Quantum Safe Cryptography

The ESO is interested in project proposals to assess and tackle the potential cybersecurity threats posed by quantum computing on the energy system. This project will address the SIF innovation challenge of "Novel technical, process and market approaches to deliver an equitable and secure net zero power system" with the aim of increasing responsiveness, system visibility and resilience. We want to explore a potential project that will lead on to practical solutions, methodologies, roadmaps and risk reduction for the whole of the energy sector.

Examples projects to address:
• How do we understand the risk posed to the sector, what controls could be put into place?
• How can we ensure system security against cyber-attack from future disruptive technologies?
• How do we build confidence in Quantum computing to reduce cybersecurity risk?

Potential partners envisaged but not limited to:
1. A technology developer or research organisation with primary focus of developing Quantum computing and digital technologies.
2. A renewable generator and other relevant stakeholders.

ESO

Generative Artificial Intelligence

The ESO is interested in project proposals looking at the use cases of generative artificial intelligence applied to the management of the national energy system. These ideas will address the SIF innovation challenge of "Novel technical, process and market approaches to deliver an equitable and secure net zero power system" with the aim of increasing responsiveness, system visibility and resilience. We want to explore a potential project that will lead on to practical solutions, methodologies, roadmaps or tools which can be applied in ESO or throughout the energy industry.

Some example use cases we have identified include:
- Exploring the use of Generative AI for developing Network plans e.g., Network Access Planning (outage planning), Centralised Strategic Network Planning, Holistic Network Design, Network Options Assessment
- Connections reform and testing network resilience by generating scenarios.
- Use of Large Language Models (LLMs) for explainable Energy Time Series Forecasting
- Use of Synthetic data to better model consumer archetypes and test policy measures to enable a just energy transition
- How do we build confidence in this new technology to perform tasks without human intervention and other considerations (e.g., ethics, explainability of models, bias, proprietary information)?

Potential partners envisaged but not limited to:
1. A technology developer or research organisation with primary focus of developing computing and digital technologies
2. A renewable generator and other relevant stakeholders.
3. Academic institutions and Research and Technology Organisations with experience in the applications of AI.

ESO

Long Duration Energy Storage

The ESO is interested in project proposals for the SIF innovation challenge of "Enabling power-to-gas (P2G) to provide system flexibility and energy network optimisation"; Unlocking system benefits and long duration storage potential of power-to-gas. We have existing projects in this area so we are particularly interested in proposals focused on the following:

- Review of existing security of supply standards
- Understanding the barriers to LDES in the future energy system, what is the whole system transformation cost? What existing infrastructure can be repurposed or needs decommissioning?
- How can we model better to understand which demand types are most suitable for different LDES technologies and how do these fit into the whole energy network?
- Decision making in the future energy system; how can we utilise demand and LDES supply during a period of Dunkelflaute? What does the future network look like?

Potential partners envisaged but not limited to:
1. Operator of hydrogen electrolyser or other green power-to-gas assets connected to the energy networks.
2. Organisations with capability in hydrogen production and use optimisation.
3. Energy network licensee
4. Academic partner or Research and Technology Organisation (RTO) with experience in hydrogen storage.

ESO

Network Modelling

The ESO is interested in project proposals to address the SIF innovation challenge of "Whole system network planning and utilisation to facilitate faster and cheaper network transformation and asset rollout"; addressing aims such as improving coordination, modelling, and planning capability across networks to support holistic and timely system development. The scope is envisaged to cover digital simulation and advanced modelling techniques to facilitate whole system network planning and development.

We are particularly interested in proposals focused on the following:
- How can we be more transparent with our network modelling by sharing models and using more open-source tools?
- Use cases for Network modelling systems e.g., Multi-Vector Modelling

Potential partners envisaged but not limited to:
1. A technology developer or research organisation with primary focus of developing computing and digital technologies.
2. A renewable generator and other relevant stakeholders.
3. Network Operators

ESO

Consumer profiles

The ESO is interested in project proposals looking at using consumer research and data to help incentivise transition to net zero. Ideas will address the SIF innovation challenge of "Novel technical, process and market approaches to deliver an equitable and secure net zero power system" with the additional aims of improving processes needed for managing and operating a net zero power system, reduce the whole system cost of intermittent renewable integration, increase the number of consumers across segments participating in markets.

Example projects:
- Exploring how we can better use technology and gather data to develop and understand different consumer profiles and their energy use (demand forecasting, product development, understanding price and carbon sensitivity and understanding groups to predict reaction to incentives).
- Identification of vulnerable consumers to better serve/help them, educating consumers on adoption of green products and services, helping them to avoiding scams, considering channels and messaging.
- Automated switches - switch on when energy is green (home energy management system) and conversely informing consumers when carbon intensity is high.

Potential partners envisaged but not limited to:
1. A technology developer or research organisation with primary focus of developing computing and digital technologies.
2. A renewable generator and other relevant stakeholders.

ESO