

System Modelling to Improve Island Grid

Resilience and Operation

The following problem statement has been developed by the innovation teams within the UK's Gas and Electricity Networks for the 2026 Energy Innovation Basecamp.

Theme: Flexibility and Forecasting

Network Areas: Electricity Distribution, Electricity Transmission, Electricity System Operator

What is the problem?

What is the wider context of the problem described above? Are there any specific details to expand on? If the problem statement is phrased as a question, this section may end by posing that question back to the innovator.

Optimisation of system design and operation of remote islands in the face of climate threats is an area that needs careful attention. Operating parts of the electricity networks as remote islands with significant renewable penetration presents unique challenges in balancing supply and demand, maintaining system stability, and ensuring reliability. However, if these challenges can be overcome, the option of island or microgrid operation could unlock greater resilience for remote areas of the network. Given the current restrictions on island operations, there is a real opportunity for innovation on this topic, using islands with significant renewables as a testbed for potential wider rollout.

What are we looking for?

What kind of solution do you want? What TRL are you looking for? Does the solution need to be operable at scale? Are you looking specifically for methods and techniques? Does the idea need to have been tested to a certain extent already? There may be A) and B) sections if there is a wider issue with different types of solutions being sought.

We are seeking solutions that enable detailed modelling of various grid reinforcement scenarios aimed at improving island grid resilience and supporting islanded operation. These solutions should incorporate innovative grid control and management mechanisms and compare alternative reinforcement approaches against standard transmission reinforcement options. The comparison should include cost implications and assess compliance with relevant grid legislation and regulatory requirements.

What are the constraints?

These might include "the solution must..." type responses (e.g., compliance with certain regulations, existing software, methodology or technology - or technology agnostic - applicability to specific networks, budgetary requirements, needing to be rolled out within a specific timespan...)

Ideally the solution utilises software that is familiar to the Transmission Owners and is interoperable with other network power modelling packages. The solution should be compliant with grid legislation requirements.

Who are the key players?

Who are the key stakeholders affected by this problem statement? Who will adopt this solution? Who benefits from the resolution? What sort of innovators are you trying to attract solutions from? Who is the target market for this problem statement?

The key stakeholders are the Transmission Owners, Distribution Network Operators, the NESO, and renewables developers with the main users being the network owners and operators responsible for grid compliance and management. Beneficiaries would include local communities, the regulator and wider energy system. The innovators would be expected to have expertise in grid stability modelling and be able to investigate island/microgrid operation and its impact on stability.

Energy Innovation Basecamp 2026

Problem Statement EIP155

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

What are the links to previous or ongoing work? Where possible, please provide links to the SNP, individual pages on network websites describing similar work, etc. Are there any current or future dependencies? Are there any other enablers that innovators should reference or specifically build on in their proposals? Are there any solutions which have already been considered / trialled?

This aligns with UK decarbonisation target and previous innovation project focused on modelling system flexibility and design particularly at a transmission level.

What else do you need to know?

Use this space to add anything else that an innovator would need to know to submit a submission to this problem statement. This may be additional context on the issue, additional sources of information, additional information about your network's processes, or any additional enablers and constraints.

Innovator submissions to this problem statement will be open on the Smarter Networks Portal from 4th February to the 13th March, 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 on 4th February 2026. More information on last year's Basecamp programme can be found on the Smarter Networks Portal.