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The most important decisions to enable the implementation of smart local energy systems

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INDUSTRIAL STRATEGY

UK Research and Innovation

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About EnergyREV

The Energy Revolution Research Consortium (EnergyREV) is part of the Government-funded Prospering from the Energy Revolution (PFER) Industrial Strategy Challenge Fund. The PFER programme is investigating opportunities and challenges around policy, regulation, user engagement and digitalisation of energy systems to unlock the benefits of SLES. The PFER programme has invested around £100 million, matched by industry, in a range of projects to help businesses, researchers and local communities develop, test and prove SLES.

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Introduction

Smart local energy systems (SLES) are currently a set of diverse projects, designed to satisfy local needs and national goals, trialling a range of different technologies and engaging a myriad of stakeholders and end-users. EnergyREV research has revealed a range of environmental, energy system, economic, and societal benefits that can be attributed to SLES.[1] We have also found that a SLES approach could enable a transition that is faster, fairer, cheaper, and more enduring than top-down, centralised approaches (Fell et al, 2020; Morris et al, 2021).

The emergent and varied nature of SLES means that they can't be defined in terms of the specific technologies, business models, governance structures, operation paradigms, or users. This lack of definition presents challenges as the configuration, benefits and issues of SLES are not always recognised by policy and regulatory frameworks. In turn this makes it hard to determine what role SLES play in future energy systems, how they can be scaled-up, and how to capture their potential benefits.

Our previous work (see Morris et al, 2022 for example), has found that the UK does not have the appropriate policy, institutional and regulatory framework to realise the technical, economic, and societal potential of SLES. This study sought to understand what decisions are needed to enable the implementation of SLES. The work was conducted by a team of researchers led by the Grantham Institute at Imperial College London, a partner in the EnergyREV consortium. This report is a summary of the main findings of the study.

Summary

Barriers to SLES include the centralised nature of energy decision making, the unclear role and responsibilities of actors in the energy system, the poor business case for SLES, and the tensions with a just transition.

We asked energy experts to identify the most important changes needed to enable SLES. They outlined these decisions:

- National government should devolve powers, resources and capabilities to local authorities and require them to engage on, plan for and coordinate the development of SLES.
- Greater coordination between key actors, particularly Distribution Network Operators (DNOs), the Electricity System Operator (ESO), local authorities (LAs) and SLES is needed to ensure good energy system outcomes. This coordination could be facilitated by a new coordinating body that sits between national and local energy systems.
- Mandate open energy data and transparency, including from the DNOs and ESO, to realise the value from SLES.
- Require all energy decisions to be evaluated against wider benefits to ensure that the energy transition is fair and that the benefits of SLES are realised.

1 See the EnergyREV website for a range of our publications.

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Approach

To reach these findings expert energy stakeholders took part in a series of Decision Theatres in March 2022. Decision Theatres are workshops that culminate in participants making decisions. The key question posed to participants was:

> "What are the most important changes that could enable the implementation of smart, local energy systems?"

Six Decisions Theatres were held, with 6-11 participants at each and 46 participants in total. Participants were a mix of experts from energy businesses, academic, policy and regulation and other relevant backgrounds such as think tanks and charities.

For each online workshop, participants were provided with a briefing report in advance that summarised EnergyREV research findings.[2] During the workshop each participant proposed a set of priority decisions against the key question and then voted on the most important decisions as a group. After discussion, each group consented[3] to a set of around six priority decisions. Consequently, 40 priority decisions were identified across the workshops.

The research team analysed the decisions and discussions and here we present our findings and conclusions. First, we describe the problems identified for SLES within the current policy and regulatory landscape. Then we summarise the decisions that could enable the implementation of SLES. Finally, we draw some conclusions about the outcomes of this research and outline next steps.

2 Also available on the EnergyREV website.

3 The top set of decisions was finalised through a process of consent rather than consensus. This means that whilst not everyone agrees on all decisions voted most important, they agree to move forward.

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Problem identification

During discussions and activities in the workshops four clear themes of problems with the current policy and regulatory arrangements for SLES emerged.

Theme 1: Centralised energy decision making

In the GB energy system planning, operation and markets are predominately centralised. The same is true of the budgets for energy programmes, for example energy efficiency and new renewable resources (e.g., contracts for difference). This means that space and resources for SLES to emerge is limited within national frameworks.

The responsibilities of the GB energy regulator, Ofgem, constrain the ability of SLES to emerge. In part this is because Ofgem does not have specific duties that could better enable the development of SLES – for example a duty to consider local energy systems. In part it is because of how Ofgem chooses to interpret its existing responsibilities, for example Ofgem does not account for co-benefits from local energy in its decision making.

Theme 2: Unclear roles and responsibilities

At a national level GB lacks a function or institution with a role to plan and coordinate local energy (including SLES) in the context of the net-zero target. Consequently, local energy systems are emerging in a patchwork way.

Local authorities have an important role to play in energy system planning because they have the local democratic mandate and often hold the local planning function. However, many local authorities lack the powers, resources and capabilities to effectively deliver the energy system planning role.

The current duties of the DNOs (and other local network companies) hinder the emergence of SLES. For example, in Ofgem's recent call for input on local energy system governance (Ofgem, 2022) they question whether DNOs may have an inbuilt technical and risk bias towards asset solutions, resulting in underutilisation of flexible (SLES) solutions.

Theme 3: The business case for SLES

Prior to the Prospering from the Energy Revolution (PFER) programme there was a lack of long-term, strategic and targeted SLES funding. Funding for some elements of the energy system, such as energy efficiency, have been trapped in boom and bust cycles for decades.

SLES have a range of social, environmental and economic benefits. However, many of these benefits are not recognised by markets, policy and regulation and so cannot be realised.

Theme 4: Just transition

The skills required to deliver SLES are not always available in the UK and are unequally distributed.

The success of SLES requires behavioural changes in households and businesses, but awareness of these changes is low.

SLES have the potential to address or broaden existing inequalities (and potentially introduce new ones).

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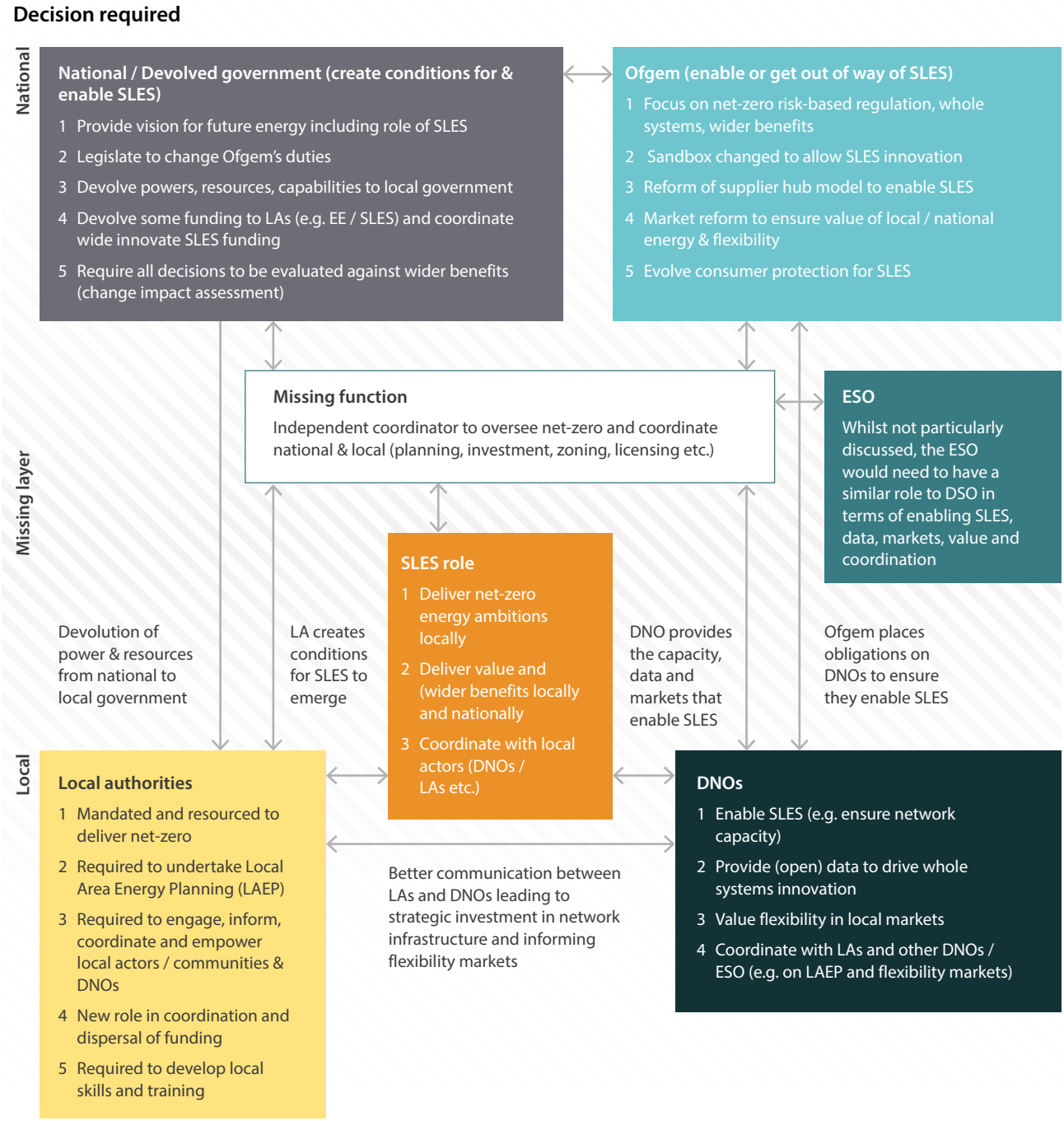
Key decisions

This diagram below summarises the key decisions identified and their implications for GB energy decision making and SLES.



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Conclusions

Our research has shown that the current policy and regulatory landscape is causing barriers to the emergence of SLES. These barriers include the centralised nature of energy decision making, the unclear role and responsibilities of actors in the energy system, the poor business case for SLES, and the tensions with a just transition.

Participants at our Decision Theatre workshops outlined decisions that would enable the implementation of SLES.

- National government should devolve powers, resources and capabilities to local authorities and require them to engage on, plan for and coordinate the development of SLES.
- Greater coordination between key actors, particularly Distribution Network Operators (DNOs), the Electricity System Operator (ESO), local authorities (LAs) and SLES is needed to ensure good energy system outcomes. This coordination could be facilitated by a new coordinating body that sits between national and local energy systems.
- Mandate open energy data and transparency, including from the DNOs and ESO, to realise the value from SLES.
- Require all energy decisions to be evaluated against wider benefits to ensure that the energy transition is fair and that the benefits of SLES are realised.

Next steps

While this study has confirmed what changes to policy and regulatory frameworks need to be made and why, there remain outstanding questions about how and when these decisions can be implemented, and by whom. The decisions we outline above entail drastic changes to governance structures. Questions therefore remain including:

- Which decisions could/should be implemented first?
- How difficult are the decisions to implement and can they be implemented at the required pace?
- What interdependencies exist between the decisions – e.g., are some changes dependent on others being implemented first or could some changes cancel out the others?

To explore these questions further, the findings of the current study will be used to inform EnergyREV policy design workshops in winter 2022/23 on the pathway and interdependencies to implementing the decisions to enable SLES.

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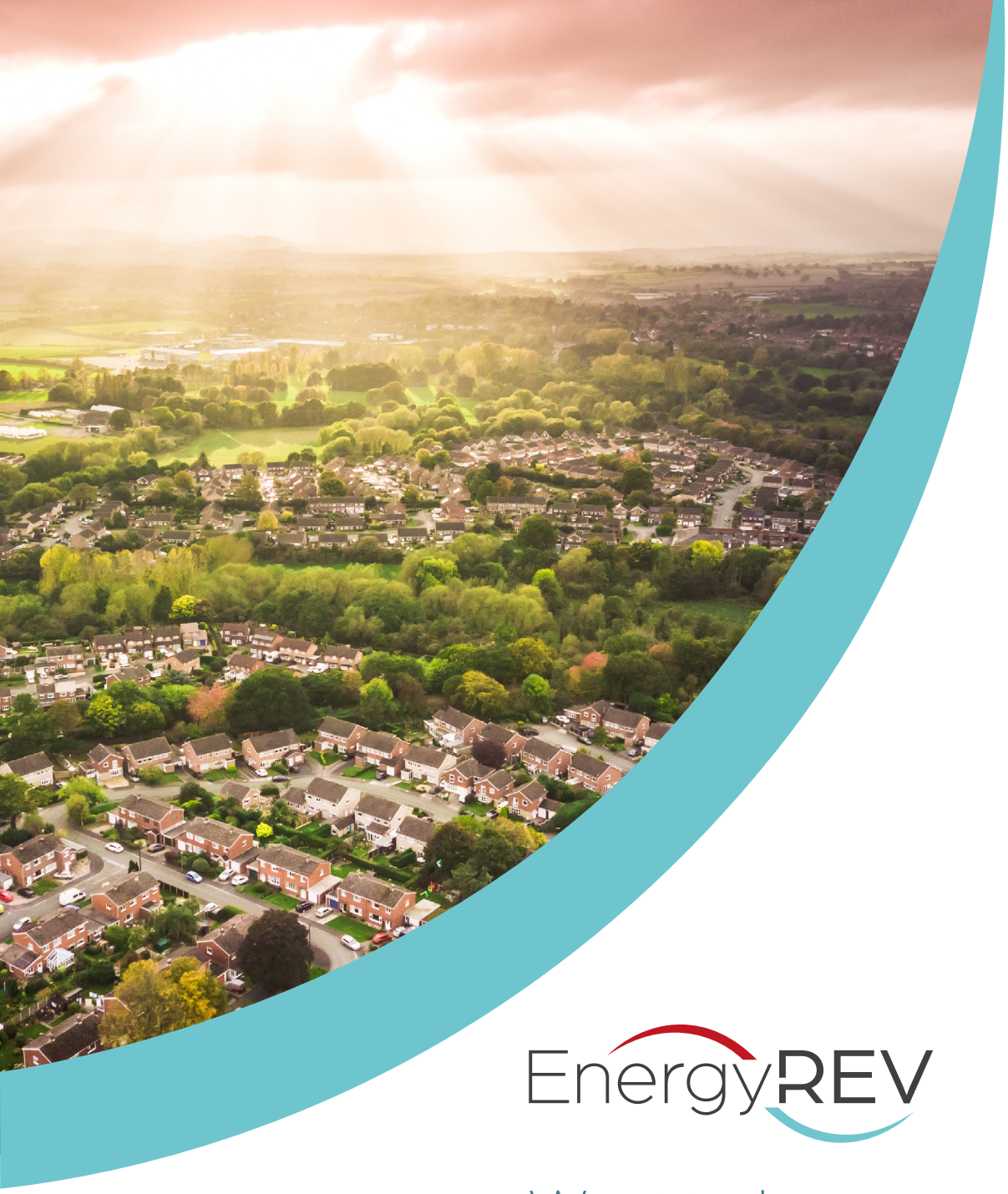

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About EnergyREV

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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