



Economic competitiveness pathway

Real life illustration: Emergent Energy

Emergent Energy is an energy systems company that has developed a 'microgrid' solution that is primarily designed to achieve a profitable business model that benefits multiple parties to deliver Net Zero ambitions. Based on this business model, housing companies and residents will not need to fund upfront capital on technologies. Residents also receive truly green energy at affordable prices, and capital funders gain reliable long term infrastructure investments returns. The microgrid system is based on the use of private wires to share the benefits of solar PV and other low carbon technologies. These technologies are intelligently integrated with battery storage, big data analytics and algorithms to create a profitable local microgrid.

Table 3: Mapping Emergent Energy to the Economic Competitiveness Pathway

Economic Competitiveness pathway: Drivers and Enablers	Emergent Energy Residential ‘Solar as a Service’ Microgrid solution
Clear and suitable policy targets	The housing market is a key sector to achieving the UK government’s Net Zero target. There is a ban on gas boilers for all new homes from 2025 and a requirement for all social housing and rented accommodation to be EPC C rated by 2030. There are also plans to phase out gas boilers.
Derogation of regulatory and market constraints (Sand box Derogation Award)	Through pilot schemes it was identified that aspects of the Balancing and Settlement Code (BSC) arrangements were stopping microgrids from being commercially viable in retrofit settings. Emergent engaged Ofgem on this issue and received the first Sandbox Derogation Award, which has created the opportunity for commercially viable projects in retrofit settings. The derogation gives Emergent unique permission to trial a new process that will make it easier and cheaper for households on microgrid networks to switch their energy supplier. This is essential for operating microgrids fairly and cost efficiently in residential developments and will enable the company to trial the switching concept while scaling up its offer for housing companies.
Availability of low third-party funding and low interests rate loans	There are two key sources of funding for these projects: third party funding and low interest rate loans. Third party investment is the primary source of funding, and it is readily available for projects with proven returns. However, with more marginal projects, housing companies, public bodies, social housing providers and councils have access to very cheap capital, which they can use to pay for low carbon technologies. These low interest loans also provide opportunities for residents to gain from the systems because of the relatively lower returns required by the funders.
Cost reduction with new technology	The Emergent ‘Microgrid’ system is based on the use of private wires to share the benefits of solar PV and other low carbon technologies across multiple homes through a local supply arrangement. The microgrids can be simple, including only solar PV, private wires, and smart meters. Or they can be more complex, consisting of low carbon electrical heating technologies, electric vehicle charging and neighbourhood scale electric or heat battery storage. Integrating the technologies in this way reduces operating costs, while the local supply arrangement provides a reliable income.
Economic competitiveness of renewable energy technologies	Designed appropriately for the right settings, the microgrid solution generates sufficient income to provide a commercial return on the up-front cost of buying and installing the technologies. This makes projects attractive for infrastructure funders who are looking for low risk renewable investments to fund. At the same time residents connected to the microgrids are supplied with affordable green energy.

Economic Competitiveness pathway: Drivers and Enablers	Emergent Energy Residential ‘Solar as a Service’ Microgrid solution
Pioneers, users and adopters	Emergent currently operates nine pilot energy systems, installed into existing (retrofit) and new buildings in partnership with three city councils, serving around 250 residential customers. The systems all include solar PV, private networks, smart meters and communal low carbon heating, including both combined heat and power and heat pumps. Several of the projects also include communal battery storage.
Infrastructural investment	Infrastructure investment funders are looking for matured renewable energy technologies to fund because they are low risk. Solar PV falls in this category today, and over time as heat pumps and electric vehicle chargers mature, they will also become more attractive to funders. These technologies are intelligently integrated with battery storage, big data analytics and algorithms to create a profitable local microgrid.
Local supply business	To install new microgrids and assess the potential of new sites for microgrids, this local energy system approach makes use of existing supply chains and local contractors. The aim is to develop a seamless, highly efficient and rapidly scalable solution for working in partnership with housing company providers to install the various technologies.
Profitable business with smart grid services	<p>The ‘microgrid’ solution is primarily designed to achieve a profitable business model that benefits multiple parties. Housing companies reduce emissions from their stock without needing to fund upfront capital on technologies. They also get long term payments from the profits they generate which deliver commercially fundable investment returns. Residents also receive truly green energy at affordable prices; and capital funders gain reliable long term infrastructure investments.</p> <p>A key focus for scaling the solution is the identification of ‘use cases’ or applications where a microgrid can be deployed profitably. Factors including property types, number of properties, and the location of properties are relevant. Over time, as technology costs fall, the volume of available profitable schemes is expected to increase.</p>

Emergent Energy was able to upscale its activities by initiating and facilitating institutional and regulatory changes. These are characteristics of the transformation upscaling pattern. The derogation of Ofgem's regulatory and market constraints was a key driver to making their projects economically competitive. The success of the projects may potentially lead to establishing these regulatory changes, which may positively impact similar upcoming projects or companies in the sector.

Insights from practitioner interviews concerning the upscaling of the Emergent Energy example can be found in the full report, available from the EnergyREV website: [Pathways for the upscaling of smart local energy systems](#).

Reference

Emergent Energy systems, 2022. [Home – Emergent Energy](#).

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.

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