Energy Innovation Basecamp 2026
Problem Statement EIP166

Climate Adaption

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: Net Zero Transition Impacts

Network Areas: Electricity Distribution

What is the problem?

Climate-related risks to electricity distribution networks are increasing in frequency and severity. UK networks are already experiencing more frequent extreme rainfall, flooding, heatwaves, freeze–thaw cycles, drought-driven ground movement, and high-wind events. These hazards affect a wide range of assets such as substations, poles, cables, switchgear, and ancillary equipment.

While DNOs have begun developing climate risk assessments and high-level adaptation roadmaps, a critical gap remains in understanding the real-world effectiveness and cost-benefit of specific adaptation actions. Examples include flood defences, vegetation strategies, pole reinforcement/replacement, substation hardening, improved drainage, heat-resilient transformers, or relocating vulnerable assets.

The problem is that, although many possible measures exist, networks lack robust, comparable evidence on which actions deliver the best resilience uplift under different climate scenarios. Without this, DNOs face difficulty:

- Prioritising adaptation investment
- Demonstrating value for money to Ofgem
- Understanding region-specific impacts
- Designing long-term, least-regret strategies
- Embedding climate resilience into ED3 and future planning horizons.

The overarching question to innovators is therefore:

How can we develop tools, data, or frameworks that reliably quantify both the cost and the effectiveness of different climate adaptation measures for electricity distribution networks under a range of future climate scenarios?

What are we looking for?

We seek innovative methods, tools, modelling approaches, data frameworks, or combined technical/analytical solutions that provide quantifiable evidence for climate adaptation decision-making.

We are especially looking for solutions that can:

- Evaluate how effective specific adaptation actions are under various UKCP climate scenarios (e.g., high emissions, low emissions, 2050s/2080s timelines).
- Assign credible cost estimates (capex/opex/maintenance) to these actions.
- Quantify confidence levels around adaptation outcomes (e.g., reduced outage probability, reduced asset degradation, avoided losses).
- Support whole-life cost analysis and allow comparison across different types of measures.
- Provide decision-support tools that enable DNOs to identify the most cost-effective and "least-regret" actions depending on hazard type and network region.
- Potentially cover multi-benefit solutions that deliver resilience plus:
    - Carbon reduction
    - Biodiversity enhancements
    - Social vulnerability reduction
    - Improved reliability metrics.

TRL expectations

- Solutions may be conceptual (TRL 2–4) provided they include a credible path to demonstration.
- Alternatively, existing tools from other sectors (insurance, water, government climate risk, catastrophe modelling) may be adapted to the electricity system.

Examples of possible solution categories (non-exhaustive)

- Climate-impact modelling frameworks that simulate adaptation effectiveness.
- Probabilistic cost-benefit analysis tools for climate hazard scenarios.
- Spatial tools combining asset data with hazard maps to score benefits of interventions.
- Multi-criteria decision analysis platforms for adaptation option appraisal.
- Solutions that merge engineering models with climate datasets to forecast asset performance.
- Approaches for quantifying avoided customer impacts or reductions in expected unserved energy.

What are the constraints?

The solution must:

- Be compatible with UK climate datasets, especially UKCP18/UKCP23.
- Align with Ofgem's developing climate resilience framework, including requirements from the Climate Resilience Stress Testing Exercise.
- Integrate with (or complement) DNO asset data structures, geospatial formats, hazard mapping, and risk scoring approaches.
- Be technology-agnostic or readily applicable across the four GB DNOs.
- Be capable of being rolled out or trialled within the Basecamp project timeframe.
- Produce outputs that are auditable and suitable for regulatory reporting.
- Where data is uncertain, present transparent assumptions and ranges rather than black-box outputs.
- Comply with security and data-sharing requirements (asset locations, flood maps, etc.).
- Recognise that budgets are constrained and must demonstrate scalability / replicability.

Who are the key players?

Primary stakeholders

- All GB DNOs (asset management, network strategy, resilience, investment planning teams).
- Ofgem – especially through the Climate Resilience Stress Testing work and future ED3 planning.
- ENA Climate Change Resilience Working Group (CCRWG).
- Infrastructure UK, National Infrastructure Commission (NIC).

Secondary stakeholders / contributors

- Modelling organisations (e.g., Met Office, climate impact consultancies).
- Universities with expertise in climate impact modelling, geospatial analytics, and resilience engineering.
- Insurance and catastrophe modelling organisations.
- Local authorities and regional flood resilience partnerships.
- Emergency planning and civil contingencies groups.

End beneficiaries

- Customers in high-risk regions (flood-prone, coastal, exposed rural networks).
- Vulnerable communities with a higher sensitivity to climate-related power disruption.
- Network operators through reduced outage costs and avoided asset failure.

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

Yes. This problem statement expands on several strategic initiatives already underway

Existing work / foundations:

- Climate Change Resilience Working Group (CCRWG) work on building sector-wide resilience methodologies.
- Ofgem's Climate Resilience Stress Testing Exercise, which identified major gaps around quantifying adaptation effectiveness and costs.
- DNO climate risk mapping projects on the Smarter Networks Portal (e.g., flood resilience studies, heat mapping, environmental hazard models).
- Various regional adaptation plans and risk assessments developed during RIIO-ED2.
- Government frameworks such as CCRA3, NAP3, and the National Infrastructure Commission's work on resilience standards.

What else do you need to know?

- Adaptation decisions are inherently uncertain; innovators must consider scenario-based approaches, not single forecasts.
- Outputs must be practical and operationally meaningful — e.g., turning complex model outputs into clear, prioritised investment recommendations.
- Networks will expect tools that can handle multiple hazards, including:
    - Pluvial & fluvial flooding
    - Coastal inundation
    - Heat impacts on network assets
    - High winds and storms
    - Lightning
    - Ground movement due to drought

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.