ESO Innovation

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Agenda

- Innovation at ESO
- Our 23/24 Innovation Strategy
- Our funding mechanisms
- Network Innovation Allowance (NIA)
- Case study: AI Centre of Excellence
- Strategic Innovation Fund (SIF)
- Our events
- Q&A and close

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Innovation at ESO

Electricity System Operator (ESO)

We move electricity safely, reliably and efficiently through the system.

We don't generate or sell electricity and we are not responsible for the infrastructure.

We balance the system in real time.

We operate 24/7, 365 days a year.

We help ensure the rules that govern the industry's roles and responsibilities are fit for purpose.

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Innovation at ESO

Our mission – To drive and enable innovation across the ESO and wider energy industry.

Our role as an Innovation team:

- **Focus innovation funding** towards priority energy system challenges

- Facilitate the process of **developing and funding** innovation activities across ESO

- **Create a 'safe space'** to support both internal innovators and external innovators who are interested in collaboration

- Ensure the **benefits** from ESO innovation projects (new products, services and learnings) are realised and shared widely

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Meet the team

Anna
Carolina Tortora

Head of Digital Transformation
and Innovation Strategy

Strategy & Stakeholder

Innovation Delivery

Strategic Innovation
Fund (SIF)

Technology Insights

Virtual Energy System

AI Centre of Excellence

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Our Innovation Strategy

Our Innovation Strategy

- Refreshed annually

- Focused on longer-term priorities, with projects that are typically higher-risk and have greater uncertainty in their outcomes

- Provides an overview of our priority areas for the year ahead (innovation priorities)

- Includes case studies of projects relating to our priority areas and analysis of how we've performed over the previous year
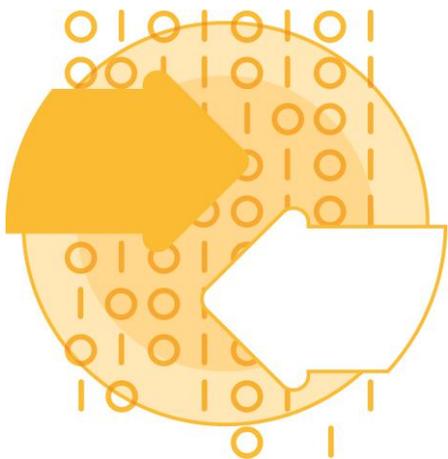

Electricity System Operator
Innovation Strategy
2023/24

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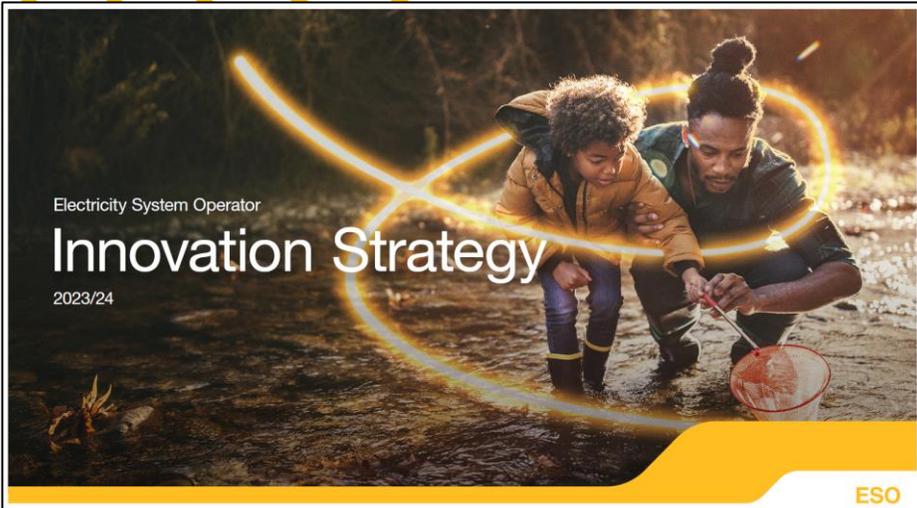
Our 2023 – 24 Innovation Priorities

Zero Carbon Transition

- It is difficult to remove the final, harder-to-decarbonise aspects of the system

- Fundamental changes need to be made to system planning and operation

- Finding a standard way to calculate the carbon intensity of generators

Digital & Data Transformation

- Driving digitalisation and a whole system approach requires greater transparency and open access to data

- Risk of cyber-attacks is growing

- Processing calculations from data and algorithm intensive models

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Our 2023 – 24 Innovation Priorities

Whole Energy System

- How can we improve efficiency and enable decarbonisation by considering energy vectors and different sectors alongside each other?

- How can products, markets and best practice be aligned across distribution and transmission networks?

Future Markets

- Understanding what and how different aspects of the energy system will change how markets function

- Understanding and testing different market reforms

- Exploring how consumers can become active participants in the system

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Our 2023 – 24 Innovation Priorities

Constraint Management

- Changes in the volume and location of electricity generation will lead to significant constraint costs

- One of the key areas of congestion is the Anglo-Scottish boundary (B6)

System Stability & Resilience

- As we move towards zero carbon operation and synchronous generation capacity decreases, the system becomes less stable

- This means faster frequency changes, less voltage and fault ride-through stability which makes it more difficult for both synchronous and non-synchronous generators to operate safely
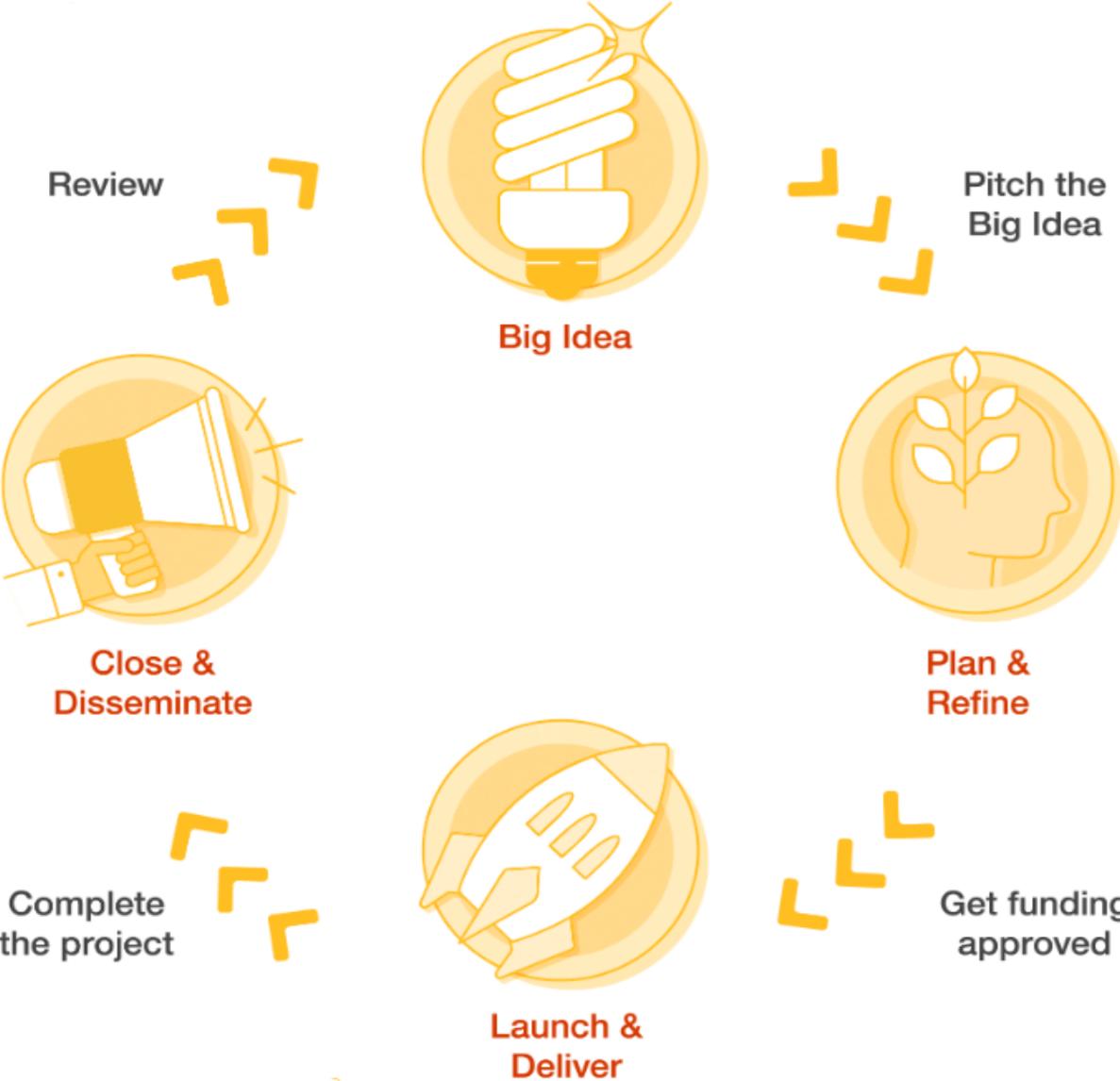
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Our funding mechanisms

Network Innovation Allowance (NIA)	Strategic Innovation Fund (SIF)
Each network receives a set allowance to administer as part of their network price control	**Ofgem administers funding** with support from Innovate UK (UKRI) – new fund to replace Network Innovation Competition
ESO will have ongoing access to **£47m (inc. 10% ESO contribution)** to fund innovation projects over RIIO-2	SIF is expected to invest **£450m by 2026**
Focused on funding **early-stage research and development** or **small-scale demonstration projects**. Each network has their own process for approving funding for projects.	Focused on funding **large-scale transformational research and development** projects in 3 phases. UKRI open a funding round for each phase. **(Discovery - £150k , Alpha – up to £500k, Beta)**
Projects must have the potential to deliver **benefits to consumers in vulnerable situations, or the energy transition to net zero**	For each funding round application, **Ofgem and UKRI publish challenge areas** related to the energy transition to net zero that projects should address

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How to get involved (NIA)

How our innovation process works

Review

Big Idea

Pitch the Big Idea

Close & Disseminate

Plan & Refine

Complete the project

Launch & Deliver

Get funding approved

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Submitting a Big Idea

- First consider how your project idea aligns to our **strategic innovation priorities**

- Ensure you understand the **Intellectual Property Rights** requirements of innovation funding (NIA and SIF)

- Consider the **data requirements and dependencies** for your project idea

- Submit your Big Idea using the form on our website, this covers
  - Current state
  - Hypothesis
  - Potential activities
  - Benefits

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Big Idea form

Find the form on the **'Get involved'** page on our website

A link will be shared with all attendees after the webinar

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Common reasons why we aren't able to take ideas forward

- Innovation funding cannot be used to validate commercial models – we must remain as impartial as possible in supporting market participants

- Duplication of a previous project or Business as Usual activity

- We don't have sufficient ESO Subject Matter expert resource to support the project at the time

- ESO is not an appropriate lead – you can submit your idea to Energy Networks Association (ENA) through the Smarter Networks Portal

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AI Centre of Excellence

AI Centre of Excellence

Artificial Intelligence (AI) and Machine Learning (ML) are increasingly being used to solve some of the complex problems uncovered by the energy transition. To maximise the potential of AI and ML, we need to improve data science capabilities.

The Project

- Establishing the necessary structures and world-class resources to grow ESO's data science capabilities

- Creating an ongoing pipeline of talent by building partnerships with academia, industry, networks and tech ecosystems

- Promoting opportunities to work on cutting edge projects where data science skills also positively impact society and the planet

Lyndon Ruff
AI Centre of Excellence Manager

Darya Nizhnikova
Customer and Technology Innovation Business Partner

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ENABLING THE ENERGY SYSTEM TO HANDLE THE COMPLEXITIES REQUIRED TO MEET NET ZERO TARGETS

GROWING A COLLECTIVE AI WORKFORCE IN THE ENERGY INDUSTRY

ESTABLISHING A COLLABORATIVE SPACE TO ALLOW MEMBERS TO APPLY THEIR SKILLS

TALENT PIPELINE FOSTERING THE NEXT GENERATION OF DATA SCIENTISTS & EXPANDING THE CURRENT AI WORKFORCE KNOWLEDGE

EXPERIMENTAL DEVELOPMENT SANDBOX WHICH FULLY INTEGRATES INTO ESO SYSTEMS TO TRIAL INNOVATIVE SOLUTIONS

AI CENTRE OF EXCELLENCE

LIBRARY

EXPERIMENTAL LAB

ACADEMY

TECHNOLOGY & ACADEMIC PARTNERS

RESOURCE MARKETPLACE

RESOURCE EXCHANGE

ACADEMIA
CONSUMERS / PROSUMERS
BUSINESS INDUSTRY
REGULATOR
TSOS
TECHNOLOGY COMPANIES
ENERGY SUPPLIERS
DNOS
GOVERNMENT
ENERGY GENERATORS

WHOLE SYSTEM ENGAGEMENT

ML ENGINEERING
DATA ENGINEERING
BUSINESS ANALYSIS
RESEARCH
MACHINE LEARNING
DATA SCIENCE

SUSTAINABLE ENERGY & DATA MINDSET CULTURE

STAKEHOLDERS

CROSS-INDUSTRY PARTNERSHIPS

DATA & TECHNOLOGY CONFIDENCE

SKILLS

GLOBAL AI EXPERTS AT YOUR FINGERTIPS TO SOLVE BUSINESS CHALLENGES
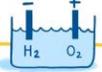
CONNECT VIRTUALLY FOR BROAD ACCESS

OPEN COLLABORATION WITH ENERGY INDUSTRY DATA SCIENCE COMMUNITY

PARTNERSHIPS FACILITATE THE EXCHANGE OF INDUSTRY KNOWLEDGE & RESOURCES

TECH PARTNER

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How to get involved (SIF)

How does SIF work?

SIF can help us tackle big sector-wide questions about the future (2028+) energy system

DISCOVERY (feasibility study)		ALPHA (experimental development)		BETA (build, operation and/or demonstration)
Up to **3 months** Capped at **£150k**	→	Up to **6 months** Capped at **£500k**	→	Duration will depend on the scale and complexity of the solution **No cap on budget**

3 Phase Approach

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How can I get involved?

- Keep up to date with the latest SIF Innovation Challenges and deadlines

- Contact us directly with project ideas (innovation@nationalgrideso.com)

- We also receive ideas through:
  - Open Innovation Events
  - Pitching sessions organised by UKRI
  - Other events such as Energy Networks Association's Energy Innovation Basecamp

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Partnering with us

- Project ideas must move through the sequential phases of SIF **(Discovery, Alpha, Beta)**

- Project ideas need to meet one of the **SIF Innovation Challenges** and address at least one of **ESO's innovation priorities**

- There will be an Open Call for SIF ideas over the summer and timelines for submitting ideas to us will follow on our website/newsletter.

- All applications are submitted to and approved by Ofgem

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Our SIF projects

CrowdFlex
(Beta application submitted)

Exploring the role of domestic flexibility in grid management. The Alpha phase focused on gaining a better understanding of the system challenges and potential solutions using domestic assets.

Powering Wales Renewably
(approved for Discovery)

Collaborating with local government and network operators to identify innovation priorities to progress Welsh decarbonisation plans and increase renewable electricity hosting capacity, whilst contributing to the development of the Virtual Energy System for Wales.

Scenarios of Extreme Events
(approved for Discovery)

Developing a proactive approach to identifying and analysing extreme, unexpected events and forecasting their impact on the electricity grid and wider energy system.

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Open Innovation Events

Open Innovation Events – The Process

Challenge Area Development

Understanding ESO and wider energy system priority challenges

Application

ESO publish challenge areas, inviting stakeholders from across industry to submit proposals addressing them

Review

ESO Innovation team and subject matter experts review proposals, selecting around 5-7 ideas to take to the event

Open Innovation Event

Day 1 – collaborative proposal development

Day 2 - pitching to an industry judging panel

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Open Innovation Event July 2022

Challenge areas:

1. **Use Cases - Virtual Energy System**
2. **Network Modelling 2.0**
3. **Strategic Innovation Fund (SIF)**

60 proposals received from **33** different organisations

5 proposals to develop at the event

All proposals were taken forward after the event

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Hear from our attendees

100% found the group work 'very useful' to develop their pitch

100% of attendees 'very likely' to recommend

"… great help for shaping and finalising the innovation proposal, we received **overwhelming support from ESO**"

"**Genuinely felt like working in a team**, couldn't expect anything better than that!"

"Access to SMEs, innovation team and partners was **invaluable**"

"… effective and efficient way to promote innovations and **accelerate the development of innovation projects**…"

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