Cornwall’s first smart-grid enabled wind turbine

Cornwall Council, Carbon Neutral Cornwall, UK100
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Summary

Transforming the energy sector is part of Cornwall Council’s response to tackling the climate emergency and helping Cornwall become carbon neutral by 2030. As part of our work to cut carbon emissions and increase renewable energy in Cornwall, we have installed a new smart-grid enabled wind turbine that will create enough green energy to power over 1,440 Cornish homes a year.

Our problem

Transforming the energy sector is part of Cornwall Council’s response to tackling the climate emergency and helping Cornwall become carbon neutral by 2030. Around 40% of Cornwall’s electricity comes from renewable sources, but we’ve pledged to work towards 100% clean energy in order to achieve our overall target.

Overview

As part of our work to cut carbon emissions and increase renewable energy in Cornwall we have installed a new smart-grid-enabled wind turbine that will create enough green energy to power over 1,440 Cornish homes a year.

This turbine?is the first to be built in Cornwall since 2016 and?the only one?to have been installed?in the South West in 2020. The 2.3MW turbine, with 40m rotor blades, has been constructed on land owned by Cornwall Council, adjacent to an existing 20MW wind farm on the A30.

Timeline / project progress

The wind turbine began generating energy in September 2020.

Stakeholders

The turbine is part of an EU-funded trial and forms part of Centrica's innovative Cornwall Local Energy Market (LEM), which helps to increase the amount of renewable energy that can be deployed by managing the electricity network more efficiently. The LEM project has been running since 2016 and is receiving £11.5 million support from the European Regional Development Fund. It’s a collaboration between Centrica, Western Power Distribution (WPD), N-SIDE, Imperial College, the University of Exeter and National Grid.

The Council has invested £3m into the turbine and will own and operate it, and receive the income. Centrica has contributed £1m and was responsible for constructing and commissioning the infrastructure connecting the turbine to the grid and LEM.

Whole systems approach

Cornwall Council has pledged to work towards 100% clean energy for Cornwall as part of plans to tackle the climate emergency and secure an environmentally sustainable future.

The smart-grid turbine is one of several initiatives the Council is investing in. Other key schemes?of Cornwall?Council's Carbon Neutral Cornwall programme?are the?8,000-hectare carbon-absorbing Forest for Cornwall; the Whole House Retrofit Innovation project to make homes more energy efficient; a?new, climate change planning document to promote renewable energy?including the commitment to power all new homes with alternative sources to gas; and a?new decision-making framework to prioritise environmental and social benefits in all Council policies.??

More specifically, the Local Energy Market project brings Cornish homes and businesses together via a fully automated online flexible energy market platform. It allows network operators to improve the way the grid works by buying energy flexibility from local homes and businesses - helping to balance grid demand and capacity. It has also installed one of Cornwall's largest battery storage units (1MW) on premises owned by Wave Hub (a company owned by Cornwall Council). Wave Hub owns the battery storage system which was constructed and is operated by Centrica.

Impact

The smart grid-connected turbine will help Cornwall better manage its energy supply and reduce? Cornwall's greenhouse gas emissions by more than 3,300 tonnes a year over the next two decades. It'll generate enough green energy to power over 1,440 Cornish homes a year.

This turbine will be the first in the UK to demonstrate the concept of making small adjustments to the output in order to help smooth peaks and troughs in electricity supply and demand on the grid; allowing us to rely more heavily on zero-carbon sources of energy. As the turbine has only been up and running for a few months, it's too early to say exactly what financial impact it's had so far.

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The turbine will be an important testbed for our smart-grid concept and demonstrates how a local energy market can make better use of renewable energy generated in Cornwall.

We are asking the Government to support the crucial upgrades to the South West electricity grid to increase capacity and enable Cornwall to generate 100% renewable electricity for Cornwall and help them deliver their legally binding 2050 commitments.

(Image: Thomas Reaubourg/Unsplash)

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