World-first renewable energy market trial hits major milestone

A world-first project to create a new market for renewable energy has reached a major milestone by starting its first end-to-end live trial.

UK Power Networks and National Grid Electricity System Operator (ESO) established Power Potential to enable distributed energy resources connected to the local electricity network to provide the only market-based reactive power source to the national electricity system.

The team have now built an end-to-end integrated system that can enable automated reactive power services, creating more capacity on the national transmission system and a potential new income stream for energy generators including wind, solar and battery resources.

Power Potential was established to help manage the rapid increase in the volume of renewable energy connecting to distribution networks without breaching safe limits. The south and east of England has seen a significant rise in distributed energy resources in the last decade, with more than 7GW of generators now connected to its networks in London, the South East and East of England. That's almost as much as the UK's entire nuclear power output.

The general shift in balance of generation from transmission to distribution means the ESO – Britain's electricity system operator is seeking new ways to manage voltage and system stability. By using generators on the distribution network to support national voltage control, co-ordination between the generators and network operators can be part of the solution.

Up until now voltage on the national transmission system has been controlled by a combination of power electronics and support from larger generators. By connecting more distributed energy sources as new sources of voltage control, it's anticipated that current constraints on the system can be better managed, making it more stable and affordable to run, while creating new opportunities for distributed energy businesses.

Power Potential stands to save energy consumers over £400m by 2050 and enable connection of up to an additional 4GW of local generation in the South East region of the UK.

The latest trial follows a series of short trials involving individual generators. This is the first time that the full system has been trialed in a live environment with multiple generators. The project uses a Distributed Energy Resources Management System (DERMS) developed by Ziv Automation. UK Power Networks has integrated DERMS into its control room to facilitate the service instructed by the ESO.

The collective trial is split into two parts, an eight-week technical trial with the generators, and then a 12-week trial of the live commercial markets, which is scheduled to finish in March 2021. The project delivers on its aim to be more than just a theoretical proof-of-concept, as it already

integrates with UK Power Networks' live network management system and customer systems. Subject to a successful trial, work will continue to explore how the local and national electricity networks can collaborate further around reactive power services to address system management challenges.

Ian Cameron, head of customer services and innovation at UK Power Networks said:

"Power Potential is truly transformative innovation because it's fundamentally changing the way we do business and interact with the national transmission system. We're creating a whole new market for renewable energy providers because it's what they have asked us to do, and a way to reduce the cost of the whole electricity system to customers.

"This is arguably the most ambitious innovation project happening across the UK energy system right now, and to get to this stage is testament to the collaboration and dedication of an outstanding team of specialists at UK Power Networks, ZIV Automation and National Grid ESO."

Dr Biljana Stojkovska, Power Potential project lead at National Grid ESO, said:

"The start of the Power Potential trials marks an important milestone for this world-first innovation project, which aims to create a new reactive power market for distributed energy resources. Through our collaborative approach with partners we're applying groundbreaking engineering and economics principles to understand what's happening in the power system and to unlock its unexploited potential.

"We look forward to the next stage of the project during which we'll get some more detailed insight into what the trial data is telling us. And we cannot do this alone. Together with our project partners we'll gain important knowledge to support future innovation in reactive markets and ancillary services."

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