Energy Innovation Basecamp 2024
Problem Statement EIP118

Extending the Life of Assets Whilst Maintaining System Reliability

The following problem statement has been developed by the innovation teams within the UK's Gas and Electricity Networks for the 2024 Energy Innovation Basecamp.

Theme: Maximising Use of Existing Infrastructure

Network Areas: Electricity Distribution, Electricity Transmission

What is the problem?

Extending asset life is critical to reducing the cost of the system and making more money available for investment in system expansion and reinforcement. As the asset ages, we need smarter ways of monitoring asset conditions. The current practice is largely one in which assets are inspected by engineers visiting the sites, including substations, transmission towers and distribution poles. Over the last decade or so, there have been many efforts to develop smarter ways of monitoring assets, predicting asset life and developing intelligent maintenance plans. Many of these projects are documented on the ENA Smarter Network Portal (ENA Innovation Portal (energynetworks.org)). Examples include:

- Condition Monitoring of Power Assets: Condition Monitoring of Power Assets (COMPASS) | ENA Innovation Portal (energynetworks.org)
- Network Reliability Asset Replacement Decision Support Tool. Network Reliability Asset Replacement Decision Support Tool | ENA Innovation Portal (energynetworks.org)
- Understand and Improving Condition, Performance, and Life Expectancy of Substation Assets. Understand and Improving Condition, Performance, and Life Expectancy of Substation Assets | ENA Innovation Portal (energynetworks.org)
- Smart Asset Management - Smartlife Workgroup. Smart Asset Management - Smartlife Workgroup | ENA Innovation Portal (energynetworks.org)

There are many more examples of efforts to make inspection, repair and maintenance (IRM) smarter and more efficient. However, it cannot be said that smart asset management is yet business and usual (BAU). One of the potential reasons for slow adoption is that there is a lack of coordinated efforts to create holistic systems for smarter monitoring and management. There is also the barrier of cost to retrofit existing assets. There are a number of challenges to overcome before a holistic solution can be created:

- Deploying remote monitoring that is both reliable and cost-effective
- Ensuring that accurate data is easily accessible whilst also ensuring cyber-security
- Managing large amounts of data ensuring accuracy and accessibility
- Developing tools that can assist in interpreting large amounts of data, this might include machine learning and artificial intelligence.
- Using current and past data to forecast asset risks and faults and automatically optimise asset maintenance.

What are we looking for?

We are interested in understanding innovations that could coordinate and leverage previous niche innovations to develop a holistic approach to proactive asset management that could identify assets at risk and identify assets where working life could be extended. We are also interested in developing strategies that reduce the cost of holistic asset inspection repair and maintenance. This could include:

- Moving already developed technologies to Business as Usual, including qualification of systems and reduction of cost
- Developing methods and tools to coordinate and integrate disparate data

- New methods (not already considered) to solve more challenging problems, for example inspection of ACCC overhead cables
- New designs and standardisation of equipment that facilitate remote monitoring and data gathering.

Areas of more specific interest would be:

- Small scale sampling on targeted asset types or groups, to support in-depth statistical analysis which may lead onto inform machine learning
- Widening the baselining activities associated with aging assets, documenting and holding metadata improvements, exploring different means of data analytics to find anomalies
- Progressing traditional near-to-real time monitoring tools to 'edge process', by means of pushing the hunting patterns to the field locations (and therefore the monitor is mainly silent).

What are the constraints?

Innovators should avoid pitching niche innovations, where innovation money has already been spent trying to solve the problem. Innovators should be able to demonstrate that they have knowledge of previous innovation projects. Any pitch should have a clear road map to Business as Usual. We particularly encourage thinking that would allow coordination, storage and integration of very large datasets. It should be understood that each network has a data management and open data plan, and so any proposal should be aware of networks' pre-existing plans for digitalisation. Innovators that are able to demonstrate proactive engagement with the network's existing plans would be an advantage. It is important that innovations can integrate with existing and planned data management systems.

Who are the key players?

The key stakeholders are:

- Networks, project engineering and asset operations teams
- Network data custodians and analysis teams
- Third party niche solution providers that already provide an asset monitoring solution.

Does this problem statement build on existing or anticipated infrastructure, policy decisions, or previous innovation projects?

Innovators should be aware of previous work in this area of innovation, much of which can be found documented on the ENA Smarter Networks Portal ENA Innovation Portal (energynetworks.org).

What else do you need to know?

N/A

Innovator submissions to this problem statement will be open here during March and April, but we encourage you to submit your response as early as possible, as networks will be able to review submissions as soon as they come in.

You can also use the virtual Q&A on the Smarter Networks Portal to ask for more information about this problem statement. Questions may be answered online or at the ENA Problem Statement Launch in March 2024. More information on last year's Basecamp programme can be found here.