Case Study Pathway

Real life illustration: ProjectSCENe (Sustainable Community Energy Networks)

ProjectSCENe (Sustainable Community Energy Networks) is a new housing development in Nottingham's Trent Basin consisting of 120 new homes. It features Europe's largest community energy storage battery (lithium-ion batteries), solar photo-voltaic panels and local thermal energy production. The aim of the project was to involve all companies in the energy supply chain to generate renewable energy, support local communities, address research and policy gaps and deliver low carbon grid services to the national grid. Using novel consumer engagement tools and a focus on business model development, the projects will also develop and test business model templates that could be used by developers of housing projects.

Table 2: Mapping the ProjectSCENe project to the Case Studies Pathway	
Case Study Pathway: Drivers and Enablers	**ProjectSCENe project**
Availability and awareness of local and successful case studies	ProjectSCENe was developed and scaled up from Creative Homes, a seven-house test site and demonstration project at the University of Nottingham.
Local skills and knowledge and social capital	University of Nottingham researchers and local developers such as Blueprint, which is partially owned by Nottingham Council, are key partners in the project. Significant social capital has been generated due to the activities of a local Energy Service Company (ESCO), as well as innovative community engagement approaches.
Openness to innovations in the region	The region has hosted several award winning and innovative sustainable projects like the Nottingham Science Park and Green Street meadows, which features low energy town houses. The city is known as a demonstrator city for the Smart Cities horizon project.
Increasing demand and market	Increase in demand for sustainable homes in the Green Street meadows has led to the development of Phase 2 of the project.
Lessons from experiments/experience and learning by doing	Several lessons were learned from research projects. These included effective and innovative methods for engaging residents in a community project by using social media and internet of things (IOT) devices; challenges and experiences in the use of large community energy batteries; and a review of the benefits and challenges in the setting up of an ESCO facility.
Socioeconomic benefits to local and regional actors	The area had a high level of fuel poverty. As a result, an ESCO was established to produce and manage the local delivery of energy. It offered several programmes to address energy related issues in the community and raised awareness regarding technical and behavioural aspects of sustainability, energy efficiency and debt issues in the local community. It also facilitated access to funding from large organisations and state agencies. These included interest free loans for energy retrofit measures to some of the most vulnerable households in the community, as well as a grant to install wall insulation or energy efficient boilers. The ESCO also provided volunteering and local employment opportunities. It has installed solar PV in homes, schools and community buildings. Residents get free energy and the rest is fed to the grid, potentially providing income to the community.

Case Study Pathway: Drivers and Enablers	ProjectSCENe project
Improved profitability and good business case,	The project demonstrated that Community energy storage (CES) has technical and economic benefits over energy storage (ES) in single dwellings. For example, the levelised cost, value and profitability associated with end user applications improves due to better utilisation and performance. Also, CES facilitates the positive effect of aggregating demand, resulting in a less spiky community demand profile and economics of scale. However, CES systems using battery technology which perform only end user applications are not profitable yet, mainly because of the high cost of the technology. Therefore, these 'energy' applications should be complemented with other services based on the power capability of CES systems. Given its high round trip efficiency (90% approximately) and suitability for short-term and mid-term storage cycles, Lithium – ion (Li-ion) battery technology is expected to become the most widespread electrochemical technology for CES systems. However, this will be strongly driven by reducing Li-ion battery prices.
Verified data about grid performance	Key grid performance results indicate that CES with Li-ion batteries can be more effective in balancing local supply and demand than ES connected to the transmission network and are more cost effective than ES located in a single dwelling. Also, managing PV generation adds more value and potentially more profitability than performing demand load-shifting
Increased acceptance and feasibility of SLES	The project showed that uptake of CES can be enhanced through financial incentives and is dependent on simple and applicable regulatory frameworks. It also demonstrated the technical and financial feasibility of the project. Community engagement as citizens rather than just consumers will increase acceptability. This helped to increase awareness of energy consumption and environmental impacts.

The upscaling of ProjectSCENe from Creative Homes could be described as project growth. Creative Homes, which is a seven-house demonstration project, was extended to ProjectSCENe, a city-scale demonstration project featuring a community energy storage system.

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

Reference

Parra, D., Walker, G.S. and Gillot, M. 2016. Are batteries the optimum PV-coupled energy storage for dwellings? Techno-economic comparison with hot water tanks in the UK. *Energy and Buildings*, **16**: 614–621. doi: 10.1016/j.enbuild.2016.01.039

INDUSTRIAL STRATEGY UK Research and Innovation

Parra, D., Swierczynski, D., Stroe, S.A., Abdon, J., Worlitschek, J. and Patel, M.K. 2017. An interdisciplinary review of energy storage for communities: challenges and perspectives. *Renewable and Sustainable Energy Reviews*, **79**: 730–749. doi: 10.1016/j.rser.2017.05.003

Rodrigues, L.M., Waldron, J., Cameron, L., Tubelo, R., Shipman, R. Ebbs, N. and Bradshaw-Smith, C. 2020. User engagement in community energy schemes: a case study at the Trent Basin in Nottingham, UK. *Sustainable Cities and Society*, **61**: 102187. doi: 10.1016/j.scs.2020.102187

Rodrigues, L.M., Waldron, J., Cameron, L., Tubelo, R., Shipman, R. and Ebbs, N. 2018. Community Energy Networks. In: 34th Passive and Low Energy Architecture Conference (PLEA, 2018). Hong Kong China.

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.

www.energyrev.org.uk

@EnergyREV_UK

info@energyrev.org.uk