The Grid Technology Pathway

Real life illustration: The Mull Access Project

The Scottish and UK Governments have ambitious targets for community energy generation with 500MW planned for Scotland by 2020. Many of these are likely to be in isolated and rural areas. The Mull Access project looked to match the output from a 400kW hydro-generator with approximately 600kW of new controllable demand being installed in up to 100 homes in Mull. The project involved partners including Community Energy Scotland (CES), Mull and Iona Community Trust, SSE Energy Supply Ltd and, Element Energy. They helped to determine the feasibility of connecting locally generated intermittent renewable energy to local demand in areas where electricity export potential is constrained.

The upscaling pattern of the Mull Access project could be described as project replication because its success has led to the replication of its ideas and concept to other remote areas with similar national grid connection constraints. As a result, the flexible connection exemplified by the project is now being routinely offered.

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Table 4: Mapping the Mull Access project to the Grid technology pathway	
Grid Technology Pathway: Drivers and Enablers	**Mull Access project**
Removal of technical problems	There has been a steady growth in the number of Community Energy Schemes in Scotland that are seeking connections with the grid. However, many of these projects are being developed in remote areas which are already subject to grid constraints. Therefore, it was necessary to explore alternative and unconventional methods of connection and interaction which would link the output from a community owned hydro scheme with new local flexible demand.
Technology improvements	The new local demand side management solution consisted of new controllable demand generator, control systems and associated communication technologies. The generator was responsible for matching local demand with generation.
Cost reduction with new technology	Optimising local production and consumption by linking local controllable demand with local intermittent renewable energy generation provides the opportunity to avoid or defer prohibitive network reinforcement costs and reduces losses on the distribution system. This delivered financial benefits for customers, given that 40% of network reinforcements cost are borne by customers.
Suitable technological infrastructure	The integration of the new controllable demand generator, control systems and associated communication and management technology with the network was tested to ensure the integrity and reliability of the network.
Technical ease of installing new technology	A network monitoring system, which provides a signal to export energy, was generated. It was transmitted locally rather than the traditional method which would involve signals being routed via the Network Management Centre. This local signal transmission and control was easier to install and increased flexibility and faster customer connection.
New infrastructure and software	New controllable demand generator, control systems and associated communication technologies were installed as well as the local network monitoring system.
Lessons from experiments	The Mull Access project demonstrated a system that used locally generated renewable energy based on local demand in areas where electricity export potential is constrained. The success of the project led to flexible connection being routinely offered to new customers. The project also facilitated faster connection of renewable energy. Economic analysis of the project also provided insights on potentially viable commercial arrangements and business models.

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Insights from practitioner interviews concerning the upscaling of the Mull access project example can be found in the full report, available from the EnergyREV website: Pathways for the upscaling of smart local energy systems.

Reference

Mull access project, 2020. The ACCESS Project.

About EnergyREV

EnergyREV was established in 2018 (December) under the UK's Industrial Strategy Challenge Fund Prospering from the Energy Revolution programme. It brings together a team of over 50 people across 22 UK universities to help drive forward research and innovation in Smart Local Energy Systems.

EnergyREV is funded by UK Research and Innovation, grant number EP/S031898/1.

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