high, and winter, when demand is high but solar output lower.

Batteries powering up in Cornwall

Across the Bristol Channel, Britain's biggest energy company is making headway on another innovative pilot project hoping to ease grid operators' headaches and bring more green energy on the system.

This month, British Gas owner Centrica began recruiting households to take part in a £19m trial of a local energy market that will see the company putting batteries, solar panels and smart storage heaters in up to 100 homes.

Businesses will also take part, including Hendra, a holiday park near Newquay, where a battery will be installed to make the most of the caravan site's existing solar panels and pair of wind turbines.

Centrica hopes to aggregate the batteries to provide flexibility to the local network operator, Western Power Distribution. With Cornwall's sunny climes and location at the end of the power network, so much solar power has been installed that in places it is creating bottlenecks on the network, or providing electricity when it is not needed.

"Cornwall has made a lot of progress on renewables, which has created the need for more flexibility," said Jorge Pikunic, managing director of distributed energy and power at Centrica. He said the project was an important way of attracting further renewable power to one of the UK's more deprived areas.

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