Department for Energy Security & Net Zero

Smart Energy Innovation Showcase 2023

Tuesday 26 September

Millennium Point, Birmingham

Supergen Energy Storage

UKRI Engineering and Physical Sciences Research Council

Department for Energy Security & Net Zero

Time	Session	Location
0900-0945	**Registration, Tea & Coffee**	**Atrium & Platform**
1000-1030	**Opening Remarks** Dr Deren Olgun - Department for Energy Security & Net Zero Prof. Seamus Garvey – University of Nottingham	**Auditorium**
1030-1045	**Programme Spotlight** Smart Energy Innovation Team – Department for Energy Security & Net Zero	**Auditorium**
1045-1145	**Networking & Exhibitor Stands / Tea & Coffee**	**Atrium & Platform**
1145-1215	**Drop-in session 1 - Policy** Kacie McColgan - Department for Energy Security & Net Zero Victoria Pelka - Ofgem	**Auditorium**
1215-1245	**Drop-in session 2 – Trade & Investment** Eva Myslikova – Department for Business & Trade Peter Clifton – The UK Infrastructure Bank	**Auditorium**
1245-1400	***Networking lunch***	**Platform & Atrium**
1400-1420	**Drop-in session 3 – V2X Innovation Programme** Dr Josey Wardle – Innovate UK (UKRI)	**Auditorium**
1420-1450	**Drop-in session 4 – Support for Innovation and Commercialisation** Rhiannon Turner – Carbon Trust Ellen Webb-Moore – Innovate UK (UKRI)	**Auditorium**
1450-1500	**Closing Remarks** – Smart Energy Innovation Team, Department for Energy Security & Net Zero	**Auditorium**
1500-1700	**Networking & Exhibitor Stands / Tea & Coffee**	**Atrium & Platform**

Supergen Energy Storage

UKRI Engineering and Physical Sciences Research Council

Department for Energy Security & Net Zero

Department for Energy Security & Net Zero

Opening Remarks

Dr Deren Olgun – Department for Energy Security & Net Zero

Prof. Seamus Garvey – University of Nottingham

1000-1030

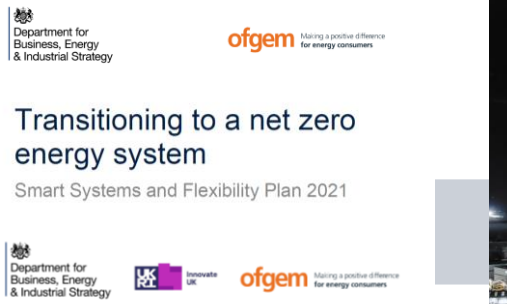
Smart Energy Innovation Showcase

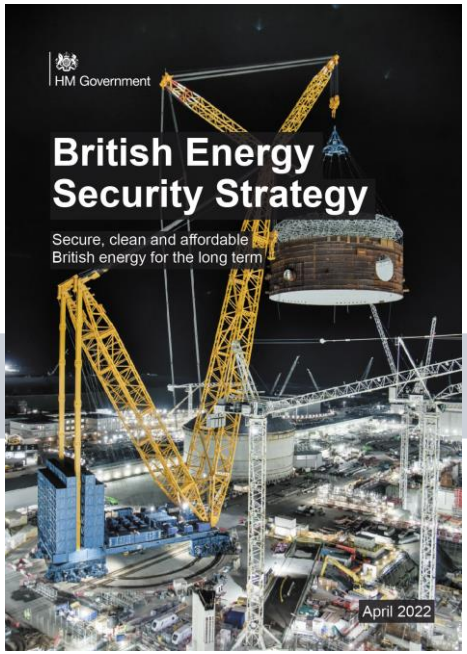
Dr. Deren Olgun

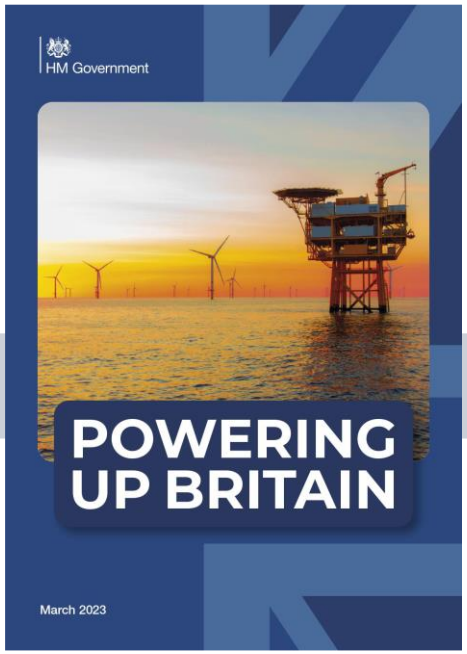
deren.olgun@energysecurity.gov.uk

Deputy Director, Energy Innovation Strategy & Portfolio, Department for Energy Security & Net Zero

The Government has set an ambitious roadmap for achieving net zero by 2050







Department for Energy Security & Net Zero

To achieve net zero we will need a smart and flexible energy system

More variable generation

Increase in electricity demand (doubling by 2050)

Maintaining the balance of electricity supply and demand.

Responding to these challenges will require a smart, flexible energy system

What is a Smart, and Flexible Energy System?

Smart means the ability of a device to respond in real time to communication signals, using digital technologies, to deliver a service.

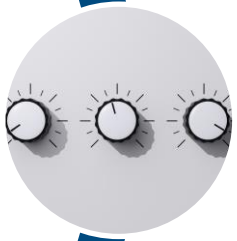
Flexibility is the ability to shift in time or location the consumption or generation of energy.

A smart and flexible system is one which uses smart technologies to provide flexibility to the system, to balance supply and demand and manage constraints on the network.

Transitioning to a smarter and more flexible energy system is an opportunity for UK businesses and consumers

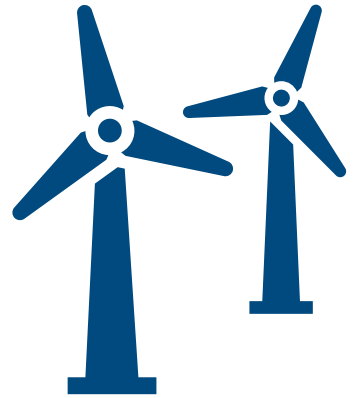
The transition to a smarter, more flexible energy system will…

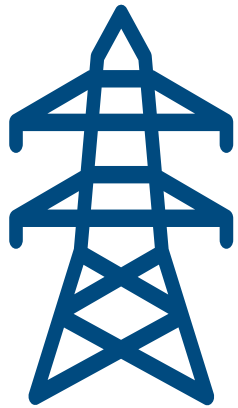
Save up to **£10bn per year** by 2050; system cost reduction of **£30-70bn** from 2020-2050.



Increase consumer control and energy security.

Support up to **24,000** jobs.





Department for Energy Security & Net Zero

The Smart Systems and Flexibility Plan set out four key areas of focus for achieving a smart and flexible energy system.

Facilitating flexibility from consumers

Facilitating consumers to change their consumption patterns to match times of cheap and abundant low carbon electricity

Removing barriers to flexibility on the grid

Identification and removal of specific barriers to smart technologies, including long-duration storage on a grid and domestic storage.

Reforming markets to reward flexibility

Improving market design and coordination so that flexibility providers can secure revenues across multiple markets and flexibility is fairly rewarded.

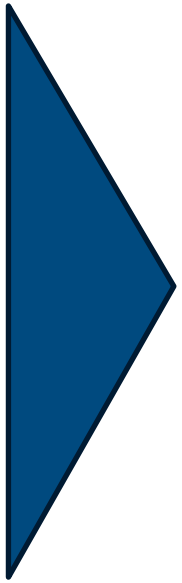
Digitalising the system

Digitalisation of data across energy sector to provide leadership and coordination, incentivise change, and develop innovative system-wide digital solutions.

We are supporting two innovation programmes to help deliver on these areas of focus

£69m Longer Duration Energy Storage Programme

£65m Flexibility Innovation Programme



Facilitating flexibility from consumers

Removing barriers to flexibility on the grid

Reforming markets to reward flexibility

Digitalising the system

Supergen Energy Storage Network+

Professor Seamus Garvey

Engineering and Physical Sciences Research Council

Supergen Energy Storage

Link to video

At a glance

- Led by Professor Yulong Ding, University of Birmingham
- **19 academics** across 12 UK institutions
- **34 partners** globally
- **£1.2m** total with **£1m** from EPSRC
- **£410k** of flexible funding
- **£100k** from the International Energy Storage Alliance for joint international projects
- **£2m** in-kind support from the 34 project partners
- A **48**-month project, started on **2nd September 2019**

Generation Technologies

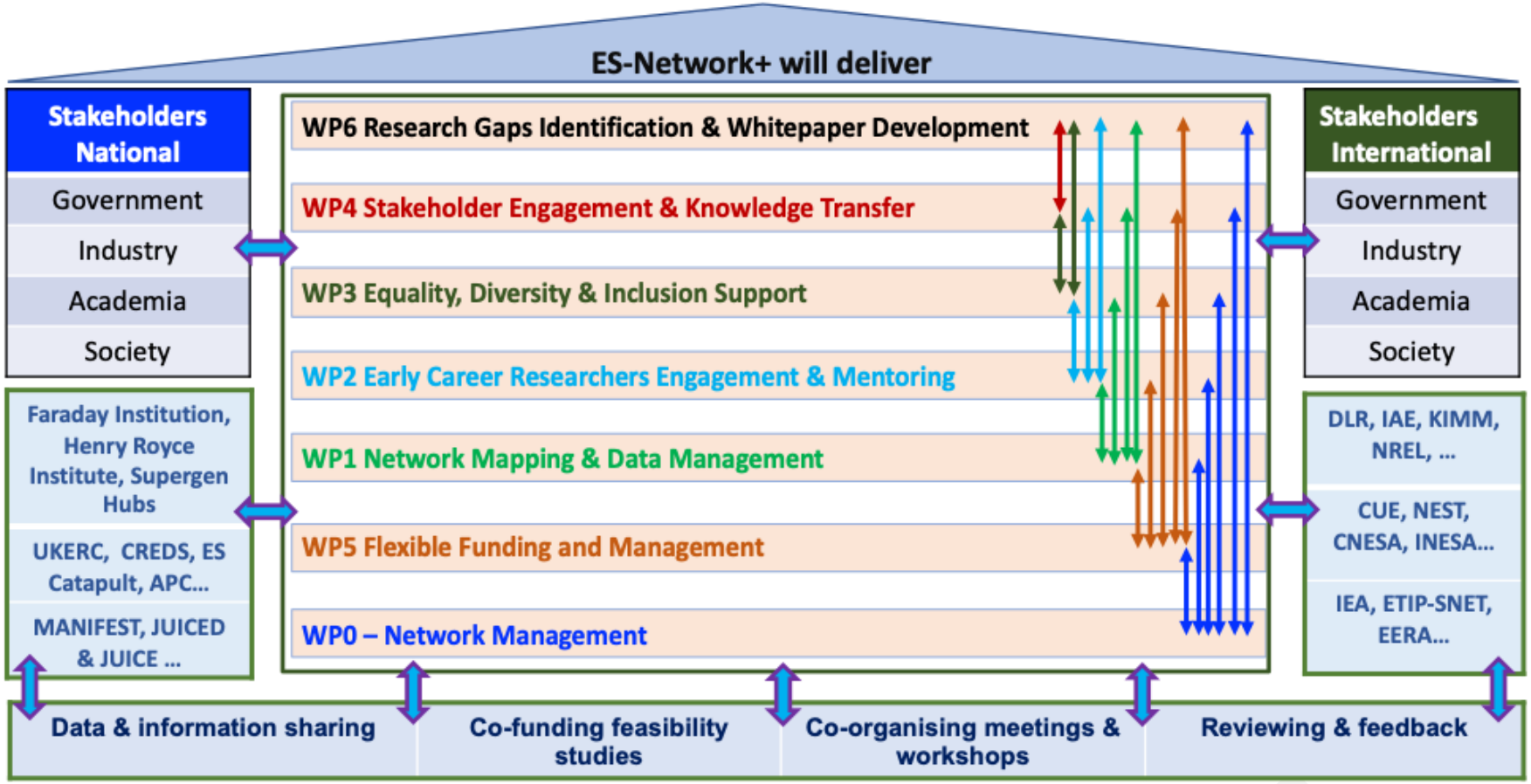
- Wind
- Solar
- Nuclear
- HydroPower
- Geothermal
- Biomass

Storage Technologies

- Batteries (flow/non-flow)
- Compressed Air
- Pumped Thermal
- Flywheels
- Supercapacitors
- Pumped Hydro

- A thriving, diverse & well-connected community for energy storage & related areas
- An authoritative & impactful energy storage document for all stakeholders
- Technology breakthrough ideas co-created through application-driven feasibility studies
- Comprehensive energy storage related data that is curated, accessible & sign-posted

Early Career Researchers Engaged, Connected & Mentored	Equality, Diversity & Inclusion Embedded Within ES-Network+	Research Gaps & Priority Identified for Further Research	Entire Energy Storage Community Mapped & Engaged



Community Binding

World Energy Storage Conference & 7th UK Energy Storage Conference

- 12th – 14th October 2022; 300+ participants.
- Organised by Supergen Energy Storage Network+ and the University of Birmingham, together with partners including the International Energy Storage Alliance (INESA).
- Provided an inclusive platform for all energy storage researchers and practitioners across academia, industry, government agencies and non-government organisations

Engagements with industries

Network size: our network has increased to 1800+ (doubled in size over the last year).

UK Energy Storage Roadmap: The UK Roadmap for Energy Storage Research and Innovation has been delivered.

Joint Flexible Funding Call with Henry Royce Institute.

Other collaborations – UKERC, Energy Systems Catapult.

International Activities – India, Vietnam, Canada, Singapore, Brazil, Germany, Spain, Italy, China, South Korea, …

Early Career Researchers (ECRs) & Equality, Diversity and Inclusion (EDI)

Established in 2019, the ECR Committee has been empowered to utilise the best use of SENS+ resources to help their community thrive and develop.

- Promoted networking, career development opportunities and advancing equality, diversity and inclusivity within the energy storage network and beyond.
- Organised seminars, webinars, workshops via Travel, Conference and Training Grants
- Undertook training activities (e. g. the Conversation and Masterclasses)
- Provided advice through mentoring and provision of letters of support for funding application

Numerous thought-leadership events arranged / co-sponsored.

Energy Storage Policy Masterclass

Tuesday 21st March 2023

https://www.era.ac.uk/event/energy-storage-policy-masterclass

Hydrogen Storage in Caverns 2023

Wednesday 29th March 2023

https://www.era.ac.uk/event/hydrogen-storage-in-caverns-2023

Policy and Markets for Offshore Energy Storage – Online

Thursday 13th July 2023 @ 2:30 pm - 5:30 pm

https://www.era.ac.uk/event/energy-storage-policy-masterclass

ERA Policy Commission

Commissioners

- Chair: Lord Bilimoria
- Deputy Chair: Martin Freer, ERA
- Nina Skorupska, REA
- Adam Berman, Energy UK
- Rachel Fletcher, Octopus Energy — Former BEIS CSA
- John Loughhead, CSA
- Andy Manning, Citizens Advice
- Helen Andrews-Tipper, Carbon Trust
- Benet Northcote, Four Thirty Two
- Phil Longhurst, Cranfield University
- Faye McAnulla, ERA
- Luke Murphy, Institute for Public Policy Reform

What is the role of a publicly owned generating company, e.g. GB Energy?

Timeline

- **Evidence gathering July-September**
- **Early conclusions shared at Labour Party Conference October**
- **Final report in Dec/Jan**

Moving forward

- Meeting electricity demand through wind & solar energy, supported by large-scale storage, can fulfil UK's electricity demand by 2050 – cost-effectively.
- LDES Challenge: very long duration storage (tens of TWhs) is vital due to varying wind supply. Hydrogen storage in salt caverns is a leading, cost-efficient option.
- Storage capacity & cost: Hydrogen storage (60-100 TWh), along with faster-acting medium-duration energy storage (MDES) can stabilise and balance the grid.
- Fall-back option for long duration storage: Ammonia (more expensive)
- Batteries will serve a vital role – but mainly in discharge durations of <1hour.

Energy Storage is Immensely Important to UK.

In Net-Zero UK:

Wind will provide 70-80% of primar gen$^{n.}$

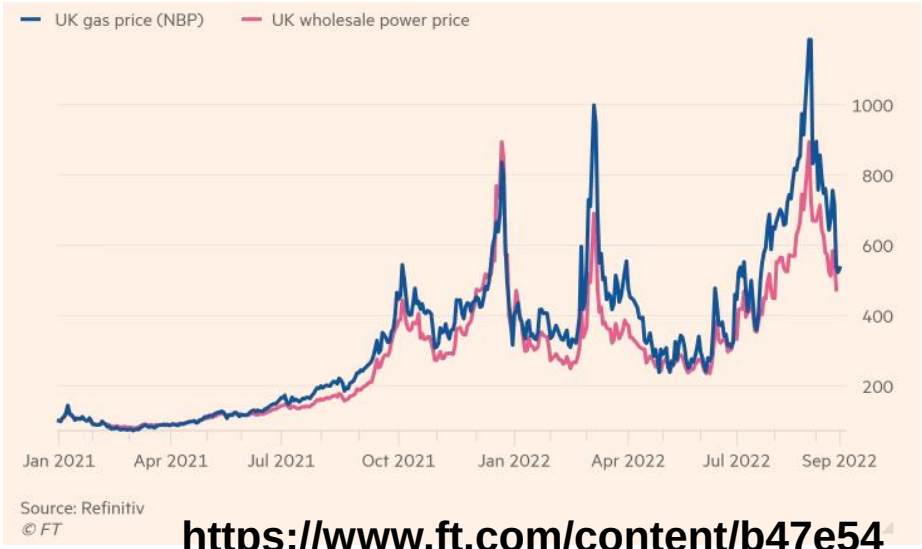
Solar power will provide 10-15% of gen$^{n.}$

~75% of demand direct from gen$^{n.}$

~125% “over-generation” required

~35% of system cost for “flexibility”

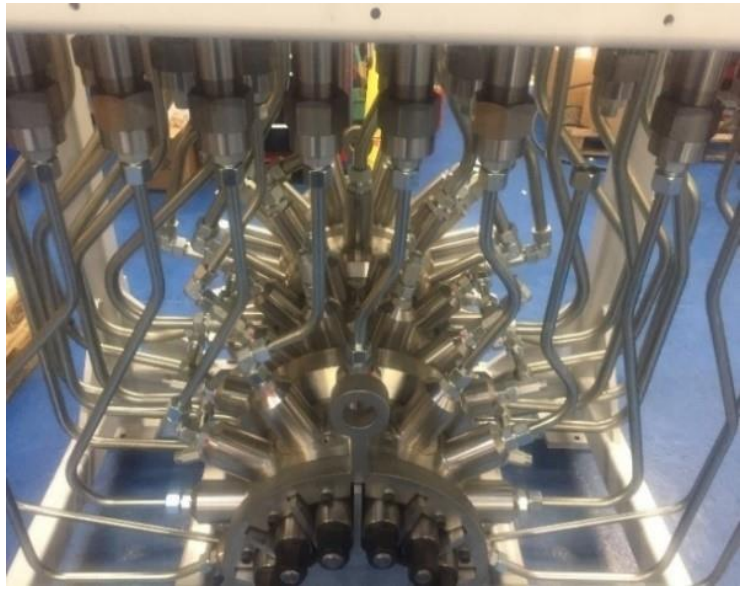
~66% of energy from storage will emerge from Medium-Duration Energy Storage

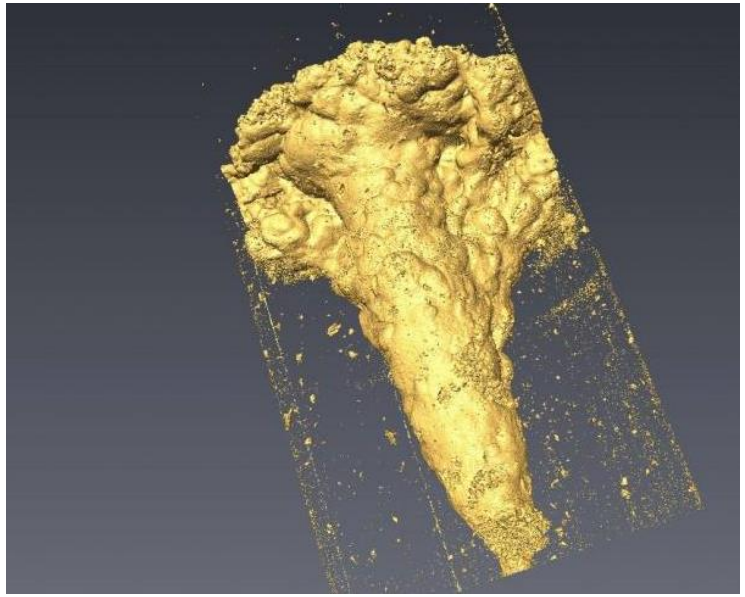


https://www.ft.com/content/b47e542c-de63-4f49-8ec6-9a459d28fe97

Examples might include

- Thermal storage in properties to enable flexible operation of heat-pumping to support grid balancing.
- Wind-Integrated Storage (store energy before generating electricity)
- Charging networks to include heating and cooling
- Thermochemical conversion and storage based decarbonisation
- Actively-controlled solution mining for optimally-shaped salt caverns.





https://www.bgs.ac.uk/geology-projects/energy-storage/

Stay in touch!

Keep up to date with news and events by joining our mailing list.

@ukenergystorage

www.supergenstorage.org

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UNIVERSITY OF BIRMINGHAM

Engineering and Physical Sciences Research Council

Supergen Energy Storage

Department for Energy Security & Net Zero

Programme Spotlight

Smart Energy Innovation Team –
Department for Energy Security & Net Zero

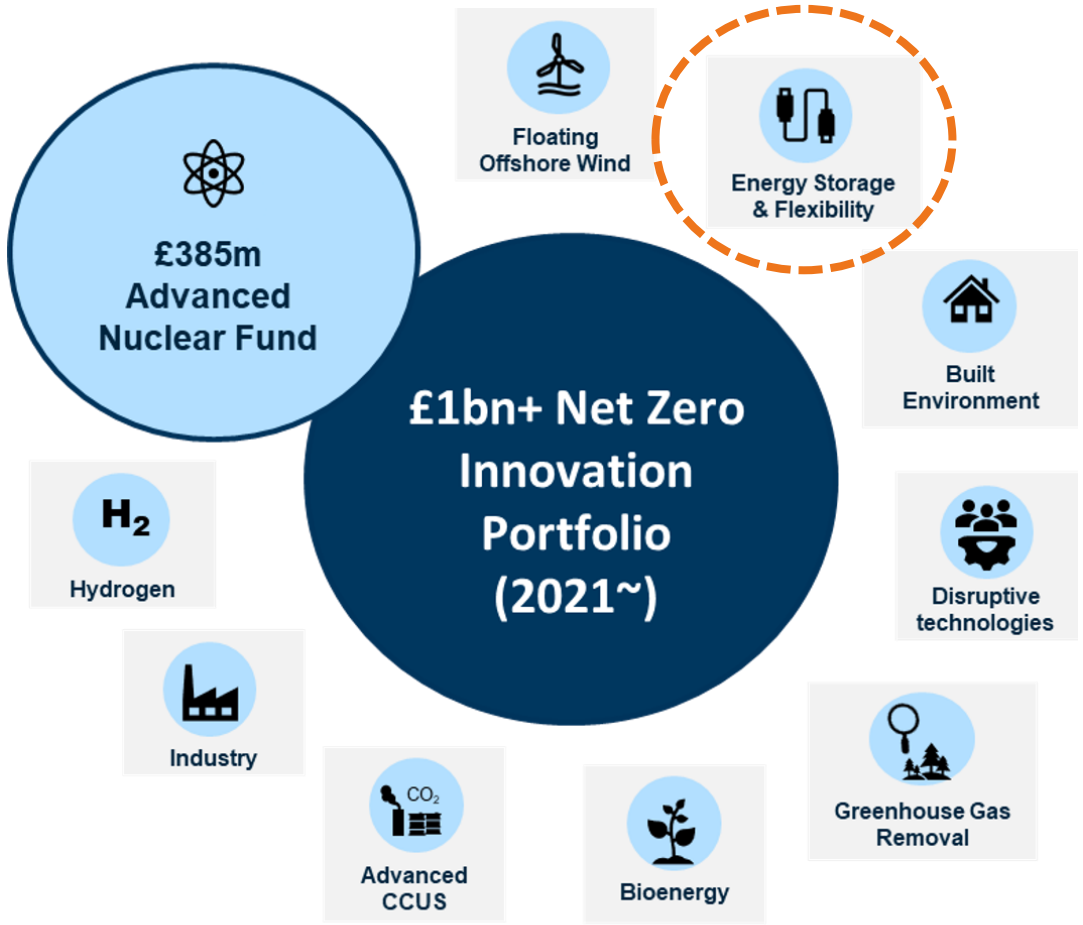
1030-1045

Net Zero Innovation Portfolio
Energy Storage & Flexibility Innovation

Bart De Leeuw
Head of Energy Storage and Flexibility Innovation, Department for Energy Security & Net Zero

Department for Energy Security & Net Zero

NET ZERO INNOVATION PORTFOLIO

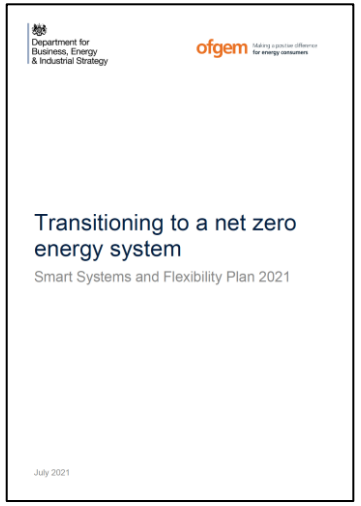


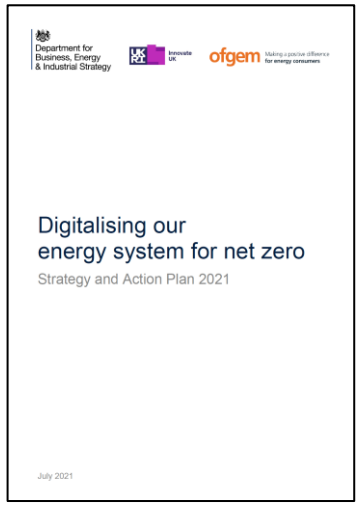
www.gov.uk/government/collections/net-zero-innovation-portfolio

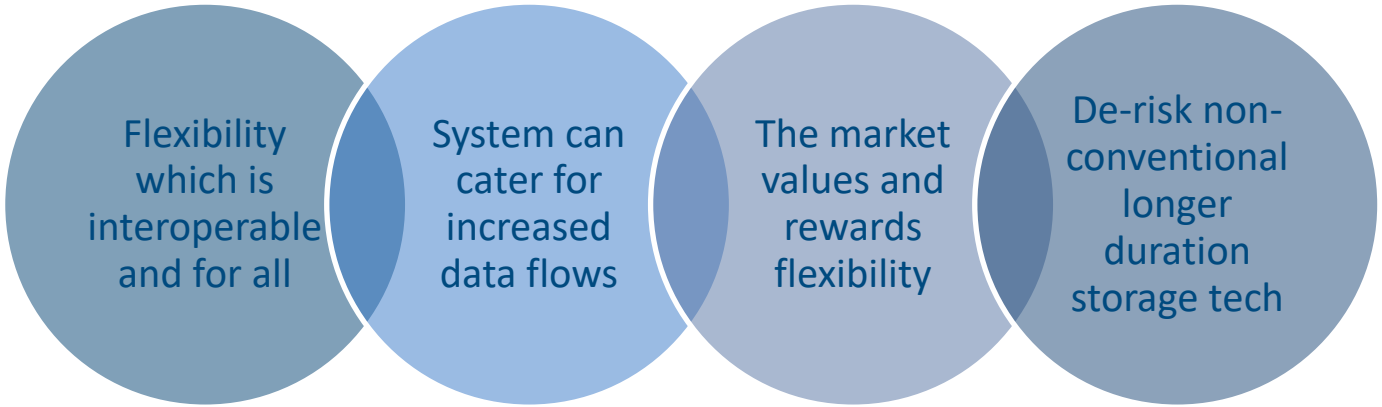
Department for Energy Security & Net Zero

Enabling through innovation

- Up to £134m through £1bn+ Net Zero Innovation Portfolio (NZIP):
  - Longer Duration Energy Storage Programme
  - Flexibility Innovation Programme
- Supports the 2021 **Smart Systems and Flexibility Plan** & **Energy Digitalisation Strategy**







Energy Storage & Flexibility Innovation programmes

Flexibility Innovation Programme (up to £65m)

Seeks to enable widespread electricity system flexibility through smart, flexible, secure, and accessible technologies and markets

Integrating systems for Flexibility

- Interoperable Demand Side Response Programme (>£12.8m)
- V2X Innovation Programme (up to £12.6m)
- Inclusive Smart Solutions Programme (up to £2.75m)

Data and Digitalisation

- Automatic Asset Registration (up to £2m)
- Energy System Digital Spine feasibility study (up to £204K)
- Smart Meter System based IoT Applications (Up to £1.8m)
- Smart Meter Energy Data Repository (Up to £1m)
- Non-Domestic Smarter Tariff Comparisons (up to £800K)

Markets for Flexibility

- Alternative Energy Markets (up to £18m)
- Flexibility Markets Unlocked (up to £2.6m)

Longer Duration Energy Storage Programme (>£69m)

Aims to accelerate commercialisation of innovative longer duration energy storage projects

Stream 1

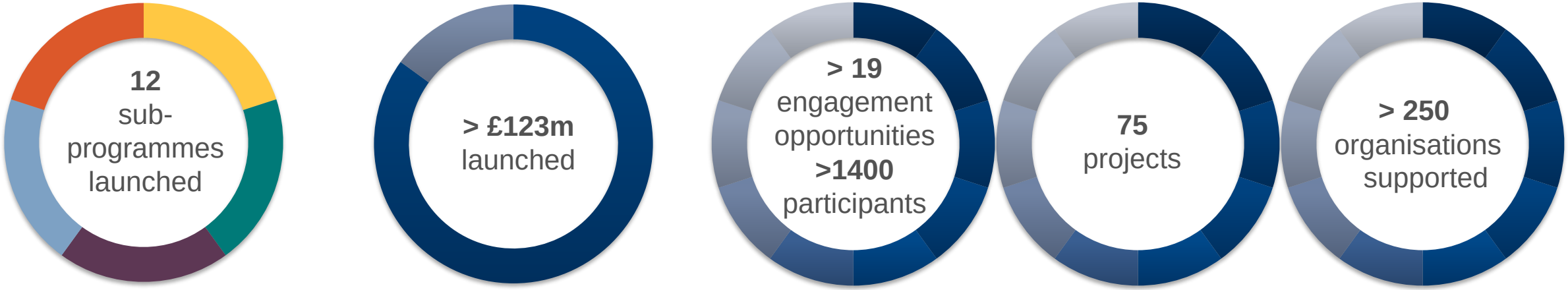
- Focuses on progressing projects to TRL 9
- Focuses on actual demonstrations in operational environments
- Storage types: Electricity, thermal and Power to X
- ~£15m grant funding

Stream 2

- Focusses on progressing projects to TRL 6
- Focuses on System prototypes in relevant or operational environments
- Storage types: Electricity, thermal and Power to X
- ~£54m SBRI contracts

Cross programme engagement **Knowledge sharing** **International leadership** **Evaluation**

Innovation programmes progress

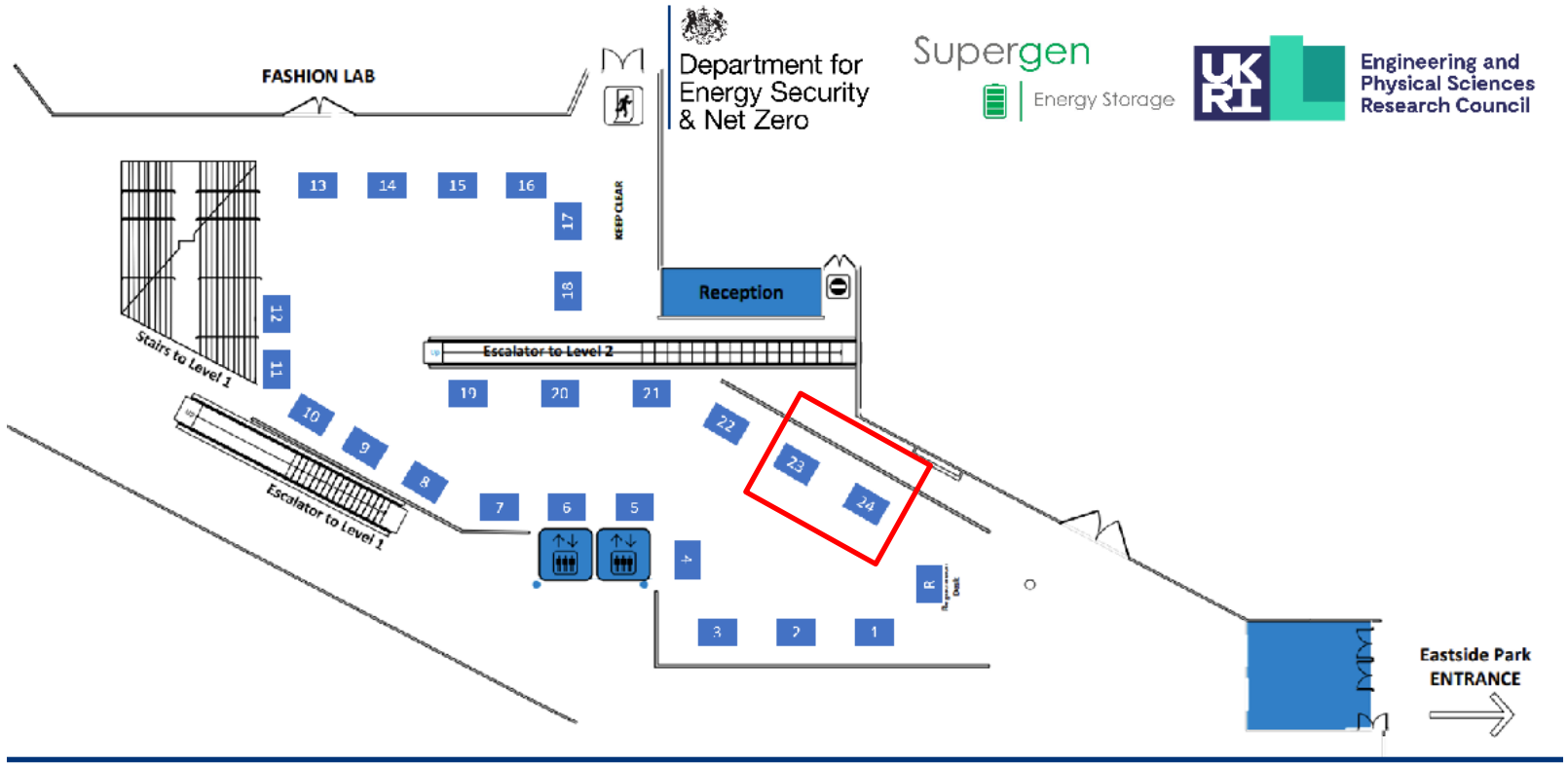


Keep informed:

- Flexibility Innovation Programme: www.gov.uk/government/publications/flexibility-innovation
- LODES Programme: www.gov.uk/government/publications/longer-duration-energy-storage-demonstration
- Net Zero Innovation Portfolio: www.gov.uk/government/collections/net-zero-innovation-portfolio

Floorplan

Come and find us at tables **23** and **24**.



1 Supergen Energy Storage Network+
2 Birmingham Centre for Energy Storage (BCES)
3 StorTera
4 Innovate UK (UKRI)
5 V2X Innovation Programme (UKRI)
6 UK Infrastructure Bank
7 Landis+Gyr
8 Invinity Energy Systems
9 Sunamp
10 RheEnergise
11 Advanced Infrastructure
12 University of Sheffield
13 Department for Business & Trade
14 Green Energy Options
15 Energy Systems Catapult
16 Arup
17 Cheesecake Energy Ltd.
18 Voltalis
19 EDF/UKAEA - HyDUS
20 Resillion
21 Engage Consulting
22 Centrica
23 Department for Energy Security & Net Zero
24 Department for Energy Security & Net Zero - NZIP 2.0
R Registration Desk

Department for Energy Security & Net Zero

Networking, exhibitor stands and refreshments

1045-1145

Tea and coffee in the platform area

Department for Energy Security & Net Zero

Drop-in Session: Policy

Kacie McColgan – Department for Energy Security & Net Zero

Victoria Pelka – Ofgem

1145-1215

Update on the Smart Systems and Flexibility Plan

Smart Energy Innovation Showcase
26 September 2023

Kacie McColgan
Electricity Storage Senior Policy Advisor– Smart Energy
Department for Energy Security and Net Zero

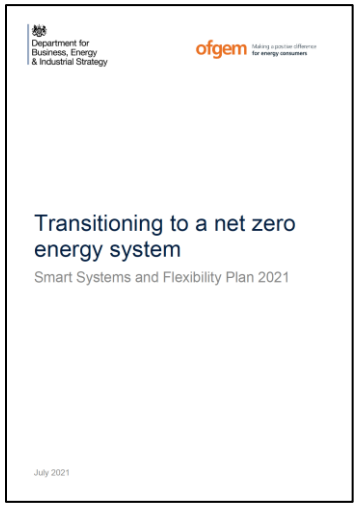
The transition to a smarter more flexible system

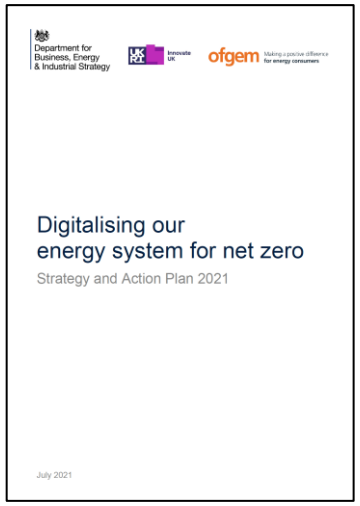
2021
Smart Systems and Flexibility Plan
Energy Digitalisation Strategy

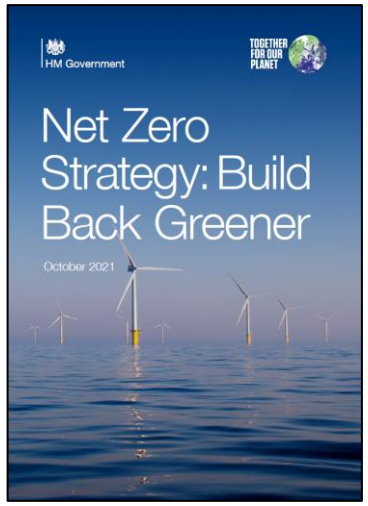
2021
Net Zero Strategy

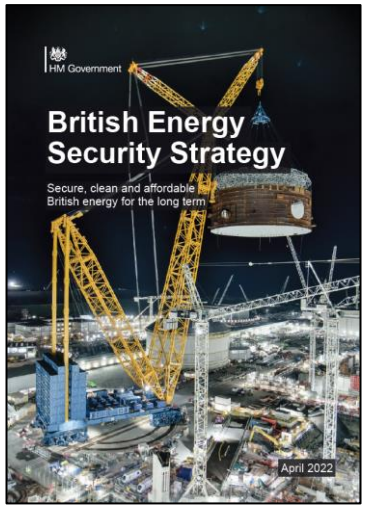
2022
British Energy Security Strategy

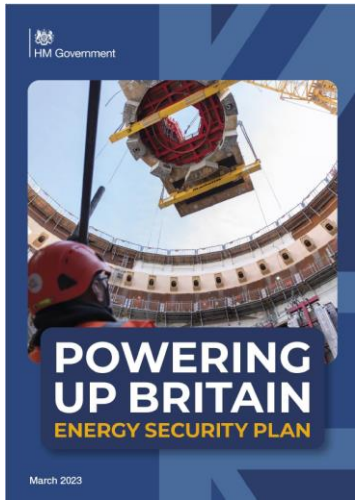
2023
Powering Up Britain: Energy Security Plan











Department for Energy Security & Net Zero

What is a smart, flexible energy system?

We need much more **flexibility** in our electricity system. The ability to shift energy in time or location to balance supply and demand is essential for decarbonising power, buildings and transport.

To meet the UK's target to have net zero emissions by 2050, we will have to shift away from fossil fuels to use low carbon sources of energy. This means:

- **More intermittent or inflexible generation**, particularly from wind and solar

- **Increased electricity demand,** as we electrify transport and heat.

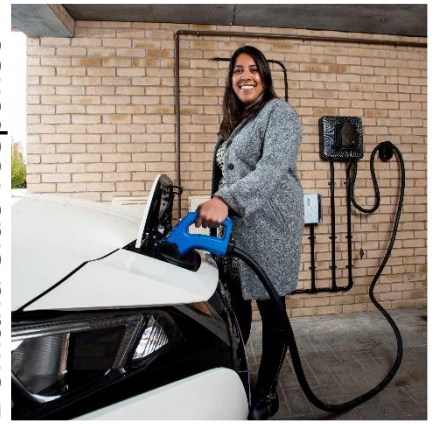
To overcome these challenges the system should match energy from the wind and sun to these new sources of demand and harness assets across the system, from large power stations to local-based solutions.

We need to use low carbon sources for flexibility. These low carbon sources will be used in a **smart** way – enabled by data and digitalisation.

It will be more affordable than a system with minimal flexibility, **giving consumers more control** over their bills, and more **security**. It will also create **jobs and exports** for the UK economy.

Electric batteries

Demand side response



Digitalisation

Since 2021, the government has:

Powering Up Britain publications confirmed the importance of flexibility.

Through the £1bn Net Zero Innovation Portfolio (NZIP), we have announced

- up to £65m **Flexibility Innovation Programme** to support innovative solutions to enable large-scale widespread electricity system flexibility, and
- up to £69m **Long Duration Energy Storage** competition to accelerate commercialisation of innovative longer duration energy storage technologies.

Introduced the **Energy Security Bill** including measures on the regulation of load control and energy smart appliances, defining electricity storage, and multi-purpose interconnectors.

Since 2021, the government has worked to:

Facilitate flexibility from consumers

- Worked with National Grid ESO on their **Demand Flexibility Service**, as an additional tool to manage our electricity system over winter.
- Published joint Government and Ofgem policy statement on how to maximise the contribution of electric vehicle flexibility while protecting the grid.
- Published the **Electric Vehicle Smart Charging Action Plan** with Ofgem to maximise flexibility from EVs.
- Consulted on a **technical and policy framework for energy smart appliances and demand side response services** and published the government response in March 2023.
- Launched the **Inclusive Smart Solutions** Innovation competition.

Remove barriers to flexibility on the grid for electricity storage

- Published Government response on **large scale long-duration electricity storage**.
- Announced **over £69m** to accelerate technology commercialisation of large scale long-duration energy storage through the LODES programme.
- Introduced a **business rates exemption** for eligible plant and machinery used in onsite renewable energy generation and storage from 2023 until 2035.
- Introduced a **VAT zero rate for battery storage** for the next 5 years when supplied as part of a qualifying material installation, e.g. alongside solar panels.

Reform markets to reward flexibility

- Launched **Capacity Market consultation** and published government response to strengthen GB's electricity security and align the CM with government's net zero targets.
- Published the **Review of Electricity Market Arrangements consultation** (REMA) in July 2022 and a summary of responses in March 2023 to identify reforms needed to transition to a decarbonised, cost effective and secure electricity system.
- Launched **innovation projects to support policy development**:
  - Alternative Energy Markets (AEM) programme to support innovative demand side flexibility propositions in a future system.
- Support the Open Networks Programme – April 2023 launched first set of primacy rules and carbon reporting methodology for local flex markets.

Digitalise the energy system

- Together with Ofgem and Innovate UK, we responded to the recommendations of the **Energy Digitalisation Taskforce** setting out our progress and next steps on delivering digitalisation within the energy sector.
- Launched **innovation projects to support policy development** including:
  - development of solutions to automatically register small scale assets,
  - launched a feasibility study to explore an energy system-wide data sharing mechanism (a 'digital spine').

Large-Scale, Long-Duration Electricity Storage (LLES)

- Large scale, long duration storage (LLES) is a key enabler to a secure, cost-effective and low carbon energy system. Pumped hydro storage is the most mature however other novel technologies, including hydrogen, gravitational storage, liquid air, and compressed air, may have greater cost-reduction potential.

- As seen on our **Call for Evidence responses**, there are **significant barriers preventing private investment** into LLES projects. These barriers to investment are further enhanced for the novel technologies as they have not yet been proven at scale.

- As first outlined in the **British Energy Security Strategy** and reiterated in the **Powering up Britain: Energy Security Plan**, *the Government will put in place an appropriate policy framework by 2024 to enable investment in large scale long duration electricity storage (LLES), with the goal of deploying sufficient storage capacity to balance the overall system*.

- We anticipate further consultation with stakeholders on appropriate policy approach to enable investment in LLES this autumn.

Next Steps

In the coming months we are planning a number of publications to note:

Upcoming consultations:

- Large-scale, long-duration electricity storage (LLES) Policy to Incentivise Investment - Autumn 2023
- Second REMA consultation on options - Autumn 2023
- Smart Secure Electricity Systems (SSES) on next steps of proposals

Net Zero Innovation Portfolio, Flexibility Innovation Programme recent and upcoming highlights:

- Inclusive Smart Solutions and Non-domestic tariff comparisons innovation programme winners announced
- Energy system digital spine feasibility study to be concluded
- Flex Markets Unlocked Phase 1 winners to be announced

ofgem Making a positive difference for energy consumers

Ofgem's Innovation Hub

How we support energy innovators

Victoria Pelka

26/09/2023

Ofgem's Innovation Hub

Our mission is to embed innovation across the energy sector and within regulation, and enable and stimulate innovation (in technologies, products, services, business models and methodologies) that benefit current and future consumers and deliver Net Zero at least cost.

We will achieve this by being strategic in our leadership, agile in how we regulate and through services we deliver to innovators.

Our services

- **Guides**
- **Feedback**
- **Sandbox**
- **Strategic Innovation Fund**
- **Insights**

Ofgem's Innovation Hub

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We will achieve this by being strategic in our leadership, agile in how we regulate and through services we deliver to innovators.

Our services

Guides	Feedback	Sandbox	Strategic Innovation Fund	Insights
Advice and guidance		Regulatory relief	Funding	Improving regulation

Ofgem's Innovation Hub

Our mission is to embed innovation across the energy sector and within regulation, and enable and stimulate innovation (in technologies, products, services, business models and methodologies) that benefit current and future consumers and deliver Net Zero at least cost.

We will achieve this by being strategic in our leadership, agile in how we regulate and through services we deliver to innovators.

Our services

- **Guides**
- **Feedback**
- **Sandbox**
- **Strategic Innovation Fund**
- **Insights**

Listen to Ellen Webb Moore in the afternoon to find out more

Our services in more detail

Fast Frank Feedback

Our most popular service:

supported ~500 innovators

with ~700 issues since 2016

- Helps innovators **understand the regulatory implications** of their propositions and navigate the sector.
- Open to any innovator, of any size, working on any aspect of the energy market, at any stage in their development.
- Innovator receives a **bilateral, legally disclaimed steer,** which are not Ofgem policy but our team's view.
- From **basic to highly specific, bespoke asks**. Often engagements are iterative.

FFF can:

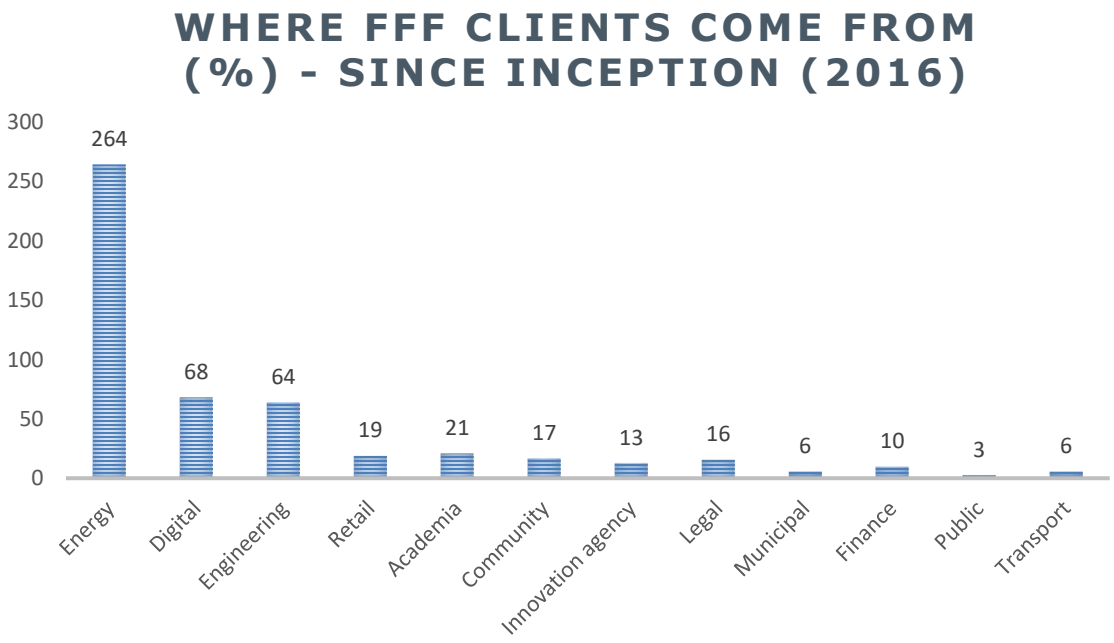
- ✓ Provide an informal steer on the regulatory implications for your proposition;
- ✓ Give assistance to organisations who operate, or intend to operate, in Great Britain;
- ✓ Identify regulatory barriers that may affect your business model;
- ✓ Represent your views when inputting into long term policy development.

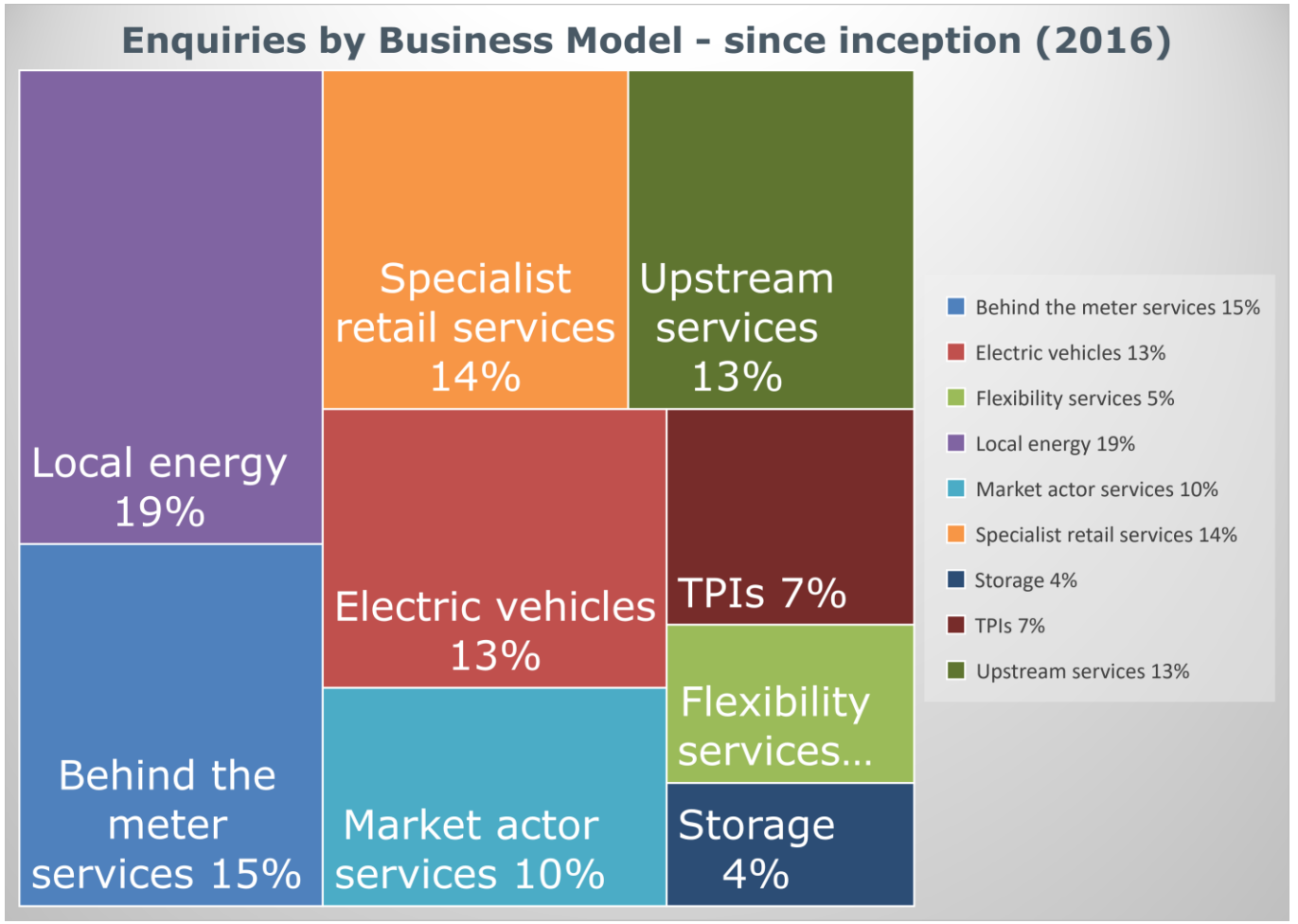
FFF cannot:

- Provide financial assistance;
- Act as a substitute for your own due diligence;
- Provide a public, commercial endorsement or certification that your product, service or business model is compliant with our regulation;
- Advise on eligibility for Government's environmental incentive schemes that are administered by Ofgem;
- Introduce businesses to a specific customer and / or business partner;
- Produce a steer as to the possible outcomes of ongoing policy changes and / or developments within industry.

Who asks for feedback?

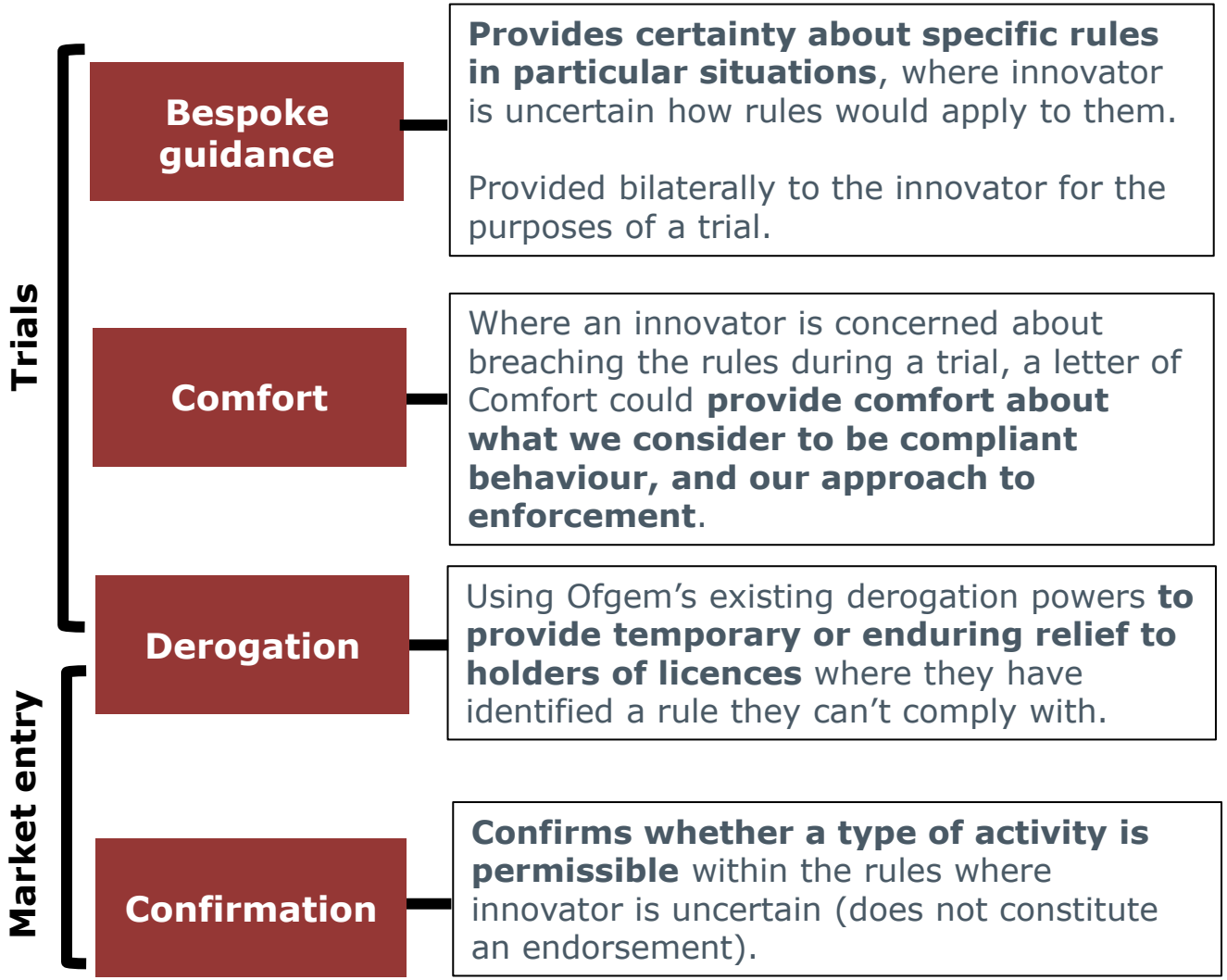
- Majority of innovators have an energy background but significant number come from other sectors
- Business models vary hugely; significant minority involve flexibility aspects





Regulatory Sandbox

- Allows innovators **to trial or bring to market new propositions without the rules applying in the usual way.**
- Can offer **relief from rules in licences and industry codes** (BSC, DCUSA, REC)
- Can only give a **tweaked version** of current regime.
- **Not all regulations are in scope** (Ofgem must be responsible for the rules in questions and have the power to offer requested relief).
- Provides **temporary or enduring** support.
- Insights can be used to **inform policy, <u>but</u>** not a means to change regulation.



Guides

- **Public, open-resource** service for innovators & their enablers.
- Provides **advice & guidance.**
- Broadcast topics are a **response to recurring themes** or issues we identify through FFF & Sandbox services.
- So far, published two guides
  - Selling Electricity to Consumers: What Are Your Options?
  - Taking charge: selling electricity to Electric Vehicle drivers
- **We're open to ideas and feedback** on what topics we should cover in future guides.

ofgem
Making a positive difference
for energy consumers

Guidance

Selling Electricity to Consumers: What Are Your Options?

Publication date:	27 February 2020	**Contact:**	Jonathan Windeatt, Senior Manager
		Team:	Innovation Link
		Email:	Innovationlink@ofgem.gov.uk

Ofgem's Innovation Link team frequently speak to people who want to enter the retail electricity market with non-traditional business models to sell electricity to customers. This guide, replacing guidance initially issued in 2017, provides an overview of the main options available for selling electricity and the key regulatory issues which they need to consider.

Normally, supplying electricity requires a licence and to do so without one is illegal. However, in certain circumstances, which we cover in this guide, you may not need a supply licence. The guide explains key aspects of electricity supply and licensing rules and where to find more information.

Innovators we've supported

Solo Energy/ Solopower

- Solo Energy has the goal of making renewable energy accessible and affordable to all

.

- Became interested in the Virtual Power Plant (VPP) concept and needed guidance on how their VPP concept could work within the existent regulatory environment.

- Commenting on the support from the Link, Solo Energy said "We found engaging with Innovation Link **really useful** and we were pleasantly surprised with the **level of thought and consideration** given to our case".

SUPPORT PROVIDED:

Guidance on what's possible within current regulation; clarity to better demonstrate benefits of VPP model to their clients; how to overcome specific barriers

Emergent

- Emergent works with registered social landlords to develop microgrids in multiple occupancy buildings.
- They want to **ensure residents can exercise their switching rights**.
- Emergent is **trialling new methodologies for collecting and processing metered data for settlement purposes.**
- Collecting and processing data in this way is more accessible, cheaper and accurate, thereby meaning these consumers should be more economically attractive to suppliers.

SUPPORT PROVIDED:

Temporary derogation from the BSC for relevant suppliers.

Derogation from the rules in DCUSA for relevant DNOs.

Relevant Ofgem policy work

Data & Digital

Providing leadership in the industry's transition to a **'digital by design'** energy sector.

Implementing regulatory reform that maximises the value and accessibility of **data**.

Flexibility markets

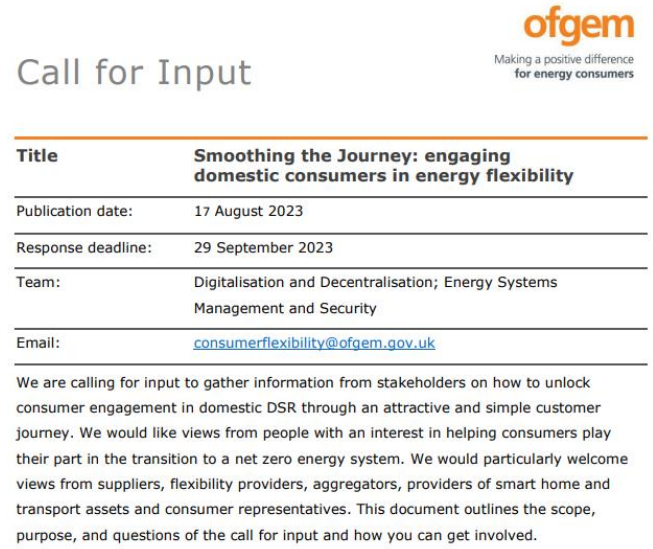
Setting out our vision for the role of flexibility markets - and the infrastructure needed to coalesce them.

Currently considering responses to our spring Call for Input on options for a **common digital energy infrastructure** to facilitate increased flexibility market liquidity

Domestic-level flexibility

Promoting domestic-scale flexibility and considering the additional regulation needed to address the risks it generates.

Consultation closes 29th September



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Call for Input

Title	Smoothing the Journey: engaging domestic consumers in energy flexibility
Publication date:	17 August 2023
Response deadline:	29 September 2023
Team:	Digitalisation and Decentralisation; Energy Systems Management and Security
Email:	consumerflexibility@ofgem.gov.uk

We are calling for input to gather information from stakeholders on how to unlock consumer engagement in domestic DSR through an attractive and simple customer journey. We would like views from people with an interest in helping consumers play their part in the transition to a net zero energy system. We would particularly welcome views from suppliers, flexibility providers, aggregators, providers of smart home and transport assets and consumer representatives. This document outlines the scope, purpose, and questions of the call for input and how you can get involved.

ofgem Making a positive difference for energy consumers

Ofgem is the Office of Gas and Electricity Markets. We are a non-ministerial government department and an independent National Regulatory Authority, recognised by EU Directives. Our role is to protect consumers now and in the future by working to deliver a greener, fairer energy system.

We do this by:

- **working with Government, industry and consumer groups to deliver a net zero economy at the lowest cost to consumers.**
- **stamping out sharp and bad practice, ensuring fair treatment for all consumers, especially the vulnerable.**
- **enabling competition and innovation, which drives down prices and results in new products and services for consumers.**

www.ofgem.gov.uk

Department for Energy Security & Net Zero

Drop-in Session: Trade & Investment

Eva Myslikova – Department for Business & Trade

Peter Clifton – The UK Infrastructure Bank

1215-1245

Department for Business & Trade

Department for Business and Trade

Eva Myslikova

Electrical Networks, Energy Storage and EV Charging Infrastructure team

Department for Business & Trade

Our Role

We act as a single point of contact for potential and existing exporters from the UK, providing impartial advice and support

Free and confidential assistance that is tailored to your business needs

Extensive market intelligence

Expert business support services

Our services are supported by teams in markets around the world

Department for Business & Trade

Supporting exports

Helping UK businesses expand into overseas markets

Through our network of overseas posts and UK-based trade advisers, DIT can provide support for UK companies wishing to expand into overseas markets, including:

- information on the main forms of overseas investment
- reasons why UK businesses may consider expanding into overseas markets
- information on overseas investment opportunities for your products or services

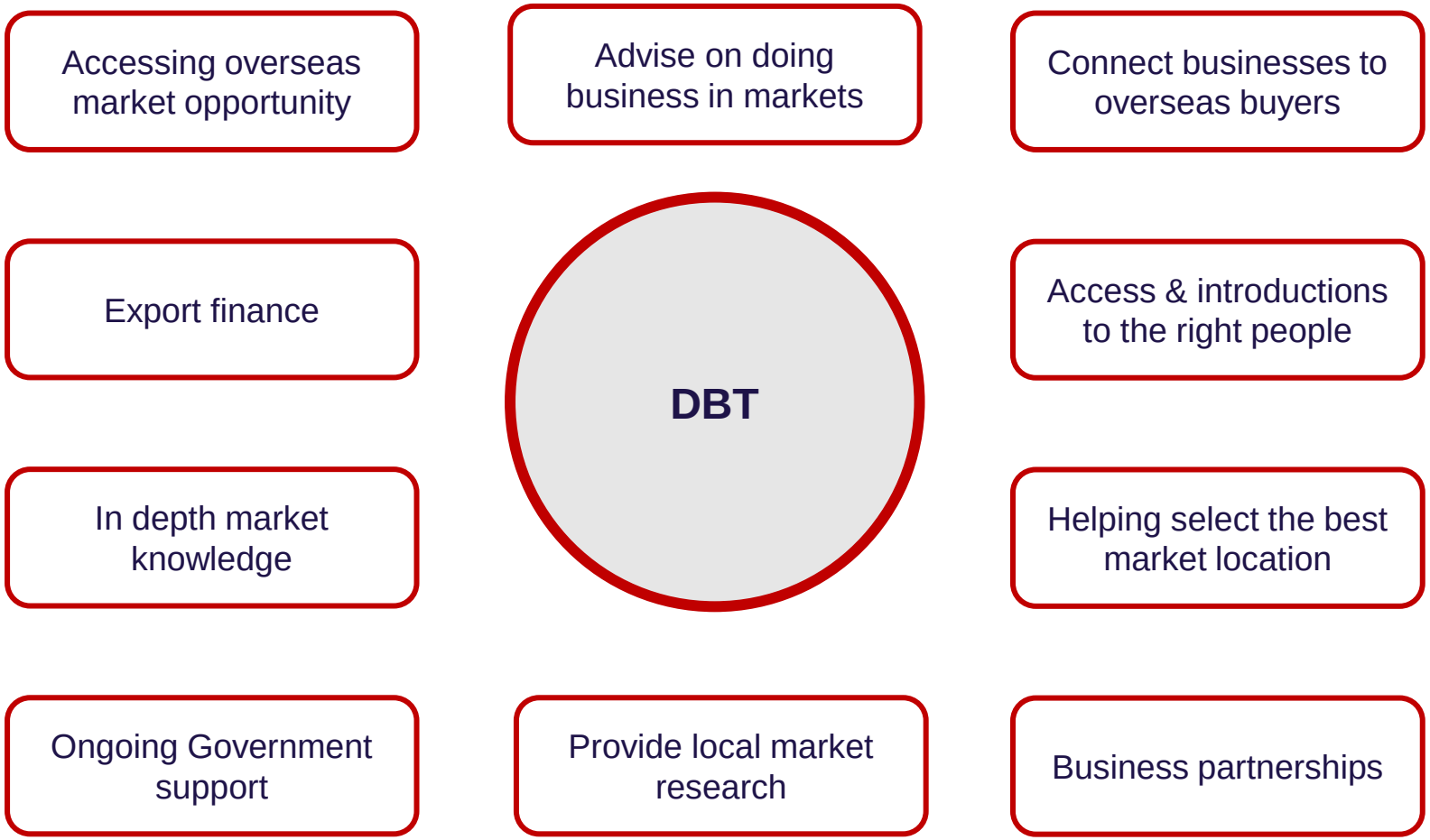
Connecting overseas buyers with UK businesses

Our find a supplier service allows international buyers to connect with UK businesses. UK buyers looking to be listed on this service can create a business profile.
We link international businesses with the right UK partners and suppliers through meet-the-buyer events, networking receptions, and product launches.

Department for Business & Trade

Our Service Portfolio

DBT provides a tailored service for companies in the electricity networks and storage sectors



Department for Business & Trade

DBT guidance, services and support

The Department for Business and Trade (DBT) provides guidance, services, and support to help UK businesses export.

The UK Government's export strategy, Made in the UK, Sold to the World, sets out how the government will support businesses to respond to export opportunities around the world.

Free export profile

- Businesses can create a free great.gov.uk trade profile to get promoted internationally. The trade profile will:
- let international buyers get in touch with their company's sales team
- showcase their company's outstanding projects and experience to give buyers insight into what you do
- give the company international credibility by displaying independent data from Companies House
- give companies looking to buy from your industry an easy way to find you.

Sell online overseas

- The Department for Business and Trade's Digital Exporting Programme gives you access to the Selling Online Overseas Tool, a free to use, online service that allows you to click, connect, prepare and sell on global e-marketplaces, such as Amazon, eBay and Rakuten, based on your product category and export market of choice. Through the tool, you can get free support and tailored advice from DBT's UK-based E-Commerce Advisers, while also gaining access to discounts, including waived commissions and special marketing packages.

Attend events

- DBT hosted events and networking opportunities can be found here.

Find export opportunities

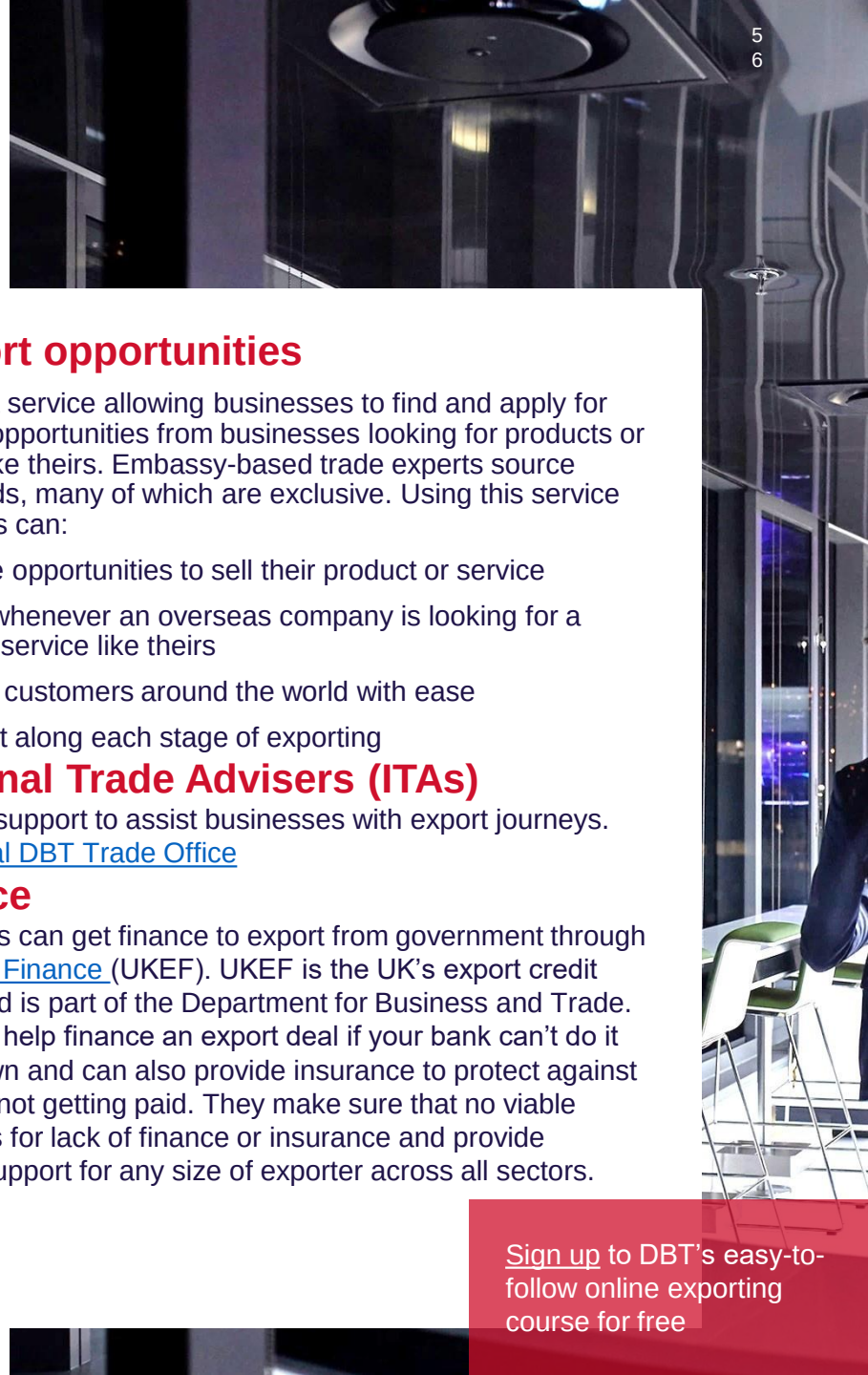
- DBT has a service allowing businesses to find and apply for overseas opportunities from businesses looking for products or services like theirs. Embassy-based trade experts source export leads, many of which are exclusive. Using this service businesses can:
- access live opportunities to sell their product or service
- get alerts whenever an overseas company is looking for a product or service like theirs
- reach new customers around the world with ease
- get support along each stage of exporting

International Trade Advisers (ITAs)

- Localised support to assist businesses with export journeys. Find a local DBT Trade Office

Get finance

- Businesses can get finance to export from government through UK Export Finance (UKEF). UKEF is the UK's export credit agency and is part of the Department for Business and Trade. UKEF can help finance an export deal if your bank can't do it on their own and can also provide insurance to protect against the risk of not getting paid. They make sure that no viable export fails for lack of finance or insurance and provide financial support for any size of exporter across all sectors.



Sign up to DBT's easy-to-follow online exporting course for free


EXPORTING
IS
GREAT
BRITAIN & NORTHERN IRELAND
Port of Felixstowe
Hutchison Ports UK
great.gov.uk

UK Infrastructure Bank

Accelerating net zero and driving regional and local economic growth

2023

Our mission is to partner with private sector and local government to increase infrastructure investment in pursuit of our two strategic objectives:

1. Tackling climate change – helping the government meet its net zero by 2050 goal

2. Supporting regional and local economic growth – providing opportunities for new jobs and higher levels of productivity

Four Investment Principles guide how we invest

1. Supporting the Bank's objectives to tackle **climate change** and/or drive **regional and local economic growth**

2. Investing in **infrastructure** assets or networks, or in new infrastructure technology

3. Delivering a **positive financial return**, in line with the Bank's financial framework

4. **Crowding in** significant private capital over time

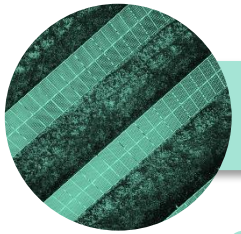
UKIB is wholly owned and backed by HM Treasury. We have **operational independence** in our investing activities and we see **partnerships as pivotal** to realising our ambitions

We are investing £22bn in equity, debt, and guarantees

£22bn financing capacity

£8bn equity & debt	Our reputation as a strategic investor crowds in capital from other investors. As an equity partner, UKIB brings leadership and insight into the UK's policy and regulatory environment
£10bn guarantees	We can provide an irrevocable and unconditional guarantee of scheduled principal and interest, backed by HMT
£4bn Local Authority loans Local Authority Advisory	We understand what Local Authorities need and how they operate, allowing us to provide bespoke financing and advisory services

We focus on six priority sectors



Clean Energy – including renewable power, hydrogen, CCUS and heating

Transport – including EV and hydrogen infrastructure, hydrogen vehicles and ports

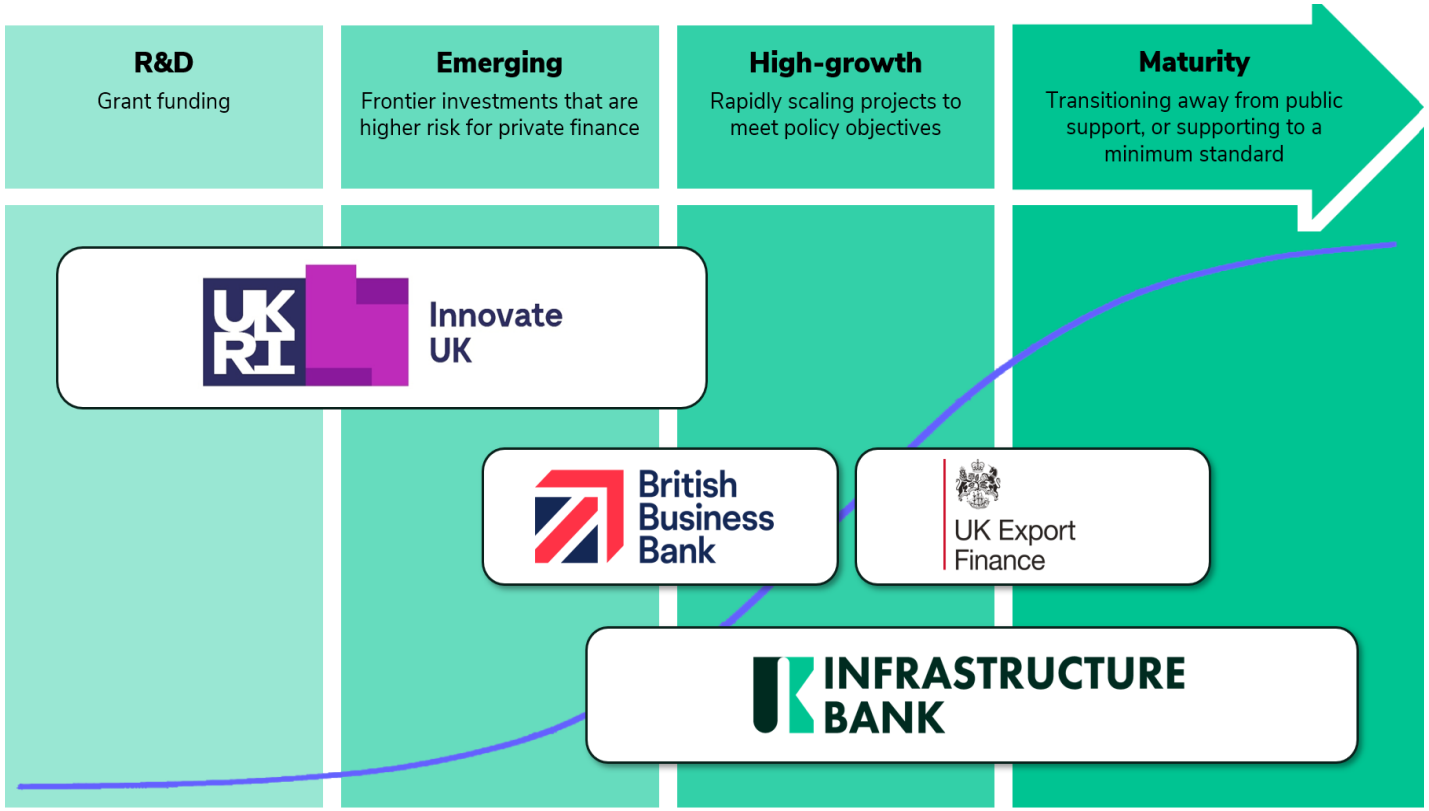
Waste – enhancing the UK's recycling infrastructure and decarbonising EfW

Water – adding to the UK's water security

Digital – significant investment in FTTP to date, and looking at 5G opportunities

Natural Capital – looking at nature-based solutions

We are unique in the public sector investment landscape



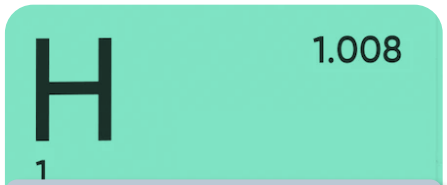
- ✓ Capex including for demonstrator sites
- ✓ Provide financing in environments of
  - Regulatory uncertainty
  - Technological uncertainty
  - Market uncertainty
- ✓ Crowd in other sources of capital
- ✓ Invest at all levels of the capital structure, from common equity to senior debt
- ✓ Fixed or floating rate

- × RCFs
- × Grants
- × Controlling equity stakes

We aim to invest in nascent sectors on the cusp of scaling up

- UKIB seeks to accelerate the development of nascent technologies and sectors by bringing down the cost of capital and providing confidence to commercial investors, with the flexibility to invest across the capital structure

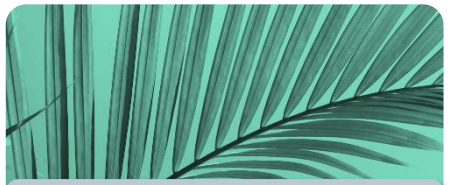

CCUS



Hydrogen


EV Charging


Heat Networks


Biofuels


Storage


Retrofit

INFRASTRUCTURE BANK

Meet The Team

Our Senior Leadership Team

Our Chief Executive and Chair are experienced industry leaders

John Flint, Chief Executive Officer

John is a banker with a wealth of experience in the industry. He is the former Group Chief Executive of HSBC, a company with which he spent 30 years, having first joined them in 1989 as a graduate trainee.

In that time, he worked across the business, serving in various senior leadership positions as Chief Executive Officer of Retail Banking & Wealth Management, Chief of Staff to the Group Chief Executive of HSBC, Chief Executive of Global Asset Management, Group Treasurer and Deputy Head of Global Markets.

Chris Grigg, Chair

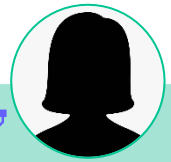
Chris has extensive experience in financial services and business, spending 20 years at Goldman Sachs, latterly as a Partner before becoming CEO of Barclays Commercial Bank. From 2009 to 2019 Chris was CEO of British Land the FTSE 100 property company. Most recently, Chris was a Senior Advisor to the Chancellor of the Exchequer. Chris has been a Non-Executive Director of BAE Systems, the global defence company since 2013 and is currently their SID.

Senior Banking & Investments Team

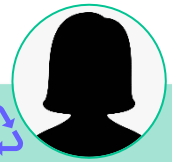
Ian Brown
Previously Head of Private Markets at LGPS Central and Global Head of Loan Financing at Lloyds Bank

Steve Lomas
Previously Head of Project and Structured Finance at the Infrastructure Projects Authority

Colin Hudson
Previously Head of Infrastructure Debt (EMEA) at Siemens Bank



Susannah Stock



Shelley De Souza

Peter Clifton

Anne De Forsanz

Axel Jaegle

Jeremy Barker

Adam Howard

Simon Little

Rob Minter

Rajesh Kedia

Emily Sidhu

Supported by 35+ banking professionals

Director Primary Coverage: Clean Energy; Digital; Transport; Water; Waste; Natural Capital

INFRASTRUCTURE BANK

Track Record

Deals so far….

INFRASTRUCTURE BANK

We have invested over £1.9bn, unlocking £9.6bn in private capital, and over 5,700 jobs.

Clean Energy

Cornish Lithium
July-23
£24m equity
Supporting creation of a domestic supply of lithium, for battery production for EV and storage

Port of Tyne
June-23
£50m loan
Enabling the regeneration of land to provide a base for green industries in the area

Gresham House
Specialist asset management
Mar-23
£75m equity
Matched-funded vehicle to invest alongside Centrica in storage technologies

NextEnergy
Aug-22
£250m equity
Matched-funded vehicle to invest in UK solar farms – targeting up to 2 GW

Octopus Investments
May-22
£100m equity
Matched-funded vehicle to invest in companies developing sustainable infrastructure

Oct-21
c.£107m loan
Construction of 450-metre quay and hinterland to service offshore wind sector

GRIDSERVE sustainable energy
July-23
£45m loan
Roll-out of critical EV charging infrastructure on motorways and services in the UK

pulse clean energy
May-23
£65.2m debt
Supporting the deployment of more than 1GW of battery energy storage system capacity

equitix
Mar-23
£125m equity
Matched-funded vehicle to invest in storage technologies

NeuConnect
Jul-22
£150m loan
Part of a £2.4bn international financing package for a 1.4GW GB-DE Interconnector

NextEnergy
Nov-21
c.£43m loan
115MW of subsidy-free solar farms in South Wales and Worcestershire

Digital

Infracapital
Aug-22
£100m equity
Investing alongside other LPs to accelerate fibre rollout across rural parts of the UK

fibrus
Mar-22
£50m loan
Rollout of high-capacity broadband to rural premises in Northern Ireland

netomnia
Mar-23
£75m loan
Rollout of full-fibre broadband targeting 1.5 million premises by 2025

CityFibre
Jun-22
£200m loan
Cornerstone lender, facilitating full-fibre rollout targeting 8 million premises

nexfibre
July-23
£250m loan
Rollout of full-fibre broadband targeting 5-7 million premises by 2026

Gigaclear
Dec-21
£100m loan
Rollout of high-capacity broadband to hard-to-reach UK premises

Transport

West Midlands Combined Authority
Mar-22
£10m loan
Decarbonising and increasing capacity along Birmingham's congested A45 corridor

Water

Portsmouth Water
Mar-23
£50m loan
Supporting UK water security via the UK's first reservoir since the 1980s

Nature

Highlands Rewilding
Mar-23
£12m loan
Supporting the acquisition of a 1300 ha estate in Argyll – to restore temperate rainforest

Case Study: Pulse Clean Energy's 1 GW Battery Storage Rollout Plan

Deal information

- Pulse Clean Energy (PCE) plans to invest over in the deployment of more than 1GW of battery energy storage system (BESS) capacity across 20 sites in England, Scotland and Wales over the next three years.
- The assets will save around 1.9 million tons of CO2 over their lifetime, with significant cost savings that could translate to lower consumer bills.
- These projects will create approx. 200 jobs in areas with low rates of income and employment.
- Includes the conversion of several existing diesel / HVO generation sites to sustainable BESS facilities.
- In addition, PCE will be constructing its first synchronous condenser project under phase three of National Grid's Pathfinder programme, to help ensure grid stability.
- Initial discussions with Financial Adviser, CIBC, identified limited appetite in the banking market.
- UKIB were able to shape the facility, including provision of a Term Loan tranche, enhanced controls and improved reporting.

Key Terms	
Borrower	Pulse Clean Energy Ltd
Sector	Clean Energy / Storage
Signing Date	18 May 2023
Purpose	Portfolio Construction Finance
Facility	Term Loan, RCF and Ancillaries
Tenor	3 yrs

Bank	RCF (£m)	Term Loan (£m)
UKIB		**62.5**
A	62.5	
B	30	
C	20	
Total	**112.5**	**62.5**

Case Study: Invest up to £300 million across investment funds

equitix

Mar-23
£125m equity

Matched-funded vehicle to invest in storage technologies

Gresham House
Specialist asset management

Mar-23
£75m equity

Matched-funded vehicle to invest alongside Centrica in storage technologies

octopus investments

May-22
£100m equity

Matched-funded vehicle to invest in companies developing sustainable infrastructure

Deal information

- The Bank has announced a commitment – subject to match finance from other sources – to invest in new storage equity funds established by Gresham House and Equitix, and the Octopus Sustainable Investment Fund (the remit for which also includes storage technologies).
- Gresham House's fund will focus on developing co-location opportunities. Centrica will be a cornerstone investor (£65m) and provide RTM services.
- The Equitix fund will support innovative business models across both short and long duration storage and include co-location and LDES (e.g. pumped hydro).

- Going forward, the Bank expects to directly invest in a range of storage projects in the coming years.
- First, intention to continue to fill debt financing gaps where required as the rate of deployment accelerates and scale of projects increases.
- The Bank is also offering funded mezzanine loan product to the sector, to provide credit enhancement with the aim of increasing the pool of capital willing to provide debt finance to projects.
- The Bank also aims to support development of markets for longer duration storage technologies to ensure first-of-a-kind projects reach financial close.

Case Study: NeuConnect

NeuConnect

Signed Jul-22

Kent

UKIB Finance - £150m

Clean Energy Sector

Senior Debt

Total Cost - £2.4bn

Summary

Financing the development of the first undersea energy link between the UK and Germany, due to come online in 2028, with a capacity of 1.4 GW.

ESRG and Impact Considerations

Interconnectors allow for an enhanced flexibility in our energy system and have been shown to have clear benefits for decarbonisation and energy security. Once completed it is estimated the project will create 250 new jobs.

Case Study: Cornish Lithium

Signed Aug-23

Cornwall

UKIB Finance - $30m

Transport Sector

Equity

Total Cost - $67m

Summary

Financing the development of the UK's first lithium mine. Initial funding will progress the project to a construction-ready state; once fully operational the facility aims to produce c.8,000 tonnes of battery-grade lithium hydroxide per year.

ESRG and Impact Considerations

Lithium is an essential component in battery and EV supply chains, two industries requiring scale-up to reach the UK's net zero target. The mine will create over 200 skilled jobs during the construction and operational stages of the mine, helping to support an area with below-average productivity.

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Department for Energy Security & Net Zero

Networking & Lunch

1245-1400

Lunch in the platform area

Next drop-in session on the V2X Innovation Programme at 1400 back in the auditorium

Department for Energy Security & Net Zero

Drop-in Session: V2X Innovation Programme

Dr Josey Wardle – Innovate UK (UKRI)

1400-1420

V2X Innovation Programme: Using EVs for energy flexibility

Smart Energy Innovation Showcase

26th September 2023

Innovate UK

Department for Energy Security & Net Zero

Dr. Josey Wardle

Innovation Lead – ZEV Infrastructure

Email: josey.wardle@iuk.ukri.org

Innovate UK

We are the UK’s innovation agency

A key delivery body of the UK Government’s Innovation Strategy

We support business-led innovation in all sectors, technologies and UK regions

Our Mission

To help UK businesses grow through the development and commercialisation of new products, processes, and services, supported by an outstanding innovation ecosystem that is agile, inclusive, and easy to navigate

UKRI Innovate UK

EVs and Energy Flexibility

Electric Vehicles provide significant energy flexibility potential

- ✓ shift energy consumption to balance supply & demand
- ✓ store renewable energy locally
- ✓ export energy back to a system - grid, home, building, vehicle

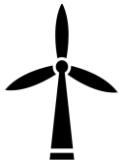
- **Smart charging** – demand-side response (DSR), shifting EV charging to off-peak periods or periods of abundant renewables
- **Vehicle-to-X technology (V2X)** – bidirectional smart charging, providing flexibility by enabling export of energy from an EV battery

The ambition:

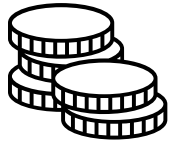
- **Mid 2020s -** Smart charging becomes widespread in homes & workplaces
- **Late 2020s/2030 -** Smart charging is the norm. Behind-the-meter and V2G services widely available for domestic & commercial EV users

Benefits overview

Reduce network and generation costs, lowering prices for all consumers



Maximise use of variable renewables



Reduce cost of charging for EV drivers

Actions required to reduce barriers to V2X roll-out

[Icons from FlatIcon.com]

Grid	Aggregator	Chargepoint	Vehicle	Consumer
Overcoming network and market barriers		Bringing down cost difference V1G → V2G	Research on V2X battery health impact	Ensuring consumer protection and interoperability
Electricity system design and level playing field for flexibility technologies			Limited choice V2X-capable EVs	Provision of trusted information
		Bi-directional charging standards		Establishing behaviours
	Innovations in V2X technologies, use cases, and business models reducing barriers and leading to mass rollout			

Initiatives include:

- V2G Programme (2018-2022)
- EV Smart Charging Regulations (2021)
- EV Smart Charging Action Plan (Jan 23)
- Call for Evidence: Gov't response (Jan 23)
- V2X programme (Sep 22-March 25)
- Secure Smart Electricity Systems programme

Department for Energy Security & Net Zero

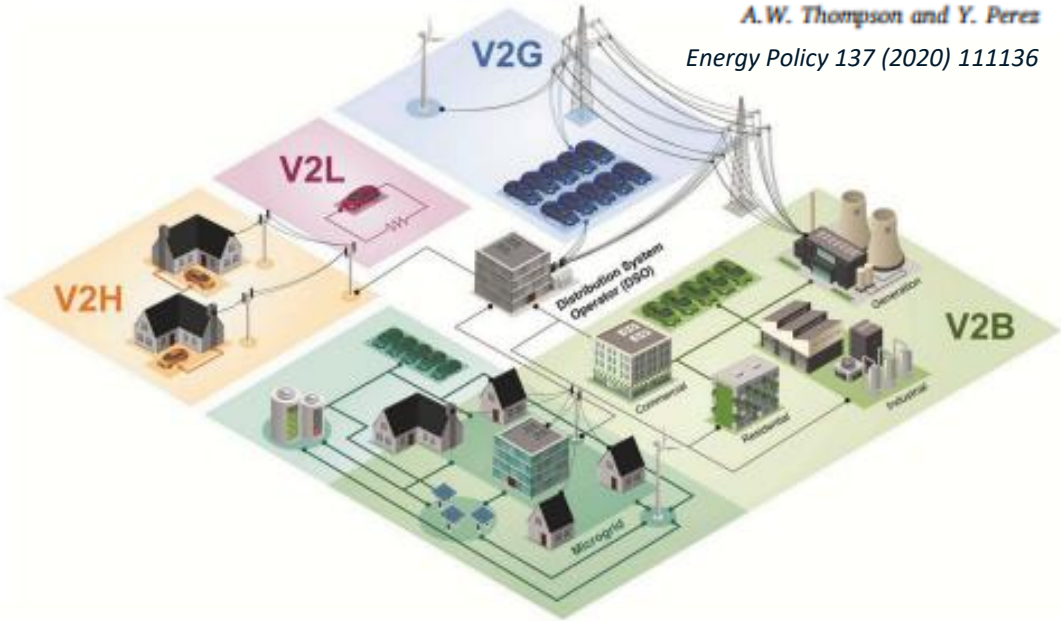
V2X Innovation Programme

https://www.gov.uk/government/publications/v2x-innovation-programme

Programme Funding: Up to £ 12.6 million

Programme Timing: September 2022 – March 2025

Phase 1:
16 research & development projects
Awarded £3.2 million funding
September 2022 - August 2023



A.W. Thompson and Y. Perez
Energy Policy 137 (2020) 111136

Phase 2:
Up to £ 9.4 million funding
Minimum 6-month demonstrations with real-world drivers in a real-world setting
Of innovative V2X customer propositions for domestic & commercial use-cases
Using DC CCS, DC CHAdeMO and AC V2X protocols
Beginning October 2023

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Department for Energy Security & Net Zero

The V2X Innovation Programme is part of the up to £65m Flexibility Innovation Programme, funded from the Department for Energy Security & Net Zero's £1 billion Net Zero Innovation Portfolio (NZIP)
https://www.gov.uk/government/publications/flexibility-innovation

16 V2X Innovation Phase 1 R&D projects

Designing and developing to prototype stage new V2X components, sub-systems, hardware and software products & services, including business models

Which can reduce entry barriers for domestic or non-domestic use of V2X bi-directional chargers to provide energy flexibility services

Charging protocols

- AC
- DC CCS
- DC CHAdeMO
- Megawatt

V2X Challenges

- Cost reduction
- New technologies
- New use cases
- Improving the customer experience
- Energy barrier solutions

V2X Use cases

- V2H
- V2V
- V2B
- V2G
- Heavy freight
- Public spaces (on-street and destination car parks)

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https://www.gov.uk/government/publications/v2x-innovation-programme-successful-projects

V2X Innovation Programme Partners

Understanding customers needs

Inflexion

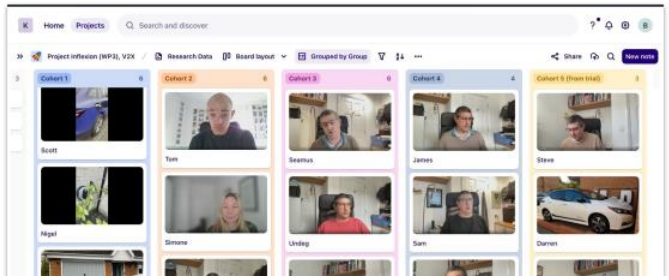
World's first V2X survey

Sizing the target market and the desirability of V2X

- **73%** Choose EV for cost savings
- **69%** Choose EV for environment
- **22%** Don't have a home chargepoint
- **64%** No frustrations with home charge
- **43%** Picked home charger based on cost
- **62%** Expect to hear about charger from car POS
- **1 in 5** consumers would take up a V2X prop

Creative research to understand users

Discovery activities to gain a deep understanding of EV Driver needs, pain points and barriers to V2X adoption.



Vectors

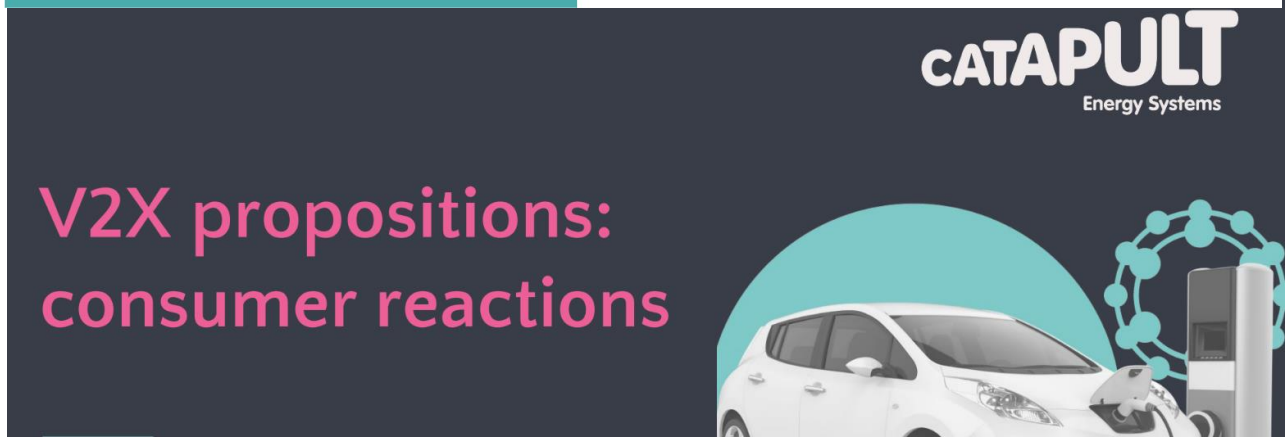
VECTORS Project: The Consumer Perspective

Vehicle-to-Home (V2H):

V2XFlex

CATAPULT Energy Systems

V2X INTERVIEWS: INSIGHTS



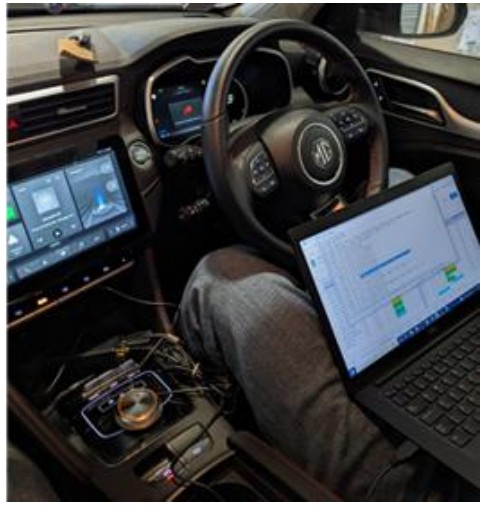
Developing new hardware & software

V2VNY AC

LeasyV2H

Entrust V2H

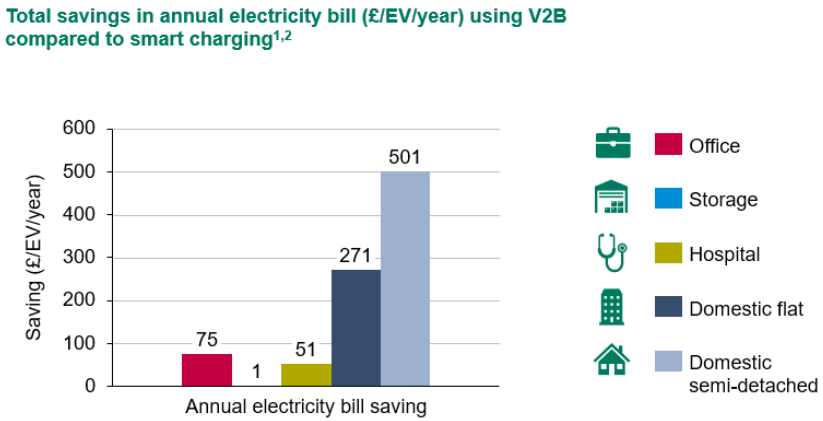
BEVScanV2X



V2X Local Network Fleet Solutions

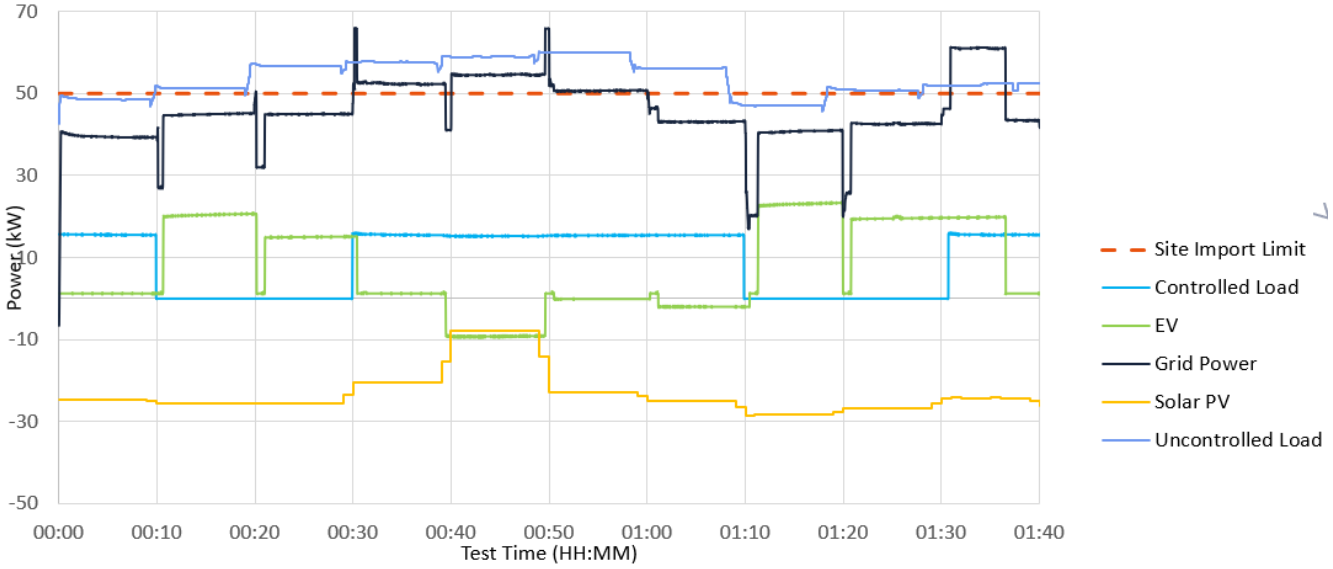
Developing smart energy integration solutions

V2Build

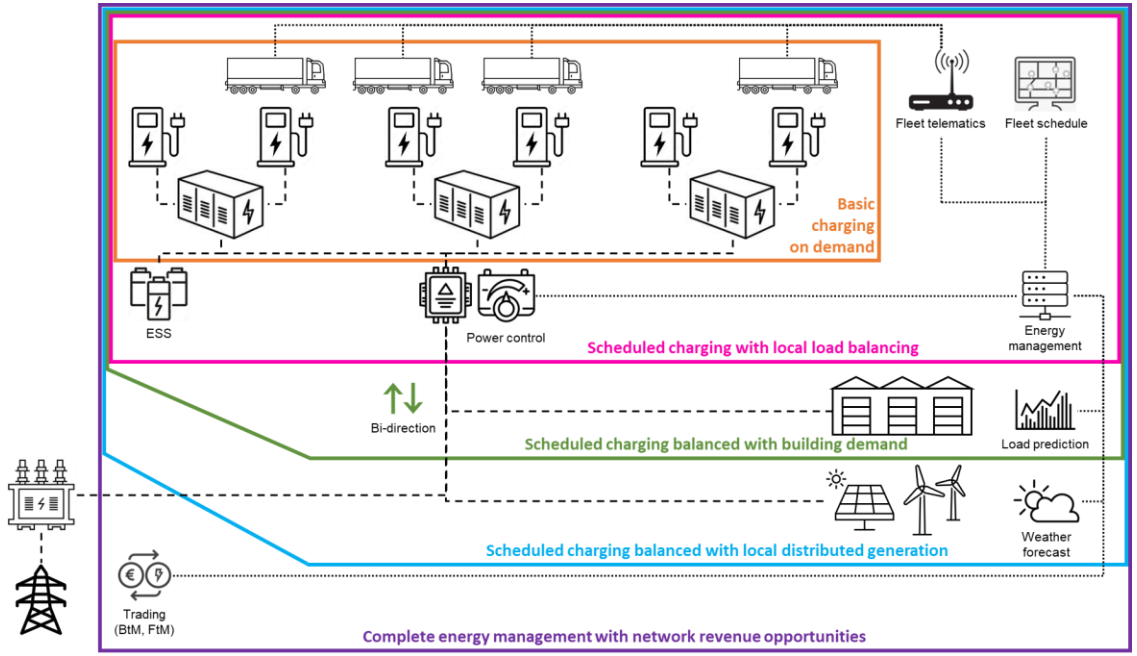


Secure V2B

V2X Local Network Fleet Solutions

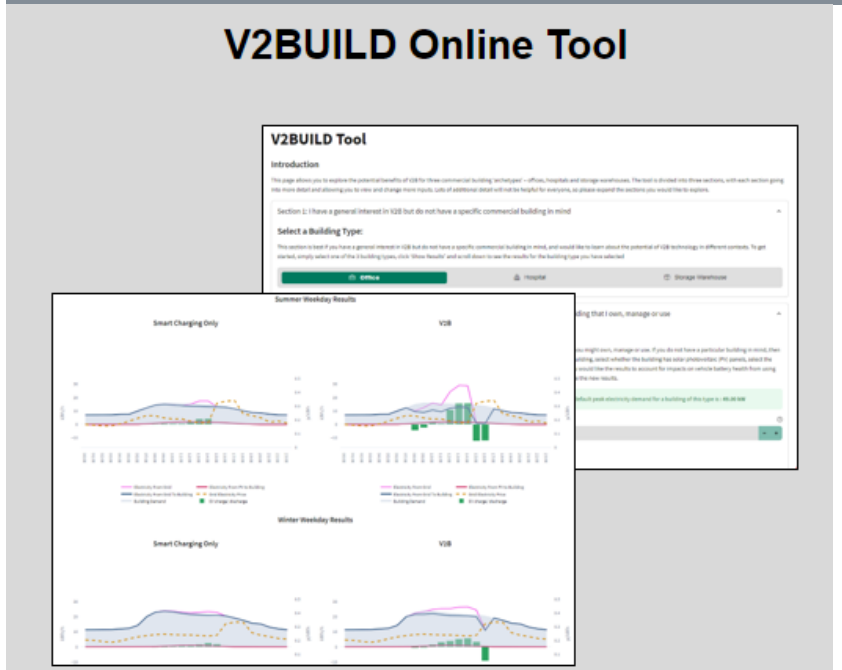


MW Charging microgrids



Developing consumer propositions, tools & business models

KALUZA



Innovate UK

Want to hear more? Visit the V2X stand to meet the developers

@InnovateUK

Innovate UK

Innovate UK

@weareinnovateuk

Programme contact:

Josey Wardle
Innovation Lead - ZEV Infra
josey.wardle@iuk.ukri.org

Department for Energy Security & Net Zero

Drop-in Session: Support for Innovation & Commercialisation

Rhiannon Turner – Carbon Trust

Ellen Webb-Moore – Innovate UK (UKRI)

1420-1450

CARBON TRUST

SMART ENERGY INNOVATION SHOWCASE 2023

Business Acceleration Support

Dr Rhiannon Turner

29 September 2023

CARBON TRUST

OUR MISSION

To accelerate the move to a decarbonised future.

CARBON TRUST

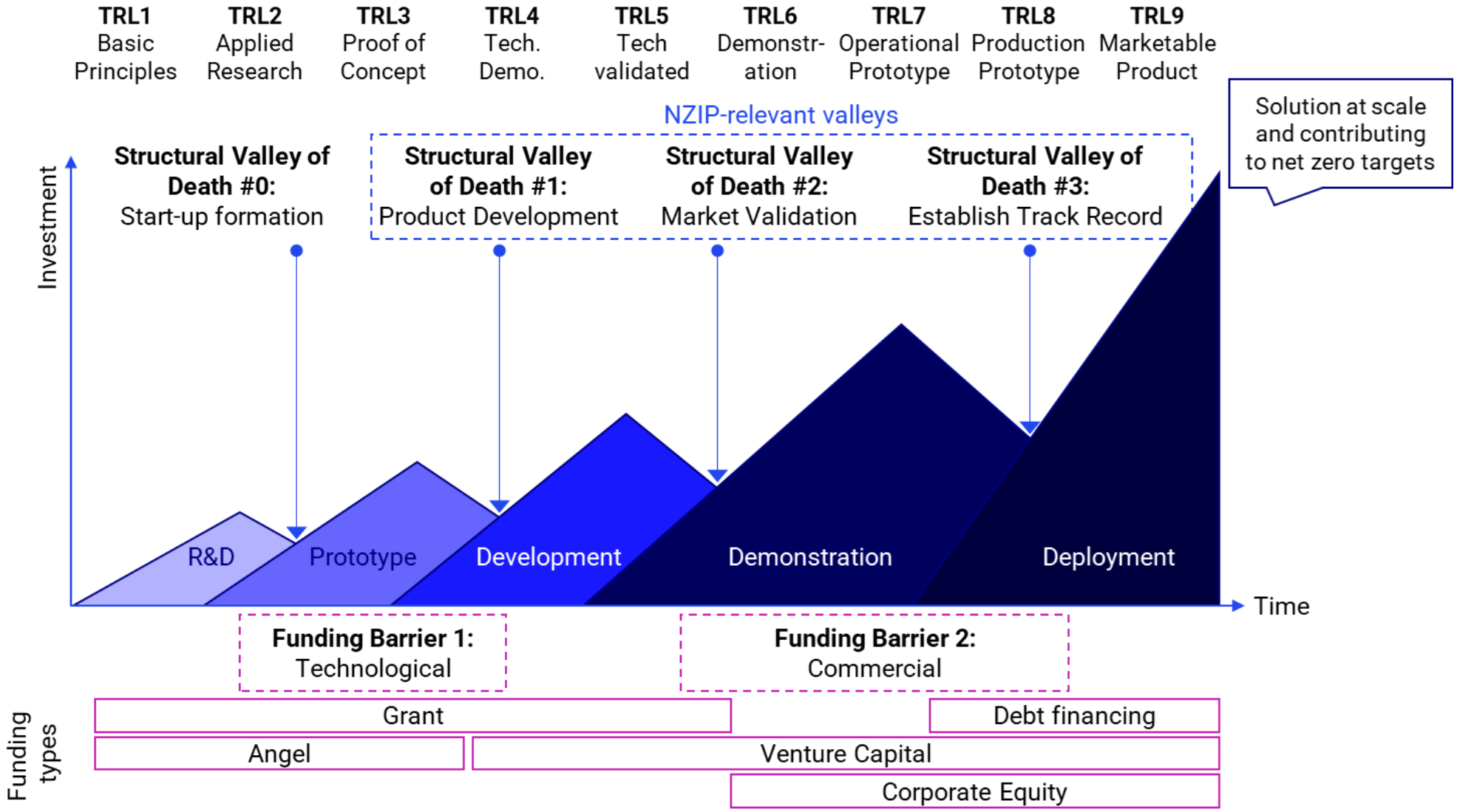
ACCELERATION SUPPORT

NZIP Accelerator

Department for Energy Security & Net Zero

Four ‘valleys of death’ facing climate tech

CARBON TRUST



Derived from: https://www.third-derivative.org/blog/climate-techs-four-valleys-of-death-and-why-we-must-build-a-bridge

Department for Energy Security & Net Zero

NZIP Accelerator
Support Available

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Market Engagement and Value Proposition

Market segmentation and sizing, customer identification and profiling, value proposition development, competitor differentiation

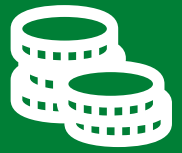
Strategy & Sales

Business model, route-to-market strategy, partnerships, sales, pricing and customer strategies, pipeline optimisation & management

Team & Board

Aligning team performance with company objectives, identify skills gaps and support recruitment & retention, board structuring

Funding & Investment



Supports enhancement in financial readiness skills for seeking and securing external investments, assistance on licensing

Product-Service Design, Development & Launch

Technological roadmap, validation of testing results, provision of support for IP strategy, Product cycle, product launch, product plans

Business Processes & Controls

Operational planning, financial controls, tax, legal, IP capture and protection, recruitment & HR practices

Department for Energy Security & Net Zero

NZIP Acceleration Consortium

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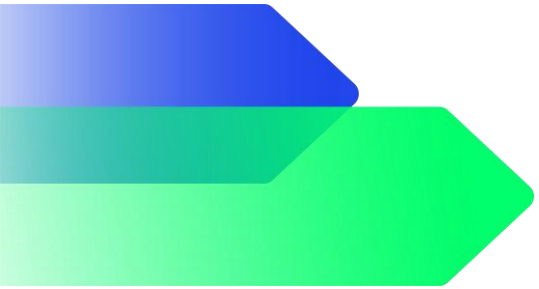

CATAPULT Energy Systems

CARBON TRUST

sustainable ventures

MOTT MACDONALD

E4tech an ERM Group company

EigenVentures

GREENHOUSE

Novagraaf

KPMG

CATAPULT High Value Manufacturing

dwf

Department for Energy Security & Net Zero

NZIP Accelerator

Delivery Mechanisms for Support

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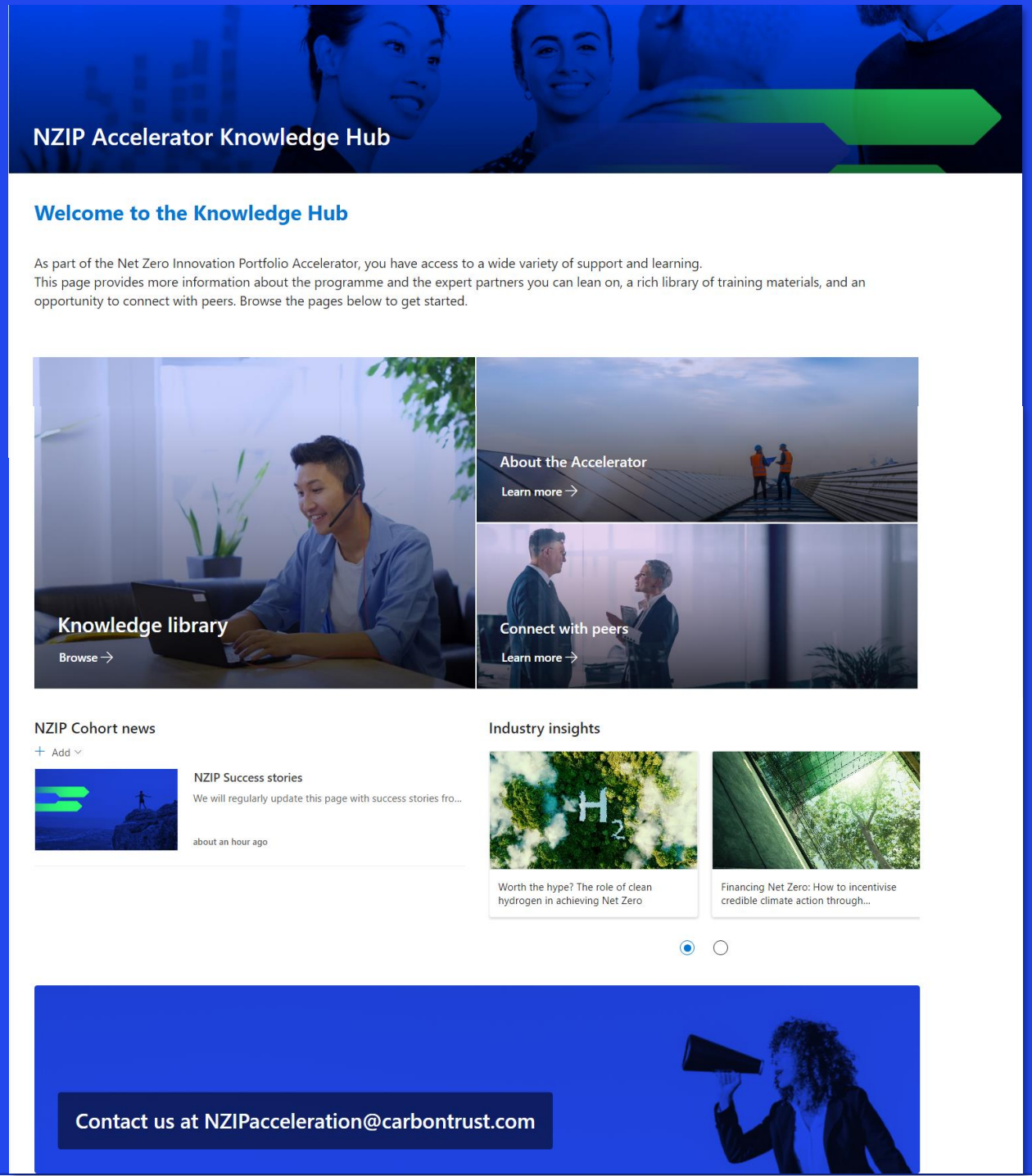
Needs Diagnostic	1-1 Support		1-Many Support		Networking & Resources	
Needs Assessment & Acceleration Planning	**1-to-1 support**	**Access to Finance**	**Business Skills Training**	**Working groups**	**Engagement, networking and events**	**Learning resources**
Identify skills, knowledge and capability gaps and plan support to meet these	Scoping and delivery of tailored task based support designed to target specific development gaps.	Overarching Access to Finance mechanism connecting cohort ventures with a broad network of investors & funders	Structured training modules on business skills and capabilities for early and late stage ventures	Sector-specific masterclasses and techno-market working groups with common tech and market integration challenges.	Facilitated market, investor and cohort networking opportunities and industry events to promote engage in-and-out of the programme	Available online learning materials (videos, reports etc.) around specific business and techno-market areas.



NZIP Accelerator

NZIP Knowledge Hub

The Knowledge Hub is a single point of entry to the rich store of content we provide as part of the Accelerator.

The Knowledge Hub includes:

- The Knowledge library, with 55 presentations on a range of topics
- Background information about the Accelerator, our partners, and the way we structure our support
- An opportunity to browse through peer cohort companies
- Relevant insights and updates from the programme and beyond

HOW DO I ACCESS THE SUPPORT?

NZIPAcceleration@carbontrust.com

CARBON TRUST

Q&A

Thanks for listening

Strategic Innovation Fund (SIF)

September 2023

What is the Strategic Innovation Fund?

A major investment programme to drive energy network innovation

- Paid for by **consumers** on their energy bills
- **£450m** available over the next five years
- Designed to help energy **network users** and **consumers**
- A **new** type of innovation competition process

An early indication of benefits…

>£3bn
potential cost savings*

>2m
tCO_2 potential emissions savings*

*general illustrative figures, based on projections and recognising that many projects may not progress to full rollout

The number so far…

111
projects funded (to April 2023)

194
different organisations funded

£18.7M
SIF funding allocated to projects

£3.8M
additional contributions from industry

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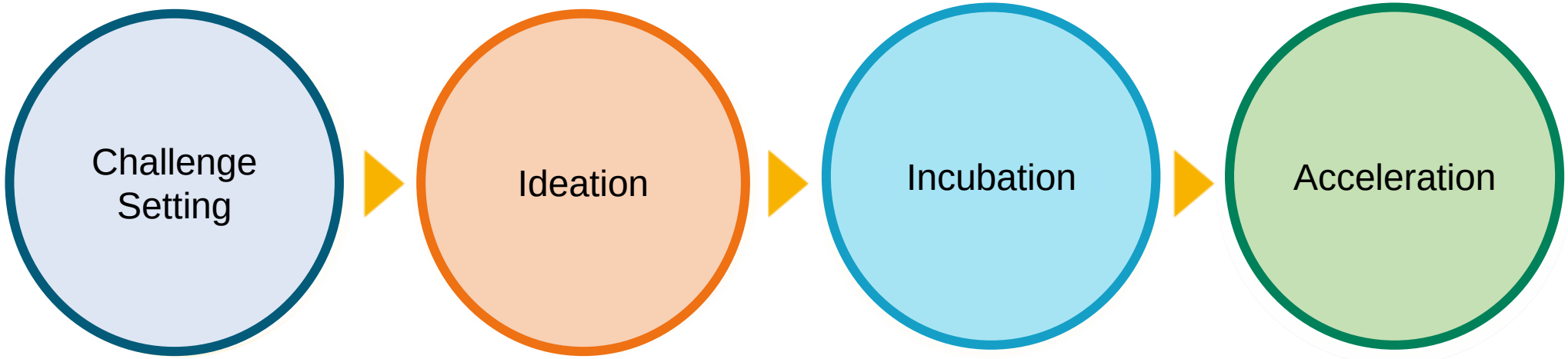
Giant Leap Together; the SIF innovation process



Innovate UK and Ofgem work with industry to develop challenge areas for projects to focus on

Targeted ideation for innovators to come forward with new ideas that could become projects

Consortia form, project teams shape proposals and apply for funding

Projects gain funding approval and begin work on Discovery projects – with potential to go on to further funding phases in future.

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Our Strategy

What are we going to focus on, to achieve our vision and fulfil our purpose:

Alignment	Responsiveness	Commercialisation
Across **funders**	**4 x annual innovation challenges**	Cross network **adoption**
Across **sectors**	**Discovery** Projects	**Procured** innovation as scale
With **regulatory change**	**Alpha** Projects	International **route to market** (networks, utilities, investors)
	Beta Projects	

Discovery	Alpha	Beta
Discovery Projects 3 months / £150k	**Alpha** Projects 6 months / £500k	**Beta Projects** c. 4 yrs / c. £10m +
Desktop study stage	Detailed design stage	Demonstration stage

Round One – Beta Phase Projects

Operational Efficiency and Risk Mitigation

Digital Platform for Leakage Analytics (DPLA) Data analytics and models to identify and locate gas leaks in the gas distribution network

Predict for Resilience Extreme weather distribution network fault prediction tool to support decision making and resilience.

Intelligent Gas Grid Autonomous and intelligent monitoring and control for pressure management and operational planning & maintenance of gas network.

Predictive Safety Interventions AI model which utilises live safety data and historical near-miss and injury occurrences to accurately predict the probability of future injuries.

Effective renewable integration

INCENTIVE Analyse and demonstrate solutions for offshore wind farms to provide grid stability services

Network – DC High Voltage DC circuit breakers enable an efficient and advanced HVDC network design to reduce the impact on coastal communities, reduces system costs and has the potential to lower the costs to consumers

Supporting future hydrogen system

HyNTS deblending Design and development of a hydrogen deblending and refuelling system to support direct integration to National Gas Transmission System

HyNTS Compression
Demonstrating the repurposing potential for transmission system compression equipment to transport and store hydrogen

Velocity design with Hydrogen
Validation of hydrogen velocity models for erosion, vibration, noise, and particle transportation, to enable safe design velocity limits for gas networks.

Domestic Flexibility

Crowdflex
Building upon the domestic flexibility trials to establish domestic flexibility as a reliable energy and grid management resource

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Round Two – Relevant Alpha Phase Projects

Localised heat decarb

Heatropolis is a ground-breaking multi-stage framework, set to unlock better outcomes between heat and electricity networks. Intelligent heat network design and operation will deliver significant flexibility and electrical load reduction to lessen the need for costly reinforcement by DNOs.

Watt Heat aims to accelerate the decarbonisation of heat and reduce costs by stimulating the market for flexibility through heat storage technologies. The project is investigating the potential of thermal storage to mitigate peak electricity load from heat, capture low energy prices, and provide wider system and DSO flexibility.

Project Local Energy Oxfordshire - Neighbourhoods (LEO-N) addresses the accelerating decarbonisation of major energy demands challenge by developing an innovative approach to creating an enabling environment for homes, businesses and communities to transition to Net Zero, at pace and scale. Currently, there is no clear route to guide consumers, nor is there the infrastructure to support the transition at local level. Working with all the key actors, LEO-N will build on earlier local energy projects by adopting a systems innovation approach, to develop the tools, commercial arrangements and supporting local governance structures to drive the Net Zero transition at pace.

System Resilience

CReDo+ is a novel enhancement of the original Climate Resilience Demonstrator (CReDo) climate change adaptation decision support tool, with a primary focus of extending to the emerging risk of extreme heat. CReDo+ will scale up across the energy sector and develop a user-friendly platform for asset experts to quantify their combined tacit knowledge of risk under extreme weather conditions into new statistical models.

Connectrolyser efficiency of hydrogen hubs by optimising electrolyser operations, minimising the reliance on traditional firm capacity connections with storage via flexible operation.

Local Planning

Powering Wales Renewably - explores innovation priorities and create a digital interface, like a digital twin of the transmission and distribution system, to accelerate the integration of renewable energy and decarbonised demand in Wales.

Flexible Queue Management - reevaluates design and operational assumptions in demand and generation connections, leveraging real-time energy data to potentially increase efficiency, unlock capacity, address constraints, and expedite new connections.

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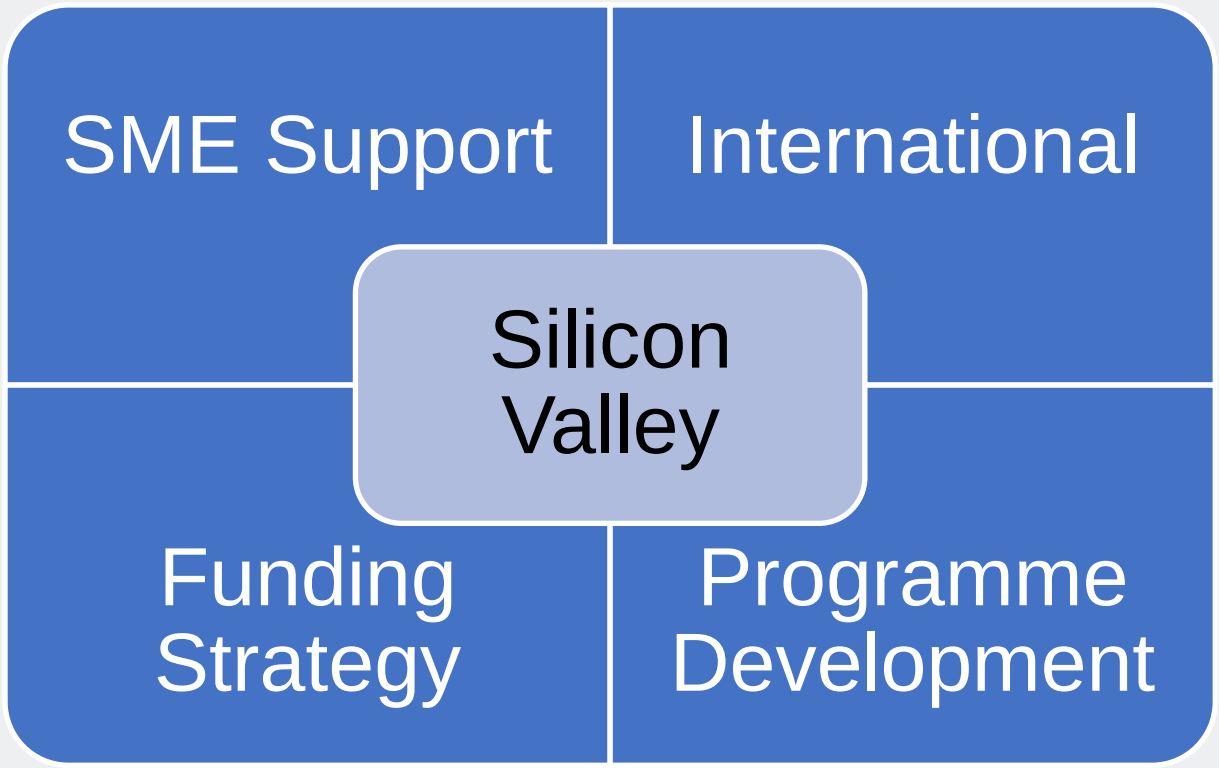
SIF Commercial Objectives

Addressing the non-financial needs of potential innovators, bridging the information gaps between ideation and incubation

Conducting strong fiscal discipline across the SIF programme, capable of ensuring security of consumer funding, whilst delivering scalable opportunities can service global demand



Gain market intelligence, market access for UK and international companies and access to innovative companies that provide solutions for decarbonizing and modernizing gas and electricity grids.

Growing the SIF programme through relationships, data, collaboration and incubation

An Energy System where any innovation that creates value can interact with its potential markets, attract the right talent, attract growth funding and deploy at pace

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SME Support

How does the SME Support align with the Commercial Strategy

Theme 1: SIF Project Partner Engagement

Supporting SIF applicants to scale and commercialise at pace

Theme 2: SME Support Landscape

Assisting SMEs to navigate the landscape to gain support which meets requirements

Theme 3: Communications

Tailored, targeted and informed communications

Theme 4: SIF Structure

Development of Incubation Support (pre-Discovery)

What does SME support look like?

Helping SMEs to navigate the landscape to gain support which meets requirements

- Continued collaboration with IUK Partners. E.g. KTN, IUK EDGE, IUK Global Team
- Close working relationships and collaborations with ENA and EIC are maintained and developed
- Onboarding of SMEs to use IUK EDGE support services

Innovation Playbook Project

Since 2005, the UK energy networks have had innovation incentives in place to test and trial innovations that address the challenges of deploying and integrating low carbon technologies. These incentives have supported hundreds of projects and incurred significant costs for consumers. Independent reviews of these incentives have found it challenging to assess their effectiveness due to the inconsistency in recording and disseminating outcomes.

The lack of reporting on post-trial outcomes, including the pathways to business as usual, makes it difficult to extract lessons for successful innovation rollouts. Moreover, the innovation projects are led by different energy networks or third parties as part of a consortium, each with their own distinct styles of project management, stakeholder engagement, dissemination, and procurement. This further complicates the understanding of repeatable approaches that could increase the probability of successful outcomes.

Aims & Objectives of the Playbook

To identify, recognise and evidence areas which the SIF can influence, in order for innovations developed during the programme to become commercial reality. This will be achieved through greater visibility of successes and failures of previous energy innovation projects to understand repeatable approaches that could increase probability of successful outcomes.

- Gather Knowledge
- Avoid Pitfalls
- Assess Project Approaches
- Commercial Viability
- Bolster SME Support
- Learn and Develop
- SIF Efficiencies

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Benefits

1. Provides a **robust evidence base from which to develop SIF programme activities** that improves commercialisation potential of network innovation

2. **Supports gap analysis of commercial and innovation activities** needed beyond current programme and helps make the case to Ofgem

3. **Additional insight to support portfolio level decision making** on projects funding– helps us do more with the information from projects using the playbook findings

4. **Supports more efficient and targeted development of application questions** allowing us to identify high impact projects and gaps in otherwise robust submissions

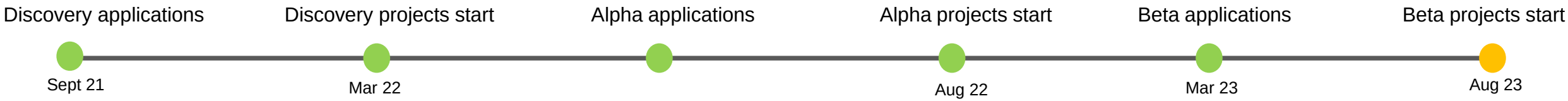
5. It will be a valuable asset around which we can further **strengthen collaborations with EIC, KTN and ENA on specific areas of the innovation to commercialisation journey**

6. If the Playbook [or sections of it] were made public, it can **help to provide critical information for third parties and networks** to take into account as they develop their ideas and project applications

7. Creates a **legacy asset that will be valuable to the sector** thereby increasing Innovate UK's reputation in energy network innovation beyond just the SIF programme

SIF timelines

SIF ROUND 1



SIF ROUND 2

SIF ROUND 3

The Energy Innovation Summit aka 'The Summit' 31 October and 1 November 2023

Energy Innovation Summit

- Joint Ofgem and Innovate Stand
- Speaking Opportunities
- Partners from across the energy system
- Joint Dissemination
- Wider Energy Systems Audience
- Problem Solving Workshops
- Live Debate

Connect with us

For more information about the Strategic Innovation Fund visit www.ofgem.gov.uk/sif

Sign up for our newsletter: https://ukri.innovateuk.org/ofgem-sif-subscription-sign-up

Read our Annual Report: https://www.ukri.org/publications/annual-report-delivering-ofgems-strategic-innovation-fund-sif/

Read our blogs: https://medium.com/@InnovateUK_Ofgem_SIF

Follow the Bright Spark podcast: www.podfollow.com/brightspark

Check out the 60 second videos on projects on the Ofgem Strategic Innovation Fund playlist: https://www.youtube.com/c/InnovateukOrgtsb/playlists

For all enquiries about SIF SIF_Ofgem@iuk.ukri.org

A brief guide to the SIF: https://www.ukri.org/publications/ofgems-strategic-innovation-fund-sif-a-brief-guide/

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UKRI Innovate UK

Department for Energy Security & Net Zero

Closing Remarks

Smart Energy Innovation Team – Department for Energy Security & Net Zero

1450-1500

Department for Energy Security & Net Zero

Refreshments & Networking

1500-1700