EnergyREV

Developing a research portal on smart local energy systems

INTRODUCTION AND BACKGROUND

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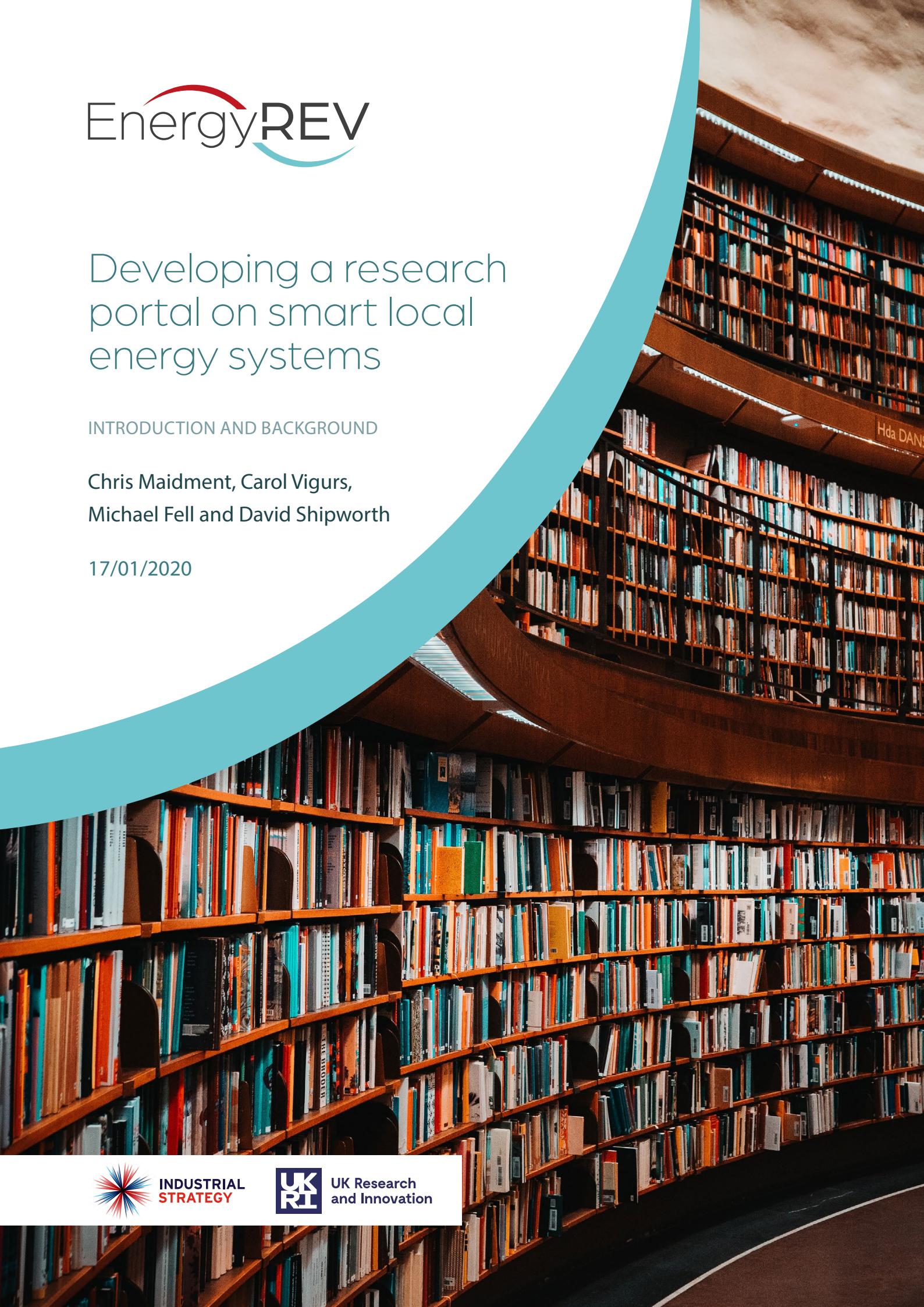

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Introduction

If you are involved in implementing smart local energy systems (SLES), for example as part of a local authority, community energy group or a business, our SLES research portal (v0.1) contains information and resources you can draw on to maximise the chances of successful delivery.

The new portal is an evolving database of research on SLES. It is currently in a spreadsheet format that will allow you to easily search and browse basic information on hundreds of research documents relevant to SLES. This is just the first stage: we will add summary details and easy-to-read syntheses of the best available evidence, as well as additional sources over the next few years. Ultimately, this will evolve into an online resource, so we are interested in what you would find most useful.

We have made the information available now so we can learn more about how you use it, and so we can tailor our resources to suit your needs. This early version of the spreadsheet will allow you to begin to explore the evidence for how SLES with good outcomes might be implemented.

This short report explains how you can use the spreadsheet, and goes on to briefly summarise the work underlying it. Finally, we provide some information about the next steps in our work, and how you can contribute.

SLES research portal, v0.1

The SLES research portal v0.1 contains a list of articles and reports that our searching and screening suggests are relevant to the design and implementation of SLES – currently around 700 documents, with more to come over time. The spreadsheet is designed to allow you to search and filter the documents in a number of ways: The search box allows you to bring up any documents that include specific words of interest.

- Documents can be filtered by a number of 'challenge areas', such as 'users' and 'business and finance'.
- Suggested searches on specific concepts, for example, 'communication' or 'privacy'.

Ideally, you don't want to trawl through academic paper details to find the information you need: we are in the process of summarising the best available evidence in an easily accessible format.

You can access the SLES research portal spreadsheet at the following link: www.energyrev.org.uk/media/1370/fell_202005_researchportal-v01.xlsx

We recommend you view the current version of the spreadsheet as it includes more documents in addition to new features and improvements. In due course, it will link directly to the online portal.

If you are unable to access any of the articles because they sit behind a paywall, please get in touch via the contact details in the sheet and we will endeavour to help. We may be able to prepare a short digest of the documents for your, and/or point you to more accessible alternatives.

The SLES research portal is a 'minimum viable product' – that is, it intends to provide just enough functionality to be useful to some in the key user group, while providing an opportunity to collect user input for future iteration. We are very keen to hear from you on what does or doesn't work so that we can build this in to our future plans.

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Building a SLES information resource

A user-centred development process will inform the transition to an online portal. Populating the resource with information will be carried out through a series of sequential evidence reviews. These will focus on topic areas suggested through our engagement with SLES stakeholders, such as how to design systems that are sufficiently secure and private, or how to structure the organisations involved in running a SLES.

Each of these reviews will explore what has actually worked, or looks most likely to work, in SLES implementation. Importantly, we will also consider the context of different approaches that might have made a certain strategy work in one place and not in another. We aim to give you the best information to help you decide what is likely to work best in your particular context.

The reviews will result in focused reports and briefings that draw out the most important information for the topic. All the information will also contribute to the online portal. This will help you to find the information you need, for example, by filtering by region, or generation type, or type of intervention such as behaviour change. We will also apply a quality and relevance process based on the methods the studies employ.

It is important for us to know how you might want to interact with the information we share. What factors do you need to be able to filter on? Would short, topic-specific summaries of the best available evidence be useful? Any suggestions that would help you, and your reflections on the direction of our work would be greatly appreciated. Please email Chris Maidment c.maidment@ucl.ac.uk. As the work progresses, we will develop more specific questions and engage in more focused user testing.

Our reviews so far

The SLES research portal has been created from extensive evidence reviews by our team, with the aim of building a foundation for the next stage of our work. The first part explored the different concepts associated with idea of a SLES, and the findings assembled in a white paper: A framework for understanding and conceptualising smart local energy systems. The findings were used to set the scope for a review of reviews, and a systematic evidence map. Links to these reports will be added to the EnergyREV website when available. The main points covered in the reports are summarised below.

Individual studies incorporate multiple limitations and biases which can restrict the reliability and applicability of the findings to other contexts. For example, if you test a user engagement strategy in a village where many people already have rooftop solar PV installed, that same strategy would be unlikely to work in a location where no-one has PV. As a result, evidence reviews set out to identify all the relevant studies on a given question and consider the overall picture. This allows you to determine if a study finding was a one-off, or happened consistently across various studies. A review that finds certain approaches to work consistently in a given context should be more persuasive, and give you more confidence in applying that approach, than a single study.

Our review of reviews identified previous SLES evidence reviews. In theory, any major findings emerging from a review should be more reliable than those of individual studies, and we would expect them to identify the most important themes and factors across the studies included. The systematic map set out to capture individual empirical studies of SLES – based on observation, measurement etc. rather than theory or logic.

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The review of reviews focused on a broad search of academic and grey literature, including documents such as government reports, and identified around 180 relevant items. An important criteria was that a review had to provide some detail on the review method in order to confirm that it had looked across all the available evidence, and not 'cherry-picked' some studies to support a particular approach or line of argument, for example. Following this screening, only 20 reviews were eligible to be included.

For the systematic map, over 17,000 documents were screened by examining titles and summaries to yield just over 700 that could be specifically relevant to SLES development, for instance those that studyied the operation of a system rather than an individual component. These 700 are listed in the first iteration of the research portal, categorised by our main challenge areas. A further screening looked at the full documents, resulting in only 38 which met all our criteria. We extracted information from the reviews and primary studies on a range of descriptive (for example, authorship, date, locations covered) and substantive factors (for example, interventions, outcomes).

We identified a number of characteristics from the high-level details of studies, which are mostly relevant to researchers working in SLES.

While there is a large body of research that is highly relevant to SLES, there is relatively little empirical data on projects that capture all elements of 'smart', 'local' and 'energy systems'. For example, there is a great deal of work on building up electricity generation infrastructure in a locality, but little empirical research that considers generation infrastructure when tied in to local demand matching, storage, other energy vectors, etc. that a true smart local energy system would be expected to involve. Much of the systems-focused work is based on modelling, which is useful for planning, but cannot provide evidence on what works in reality.

This is likely to be a reflection of the current limited spread of true SLES, and the time required to collect useful data. Our future work will, as far as possible, draw on research which is relevant to, but possibly not directly based on, SLES. This does highlight the need to ramp up research into what is actually working for SLES.

We identified a predominantly social science focus amongst existing relevant systematic reviews. Reviews in other disciplines such as engineering were less likely to report details on the review methodology, making it more difficult to ascertain how comprehensive they are. Promoting the uptake of systematic approaches to conducting and reporting reviews (if not conventional full systematic reviews, which are not always appropriate in energy research) more broadly across energy research disciplines would provide significant value.

The reviews mainly gave a narrative overview of the findings of the featured studies, rather than arriving at any conclusion based on the evidence of 'what works'. This could be a reflection of the range of research approaches applied in the energy studies field, with diverse methods and measurements making it difficult to compare studies and create a coherent picture. This is borne out in our systematic evidence map. Bringing greater coherence to SLES research would make it easier to learn lessons from future projects, while developing better evaluation approaches is likely to be critical.

Reflecting the social focus of the reviews, many emphasised the importance of individual, interpersonal and social factors in the effectiveness of interventions and initiatives. Recurring themes include:

- The importance of early and ongoing engagement with potential or current users, both to get people involved and to change habits and behaviour in ways that support energy system operation.

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- The crucial role of trusted actors in driving this engagement, with the identity of those actors being highly context-specific. This trust both reassures people that new systems will deliver the proposed benefits, and that their own privacy and security will be assured.
- The ability to interact with new system technologies is important, and the best approach will be highly dependent on the intended user group. Knowledge building activities may be appropriate in some instances, but good design and reliable operation are likely to be crucial.

The reviews also considered economic factors such as affordability and innovative financing, environmental, and organisational factors. We will prepare short digests of the most useful reviews, and provide more detail on the identified evidence along with recommendations.

Findings from the systematic mapping review so far aimed to inform our future work, allowing development of a keyword classification scheme for future use, and identifying areas of common or rare interaction between different areas of study.

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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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