

# Pathways for the upscaling of smart local energy systems

Damiete Emmanuel-Yusuf and Walter Wehrmeyer | October, 2022

Smart Local Energy Systems (SLES) are one of the key energy system components of the UK's Net Zero future. However, their deployment levels are currently low, and their growth is slow. Therefore, this report develops and supports four key pathways to the upscaling of SLES, derived from a new Transition Map based on literature and reviewed by SLES practitioners and expert researchers.

These pathways describe the dynamics of drivers and enablers towards both the setting up and the upscaling of SLES, respectively. The *Local Authority* and *Case Study* pathways have particular impact on the set-up phase of SLES and the *Economic Competitiveness* and *Grid Technology* pathways are particularly relevant in the growth phase of SLES. The report also identified other pathways from the contextual and framework phases of the Transition Map namely the *Local Community Context* pathway and the *Policy Framework* pathway.

Mapping these onto four case studies – Bunhill power and heat network; Project-Scene; Emergent Energy Systems; Mull Access Project – combined with workshops and interviews, support these general recommendations for SLES upscaling:

- The dynamics of drivers and barriers tends to be different for the set-up and the upscaling of SLES. Likewise, speaking of 'barriers' and 'drivers' as a binary choice is less helpful in understanding upscaling than a more differentiated view of barriers, hurdles, enablers and drivers.
- More than local initiatives, it is national policies such as the UK Government's Net Zero Target are critical drivers for the development of low carbon systems such as SLES.
- Local authorities need statutory powers over and above local planning frameworks, much as they have for housing and transportation, to provide an incentive to meet carbon budgets.
- Regional governance is needed to promote transparency and accountability in the administration of local energy systems. In particular, regulatory review and derogations are required to drive the viability of SLES business models.

- Partnership with industry partners and commercial companies are key; not just to provide skills and competences but also because income and networks obtained from SLES projects are incentives for upscaling and increasing deployment of SLES.
- Market structures to support technology development are essential so that the sector is not heavily dependent on (temporal and selected) funding.
- Appropriate planning for new technology Infrastructure is key so that a lack of suitable infrastructure or capacity does not limit the growth of the sector.
- Communities that generate social capital to achieve local support for grid growth can be a strong catalyst for improvements. Community engagement activities such as online platforms and face to face meetings, where incentives, profits and benefits sharing can be discussed, are vital tools to encourage support.

We also developed and suggest specific guidance for conditions needed for upscaling for the four key pathways:

- **Local Authority:** local authorities need to build capability and skill in energy.
- **Case Study:** specific funding for learning and replication must be provided for demonstrator projects so that findings can be effectively disseminated.
- **Grid Technology:** thorough documentation of lessons learned, including both failures and successes from technology improvement experiments is essential to ensure that principles, technology and experience can be transferred to succeeding projects.
- **Economic Competitiveness:** Economic competitiveness and cost reduction with new systems are critical for the pathway. Success cannot be limited to technological innovation.

## Future and ongoing research on the pathways

Given the diverse and emergent nature of SLES Systems, future research should characterise different types of context and framework pathways such as the legal or business model framework pathways that describe the factors driving particular business models or legal frameworks depending on the type of SLES systems. Different technology framework pathways can also be derived based on specific technology configurations. It is possible to derive different community context pathways and policy framework pathways as well as modified versions of the key pathways.

The mapping of the key pathways to the case studies also revealed that though the key pathways are presented as stand-alone, in practice they are often interrelated and linked to form hybrid pathways in the set-up and growth phases of the Transition Map. Using the Transition Map as a base, different pathway configurations can provide templates of driver/enabler sequences for the establishment and upscaling of a variety of SLES systems. These templates should be used to (a) map and assess SLES systems (b) provide models for the setting up and upscaling SLES and (c) identify critical factors missing or impeding development.

Research is ongoing to create a tool in which underlying drivers and barriers of significant drivers/enablers within the key pathways are further examined based on outputs from EnergyREV work packages and other relevant research. This will aim to provide more detailed guidance and recommendations on how to facilitate pathway progress and hence the establishment and upscaling of SLES systems.

The full report is available from the EnergyREV website: [Pathways for the upscaling of smart local energy systems](#).

## 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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 [info@energyrev.org.uk](mailto:info@energyrev.org.uk)