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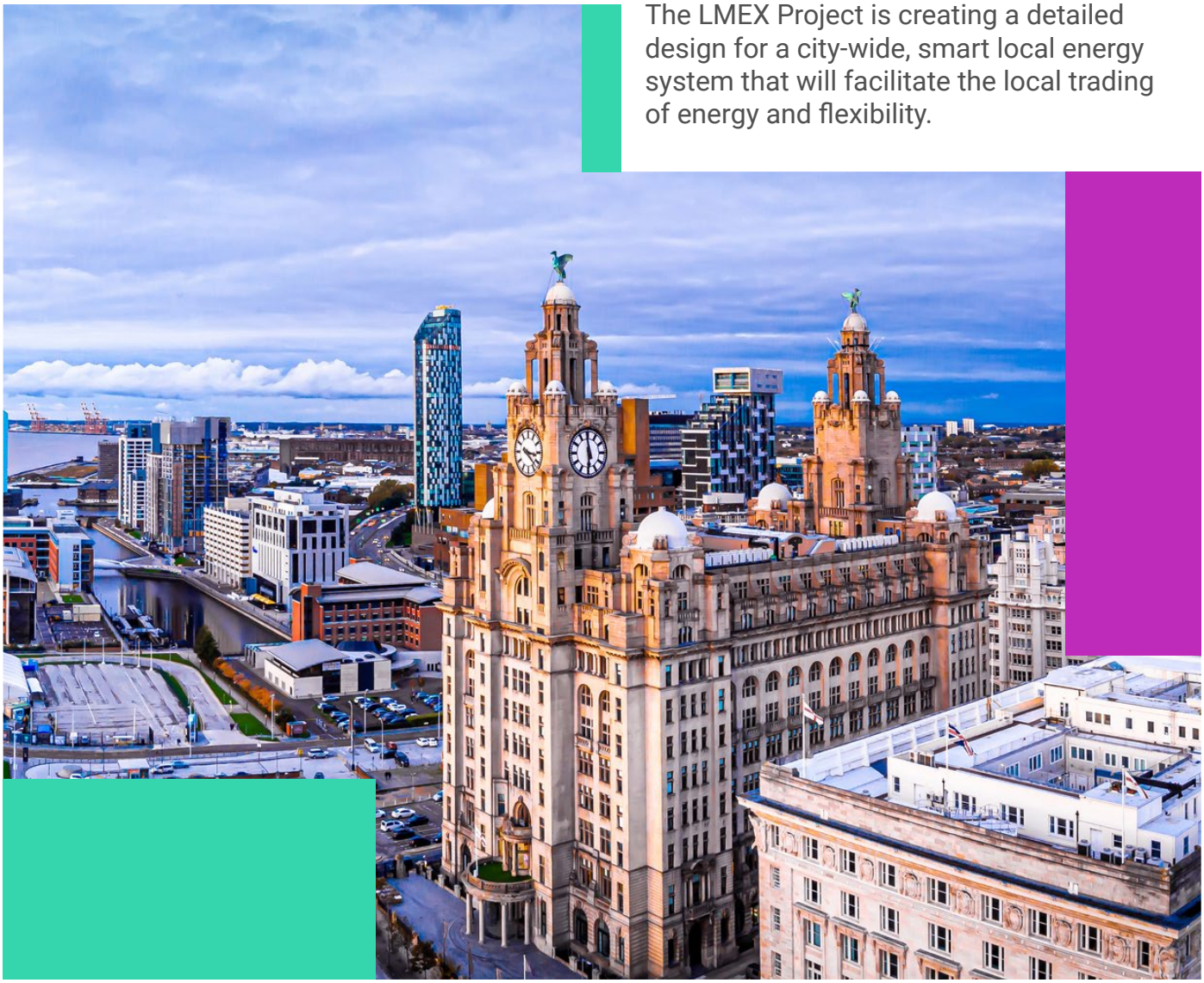
Prospering from the Energy Revolution

Liverpool Multi-Vector Energy Exchange (LMEX)

Project fact sheet

The LMEX Project is creating a detailed design for a city-wide, smart local energy system that will facilitate the local trading of energy and flexibility.



The Prospering from the Energy Revolution challenge programme ran from 2018 to 2023.
For more in-depth information on the programme and the projects see:
https://www.ukri.org/what-we-offer/browse-our-areas-of-investment-and-support/prospering-from-the-energy-revolution/

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Liverpool Multi-Vector Energy Exchange (LMEX)

Dates:
April 2020 – March 2022

UKRI funding:
£1.4m

Link:
https://liverpoolenergyexchange.co.uk/

Project partners:
New Resource Partners (lead)
Decentralised Energy Solutions
SP Energy Networks
University of Essex
Regent Capital
SMPnet

SLES components:
Local energy market

What is the project?

The LMEX Project is creating a detailed design for a city-wide, smart local energy system that will facilitate the local trading of energy and flexibility among local renewable generation, electric vehicles, energy storage, and low-carbon heating and cooling. The project has delivered designs for three key components: a Smart Network Controller which communicates with, controls and optimises local energy assets in real time; a Flexibility Exchange Platform which provides the market trading platform; and the business model for the exchange itself (LEX).

What has been delivered? What has been successful?

- ✓ City wide local energy exchange architecture.
- ✓ Design of key technical components: market exchange software, user interface, and physical Smart Network Controller.
- ✓ A commercially viable business model for the LEX operator.
- ✓ Analysis showing the value of the LEX to Liverpool with the potential for this to rise to over £10m per year by the end of the decade.

Barriers encountered and outcomes

Barrier	The need for a supply licence to trade electrical energy.
Outcome	The project has focused on developing a supplier partner business model, with sufficient commercial revenues to enable a LEX operator to cover its costs and achieve a return on investment.
Barrier	Great Britain's nationally-focused electricity market combined with a lack of data on local network constraints.
Outcome	The supplier-partner model allowed LMEX to deliver a feasible operating model, but current national market arrangements limit the recognition of local revenue streams. The lack of local constraint data affected the level of confidence in estimates of future flexibility revenue.
Barrier	Challenges delaying the physical role of the design lab due to Covid.
Outcome	This significantly delayed the setup of the Physical Design Lab and meant the project was unable to physically demonstrate the operation of the market and smart network controller. This is now being taken forward as a follow-on project.

Impacts

Forecast GHG savings in 2032:	20.6% (Range: 16.9% to 22.8%)
Forecast energy and network savings in 2032:	£1.2m (Range: £0.94m to £1.55m)
Match funding:	£0.6m

Top lessons learnt

1. The importance of a hybrid public-private finance model to drive forward local energy infrastructure with public finance supporting early-stage development and de-risking and private finance providing the scale.
2. There is significant interest within the finance community in investing in SLES projects, however the scale and characteristics of many local energy projects are a barrier. There is a need to build portfolios for investment and to standardise investment opportunities.
3. There is very little data visibility on the need for local flexibility to optimise grid operation and minimise reinforcement investment, especially in the light of electrification of transport and heat, without which proving the value of this revenue stream is challenging.

What's next?

- Deliver control mode demonstration of the software and hardware through the physical design lab using follow-on InnovateUK Impact Accelerator funding.
- Develop new software as part of the follow-on funding to guide energy suppliers and other investors to local investment opportunities.
- Implement LMEX in Liverpool and expand to other cities across Great Britain.

Analysis for the cost and carbon impacts does not include cost-savings functions enabled by the Smart Network controller (i.e. advanced local optimisation, revenues from grid services, etc.). Additionally, the network cost reductions (i.e., planning and operational costs) emanating from the wide-scale optimisation and control capabilities of the SNC are not reflected in the analysis. For more information on the methodology used to estimate carbon and cost impacts see https://es.catapult.org.uk/report/bills-and-carbon-impact-of-smart-local-energy-systems/.