



Delivered by  
Innovate UK and EPSRC



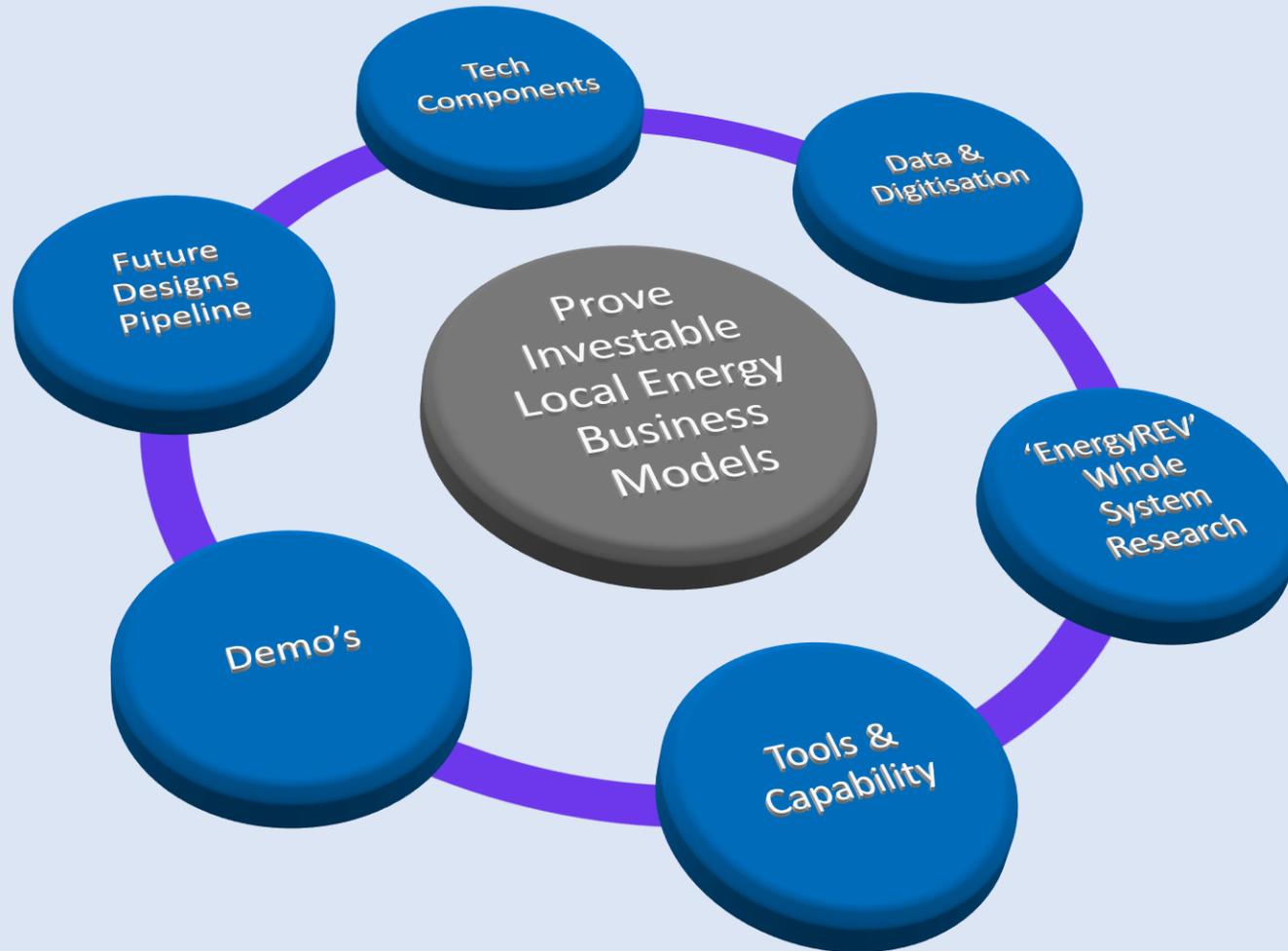
# Prospering from the Energy Revolution Challenge

## Insights from 5 years of innovation in energy-smart places

Rob Saunders, Challenge Director



# Prospering from the Energy Revolution: - Developing the potential of energy-smart places.



All scoped to work across:



Power



Heat



Mobility

# Energy-Smart Places: What are they?



## Energy-smart places

- intelligently join up different types of energy supply, storage and use in a place
- making the most of local resources, needs and opportunities
- enabling new services for users, cutting emissions and costs, and creating efficiency.



Delivered by  
Innovate UK  
and EPSRC

# Energy-Smart Places: The Opportunity

A clear choice is presented by the insights from PFER:

Embrace Place-based approaches as part of our national strategy for net zero.

Continue to prioritise a centralised, supply-side approach and ignore place as a significant delivery vector.

The programme's findings show:

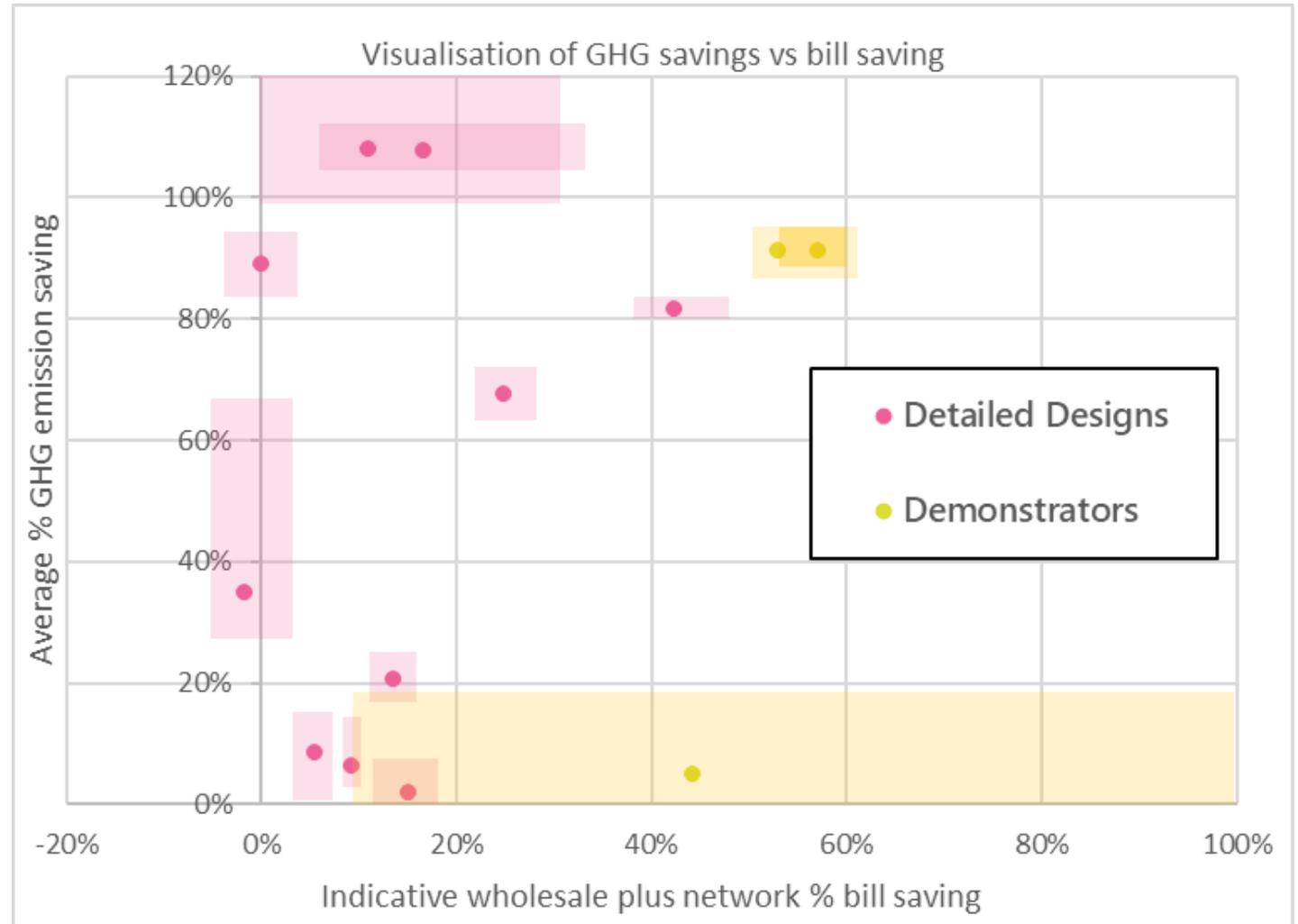
- Embracing 'place' provides a huge opportunity to deliver great net zero outcomes in places across the UK, and for the UK as a whole.
- The centralised-only model is not delivering the resilience, value, pace and efficiency needed for the UK to prosper from the journey to net zero.

# What have we learnt?



Delivered by  
Innovate UK  
and EPSRC

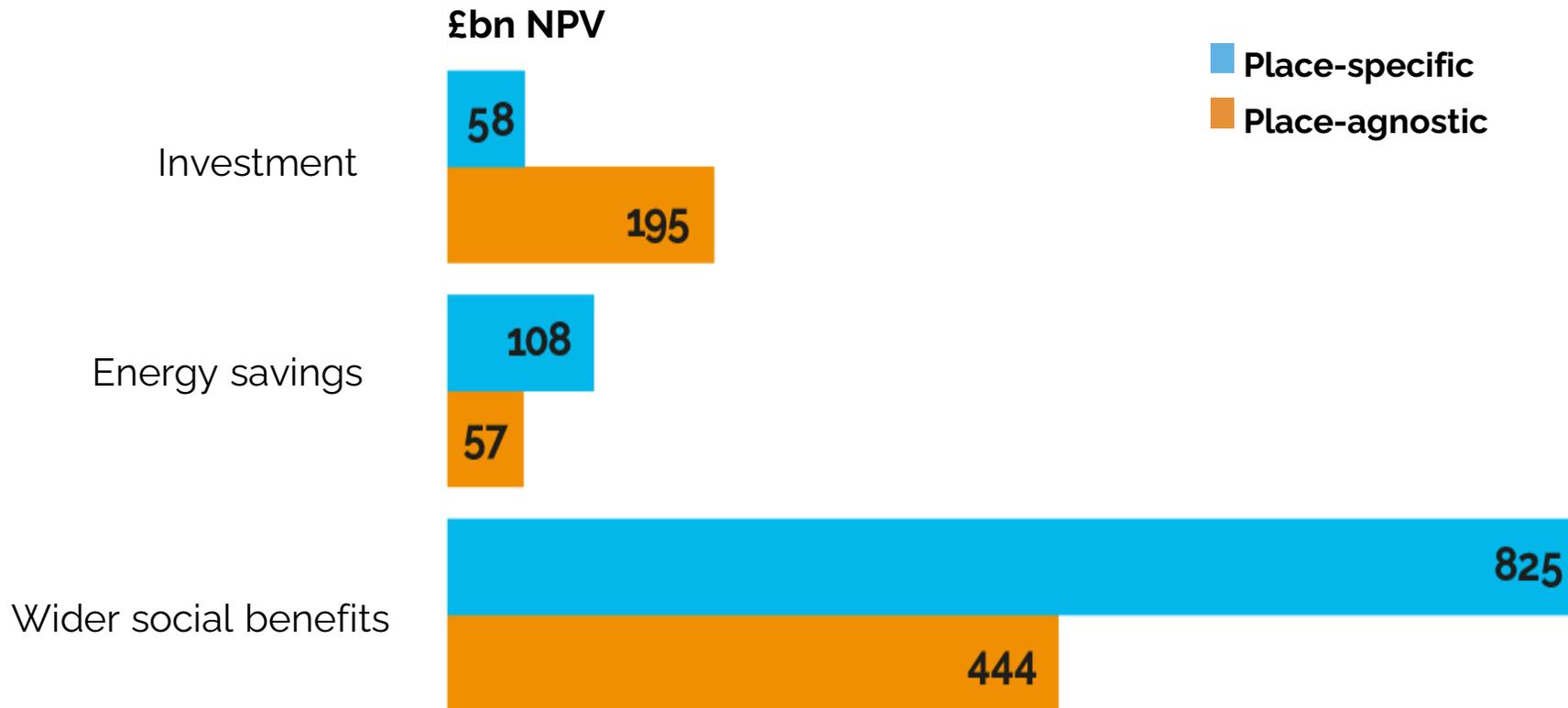
# 1. Energy Smart Places: Yes we can!



Delivered by  
Innovate UK  
and EPSRC

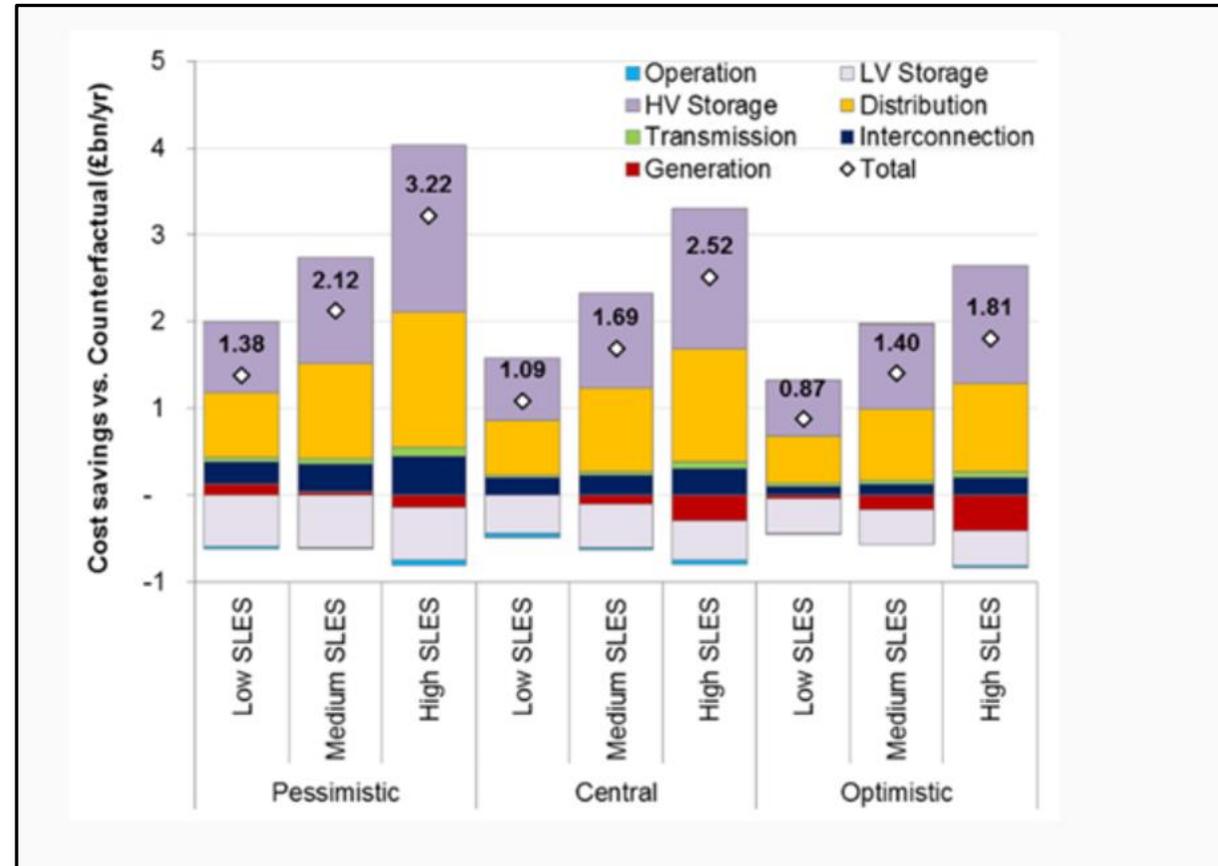
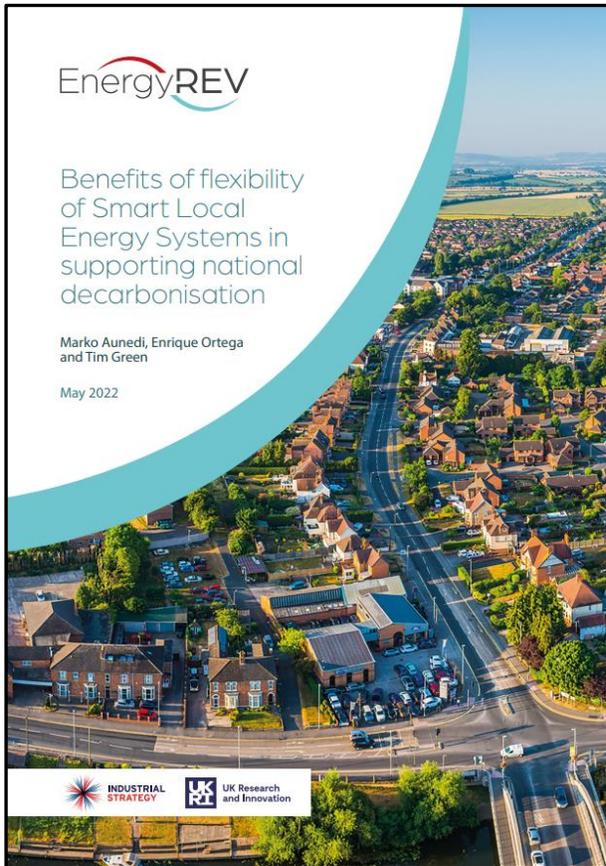
## 2. Energy Smart Places create huge benefits locally...

Place-based approaches could save **£137bn** in investment cost and generate an additional **£431bn** in energy savings and wider social benefits



Delivered by  
Innovate UK  
and EPSRC

# ...and nationally, everything else is harder and more expensive without energy-smart places.



# 3. Energy-smart places create thriving business environments



**Project Investment**

- Opens £bns markets in places across UK
- Eg £3.2bn Manchester investment for CB6 trajectory



**Business Scaleup**

- Businesses developing flexible local energy solutions attracting scaleup funding
- £700m+ in funding for PFER cohort businesses since 2018

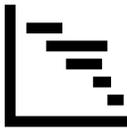


**Skilled, High-value Jobs**

- £bns of local activity in delivering decarbonised places.
- Re-skilling potential and new industries in retrofitting and efficiency.

But we've also learnt that securing these benefits needs concerted action from across the landscape.

Incrementality and delay will not deliver the best net zero outcomes for the UK.



ofgem  
Making a positive difference for energy consumers

Consultation

---

Future of local energy institutions and governance

Local NZ Plans & LAEPs

£  
Finance





Green Finance Institute



Regulation



The Future of Distributed Flexibility  
Call for input

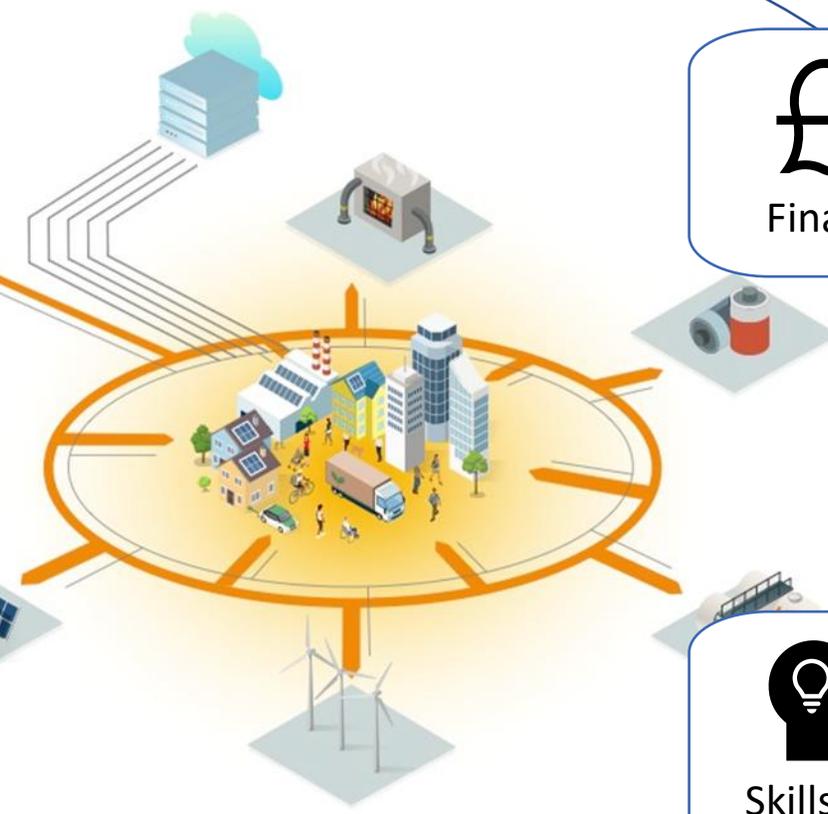
ofgem  
Making a positive difference for energy consumers



Skills & Capability

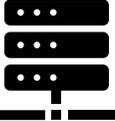



NET ZERO HUB




Partnerships

Local – National  
Public - Private



Digitalisation

Department for Energy Security & Net Zero

ofgem

Delivering a Digitalised Energy System

Energy Digitalisation Taskforce  
Chaired by Sarah Berkeley CBE



# At the heart of enabling change: A national framework for local net zero delivery

## Delivery Framework



### **System Governance**

Building on the foundations of the Net Zero Strategy, clarify the respective roles of delivery ecosystem actors so that each role is attributed to the most effective level and with appropriate authority and accountability.

### **Portfolio Management**

Building on the momentum of climate action and local area energy planning by UK places, bring a consistent methodology to integrated LCM portfolio design, management, implementation and reporting.

### **Capacity & Skills**

Building on the Local Net Zero hub infrastructure, enhance their capabilities and services to support multi-level local portfolios develop their plans and pipelines with Technical Assistance in parallel to national skills programme.

### **Funding & Financing**

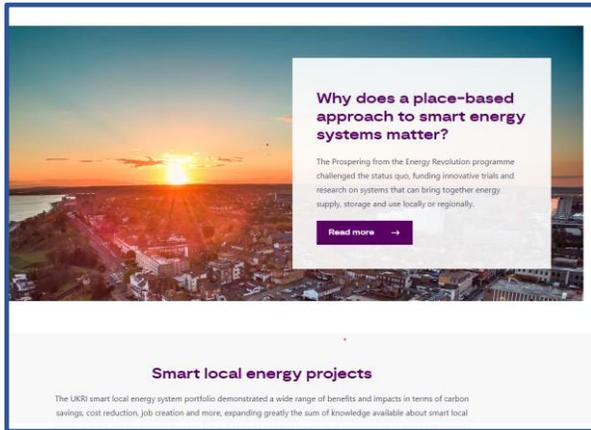
Building on the local mandate of the UKIB, furnish portfolio investment needs with a local Net Zero financing framework including core, borrowing, private and innovative investment instruments.



Delivered by  
Innovate UK  
and EPSRC

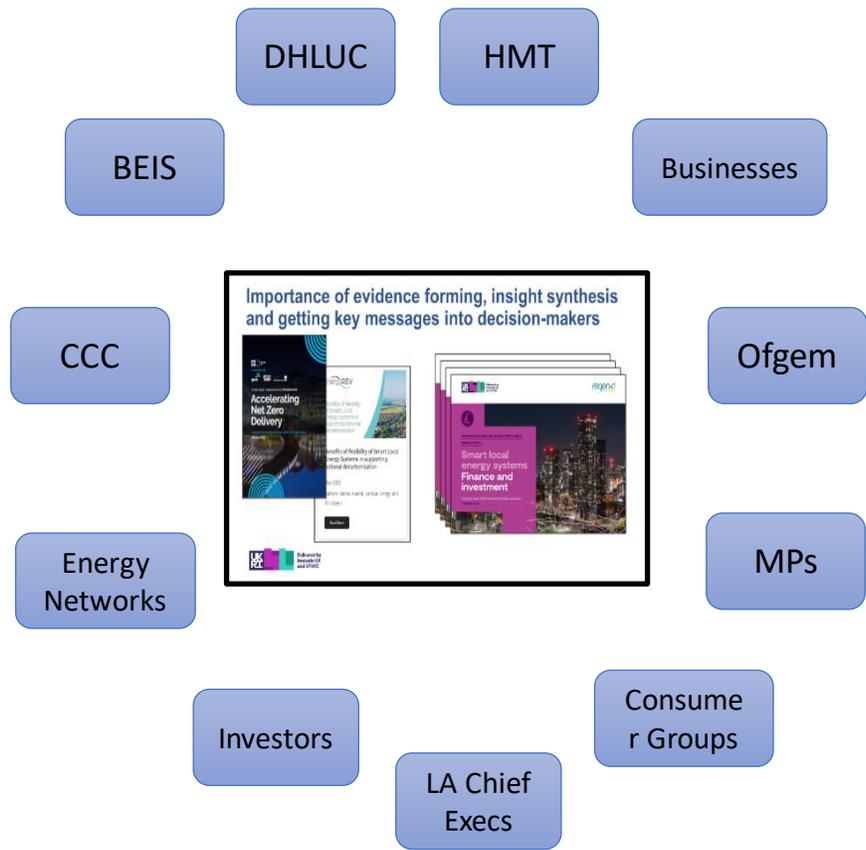
# What next?

## Consolidate, Communicate & Continue...

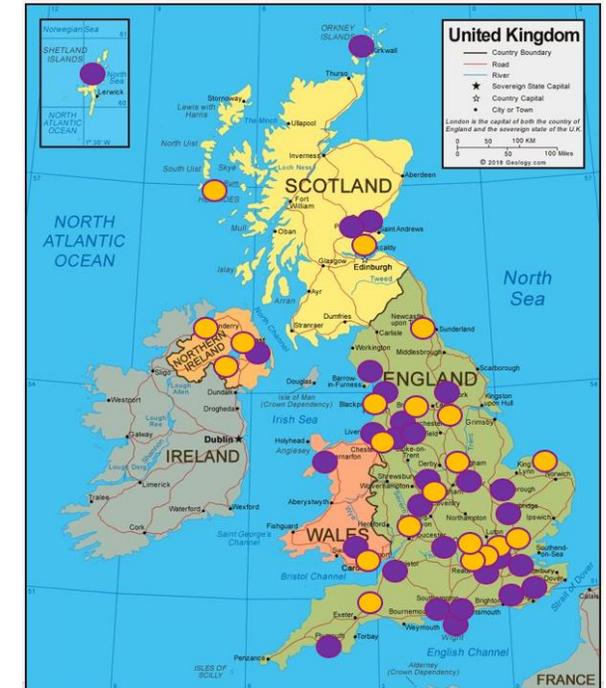


Our new website holds all the data, insight, reports from the programme.

[Enabling smart local energy systems - Innovate UK KTN \(ktn-uk.org\)](https://ktn-uk.org)



**Net Zero Living Programme**  
50-place cohort (23/24-25/26) helping overcome delivery barriers



Embrace Place-based approaches as part of our national strategy for net zero.

Continue to prioritise a centralised, supply-side approach and ignore place as a significant delivery vector.

How can all this help you deliver the best Net Zero possible?

# Energy-Smart Places: The key to a better Net Zero



# Further Information & Case Studies



Delivered by  
Innovate UK  
and EPSRC

# The Energy Revolution Cohort

## - multi-disciplinary working in practice

### 25+ local authorities and bodies...



### 30+ energy providers...



### 40+ other businesses and organisations



### 35+ energy services companies...



### 30+ data companies...



### 20+ universities...



# System innovation in the real world: Learning from running a programme like PFER...

## In-life Demonstration

- The only way to find out what really happens is to start doing....
- The only way to uncover unknown barriers (most of them) is real world proving

## Integrating Research & Innovation

- Misunderstood, difficult to coordinate, and high value!

## Evidence & Insight

- Innovation system needs much more focus here.
- Fund, learn and change vs fund and forget...

## Feedback Loops to Policy & Regulation

- Difficult to achieve but very much needed.

## Checks & Balances

- Stage-gating of big complex projects essential to stop or re-direct when needed
- Balance of flexibility vs governance

## Time...

- HMG funding cycles largely incompatible with needs of big complex innovation programmes.



# Success stories



- Project lead by SSE Networks, partnering with the Low Carbon Hub, Uni of Oxford, Oxford Brookes Uni, Oxfordshire County & Oxford City councils, Origami, Nuvve, EDF & Piclo.
- The project is developing & designing a range of distributed energy solutions & providing a range of flexibility services to the local distribution network to enable more efficient use of networks & shared value across a range of customer segments including social housing, homeowners, public & commercial buildings, EV owner & community energy assets (hydro, solar etc).
- The co-creation of DSO flexibility services alongside distributed energy business models is delivering increased network flexibility provision & better distribution of value across local energy actors.

- Project lead by the European Marine Energy Centre (EMEC) partnering with SMS PLC, Aquatera, Orkney Islands Council, Community Energy Scotland & Herriot Watt University.
- The project aims to fully utilise the vast renewable energy resources on the islands to enable an integrated energy system that can enable automated use of electricity at times of high generation & flexible use at other times.
- The project has successfully leased out 200 smart charging powered EVs, installed smart heating controls & is integrating with local renewable generators to reduce curtailment of wind generation at times of high winds when typically generation is stopped due to lack of network capacity to transport power.

- Project lead by Pivot Power (EDF group) partnering with Oxford City Council, Habitat Energy, Kensa, Invinity Energy Systems & University of Oxford.
- The project includes the UK's first transmission connected battery, an EV charging hub and a shared loop ground source heating system for social housing.
- The project's battery is a 50 MW hybrid Lithium-ion & vanadium flow battery which aims to optimise the battery chemistries & operational features to optimise the life of the battery whilst delivering a range of grid services to balance the electricity system.
- The battery is directly connected to Europe's most powerful EV charging hub, at a council Park & Ride. The heat pump system has already saved tenants over 50% on their heating costs & will continue to be optimised via time of use tariffs & smart controls.





**GREATER  
MANCHESTER  
LOCAL ENERGY  
MARKET**  
DOING THINGS DIFFERENTLY FOR THE ENVIRONMENT



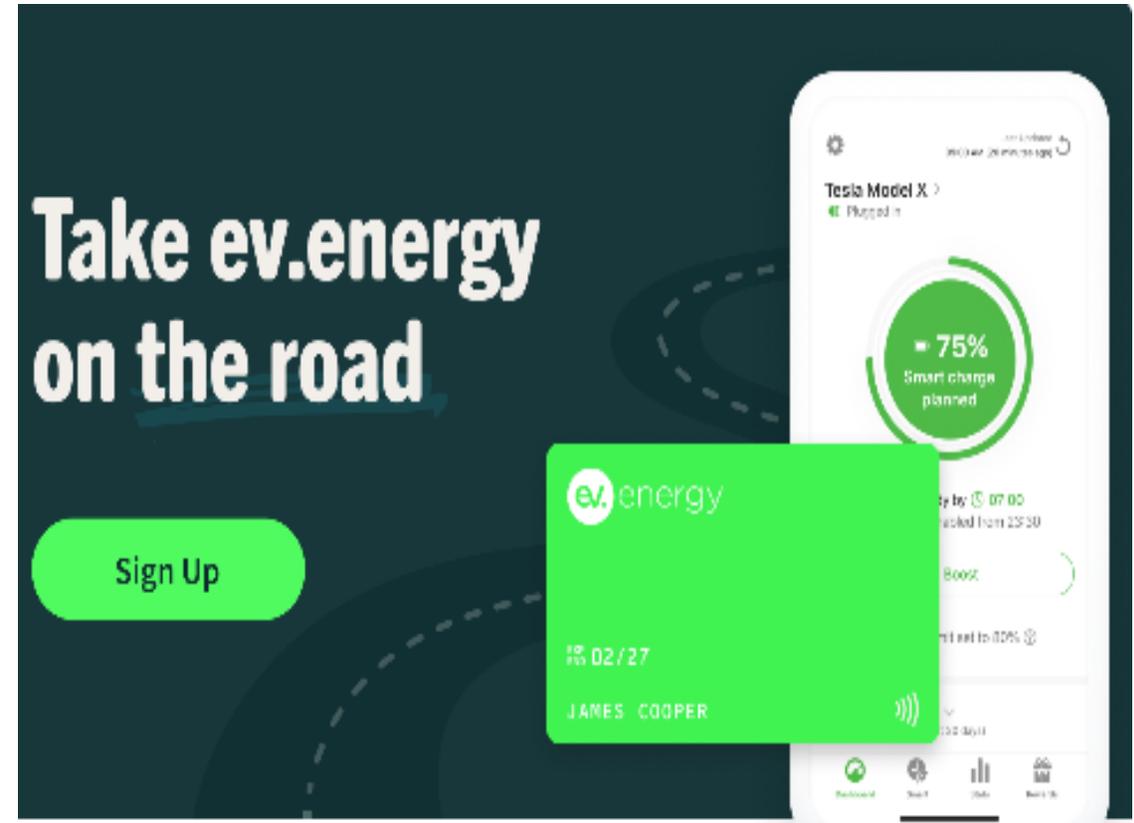
- GM LEM has developed Local Area Energy Plans for all 10 of the Combined Authority boroughs and adopted them as the basis for its future net zero strategy
- Onto that is layered a plan for a local energy market which will trade and optimize energy assets, flexibility provision and network capacity at a local level to reduce costs and provide the right services for GM residents.
- Its ‘market maker’ trading platform MVP puts local and low carbon at the centre of trading decision making.
- By 2038 it could deliver £40mn/year in value to the local energy system by using the existing network more efficiently and avoiding reinforcement costs;
- And stimulate £4.6bn of new low carbon investments locally
- GM LEM is a key part of GMCA’s wider decarbonisation plans with backing from Greater Manchester Mayor, Andy Burnham
- It is attracting international interest with joint delegation visits planned between Osaka, Japan and Greater Manchester following showcasing in European cities such as Brussels this summer.



Delivered by  
Innovate UK  
and EPSRC



- “Maximising Grid Services for Electric Vehicles” project.
- Consumer-focussed new service developed
- New smart charging to enable flexibility to be provided to the grid by aggregating across lots of consumers
- Consumer value through time-shifting to cheaper times on agile tariffs, and flex revenue sharing.
- EV Energy continues to be at the forefront of emerging DSO flexibility across the UK and is providing flexibility services into the demonstrator project LEO trials.

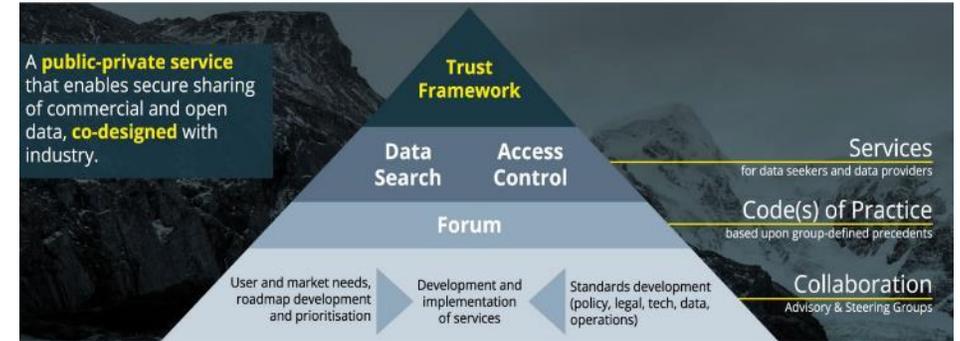


Delivered by  
Innovate UK  
and EPSRC



# “Open Energy”: Open Data Sharing

- Icebreaker One developed the Open Energy data sharing platform as part of the Modernising Energy Data Access (MEDA) competition.
- The project built on IB1’s experience from Open Banking to define the governance and standards needed to allow open sharing of datasets across the energy sector
- Open data systems are the foundation of a new digitalized energy system that will offer new and cheaper services for consumers, as identified by the Energy Data Taskforce
- The Energy Digitalisation Taskforce recommended the adoption of a “Data Sharing Fabric” in its recommendations. Icebreaker One continue to provide data sharing services to a range of partners & Ofgem & BEIS are considering options to improve data sharing for the sector.





Webinar

# NET ZERO GO Launch Event

Weds 23 March 2022  
10.30am - 12pm



Part of  
**CATAPULT**  
Energy Systems

- The 'Net Zero Go' toolkit for Local Authorities was developed as part of the Energy Systems Catapult's integration service (ERIS).
- Launched in March '22, it is a one-stop shop to help LA's get on the road to delivering net zero outcomes in their area.
- It contains help across the whole technical development process, case studies, templates for streamlined working, business-model guidance and leads users through the development journey
- It has had excellent engagement since launch, with most recent webinar attracting over delegates from over 300 LA's.
- BEIS have committed to funding its continued development this year, and see it as the central convening point for capability support to LA net zero programme development.



- >60 researchers from 22 Universities investigating the opportunities and challenges of smart local energy systems
- An interdisciplinary and whole-systems viewpoint.
- working together with PFER demonstrators, designs and the catapult to synth
- >60 researchers from 22 Universities investigating the opportunities and challenges of smart local energy systems
- An interdisciplinary and whole-systems viewpoint.
- working together with PFER demonstrators, designs and the catapult to synthesise insight into
  - > 60 papers
  - 8 Interactive Tools to support SLES
  - Local zero podcast - 49 episodes discussing how local action can help to tackle climate change. Over 35,000 downloads!

EnergyREV

Bristol's ICT subsystem:  
Case study on skills  
and training needs for  
transitioning to smart  
local enerav systems

EnergyREV

POLICY & REGULATORY LANDSCAPE REVIEW SERIES

Working Paper 3:  
Decarbonisation of heat:  
How smart local energy  
systems can contribute

EnergyREV

Beyond the pilots:  
Current local energy  
systems in the UK

Tim Brauhnoltz-Speight, Maria Sharmina,  
Dimitrios Pappas, Janette Webb,  
Matthew Hannon, and  
Fabián Fuentes González

May 2022

### Research themes

 <p><b>Infrastructure</b> Adapting advances in AI, data analytics and controls to enhance smart local energy systems.</p>	 <p><b>Business</b> Understanding the current local energy business sector to accelerate innovation.</p>	 <p><b>Institutions</b> Assessing policy, regulation and markets to enable local energy sector change.</p>
 <p><b>Users</b> Revealing how user preferences and practices evolve over time in relation to local energy systems.</p>	 <p><b>Developing a whole systems understanding</b> Capturing and synthesising knowledge from all aspects of the value chain and sharing and utilising learnings.</p>	 <p><b>Supporting Scale-up</b> Understanding potential constraints that can prevent scale up of local energy systems and identifying solutions to overcome them.</p>



Delivered by  
Innovate UK  
and EPSRC