

NIA Project Registration and PEA Document

Date of Submission

Sep 2025

Project Reference Number

NGED_NIA_084

Project Registration

Project Title

Future of Security of Supply for Electricity Distribution – Initial Research

Project Reference Number

NGED_NIA_084

Project Licensee(s)

National Grid Electricity Distribution

Project Start

October 2025

Project Duration

0 years and 6 months

Nominated Project Contact(s)

Liza Troshka

Project Budget

£95,638.40

Summary

The project aims to review and assess the adequacy of current electricity security of supply standards and regulations in light of the UK's evolving energy landscape. As demand for electricity is expected to grow substantially due to the decarbonisation of heat, transport, and industry, the project seeks to understand whether existing standards and regulations remain fit for purpose in ensuring reliable and resilient electricity supply. By identifying gaps, analysing future needs, and developing recommendations, the project will provide an evidence-based foundation for shaping future standards and regulations that balance security and decarbonisation goals.

Problem Being Solved

Security of supply standards have been evolving since their original introduction and in most recent years have been updated to incorporate contribution from new generation technologies and to enable use of flexibility (demand side response). Future plans for decarbonisation of heat, transport and other processes, including industrial decarbonisation, has the potential to significantly increase both demand for and reliance upon electricity, thereby increasing the socioeconomic need for reliable electricity supplies. Existing standards and incentives may not fully meet this need.

The National Infrastructure Commission's report on electricity distribution recommended a full review of security of supply standards by the end of 2028. The government's recent response to the report accepted the recommendation but stated that "the review itself may need a more flexible timescale than completion by 2028".

Method(s)

A desktop research project which will focus on summarising how DNO security of supply obligations are compared to other energy networks' security of supply obligations nationally, internationally, and cross-vector.

Why and when change may be needed will be considered and documented.

Options for future changes to security of supply standards and regulation will be proposed with a summary of the options, pros and cons of each option including interactions between different options and recommendations for next steps to select and implement

change.

Scope

To address the problem stated above NGED has partnered with University of Bath (UoB) and will undertake a research project to look into the security of supply standards and regulations in five work packages, as described below:

WP0: Project Management

NGED will hold project management duties which will be performed in accordance with NGED Innovation governance and NIA governance.

WP1: Review of the current state of security of supply obligation and incentives for DNOs

UoB will deliver WP1, drawing on historical background, transmission, gas distribution and international examples. UoB will review the current state of security of supply obligations and incentives for electricity distribution in Great Britain.

Full detail about the research coverage is provided below:

- A summary of the historical background to security of supply – how we arrived at the current arrangements – including a suggested timeline of key points from the first issue of P2 onwards.
- A comparison with the security of supply situation in electricity transmission (i.e., SQSS), highlighting any inherent differences in distribution.
- A comparison with the security of supply situation in gas distribution (the current dominant energy source for heating) and liquid fuel distribution (the current dominant energy source for transport), highlighting any inherent differences in electricity.
- A comparison with relevant international security of supply examples, highlighting any inherent differences in Great Britain.
- A commentary on the net effect of current security of supply obligations and incentives, including:
 1. Obligations set in Engineering Recommendation P2
 2. Security of supply obligations set by the Electricity Safety, Quality & Continuity Regulations, and the Electricity at Work Regulations
 3. The effect of Interruption Incentive Scheme on security of supply
 4. The effects of guaranteed standards set by the Electricity (Standards of Performance) Regulations on security of supply
 5. The effects of provisions for worst-served customers on security of supply

UoB will also deliver a commentary on the relationship between security of supply, resilience, and other related concepts. For this project, the direct impact of climate change on electricity network equipment will be considered part of resilience and therefore out of scope.

WP2: Analysis of trigger points for changes in security of supply

UoB will deliver WP2, analysing the trigger points for changes in security of supply.

UoB will address the trigger points for changes needed in security of supply (i.e. why and when change is needed). This analysis will focus on:

- How the decarbonisation of heat, transport and other processes is increasing both:
 1. Reliance upon electricity, so increasing the socioeconomic need for reliable electricity supplies.
 2. Consumption of electricity, both normally and in cold-load pickup. Engineering Recommendation P2 currently assigned classes of supply to groups of customers (i.e. how much security that group will receive) based upon the combined peak demand of that group. This calculation could be invalidated or at least require recalibration.
- How the transition from passive to active electricity distribution networks is:
 1. Creating a requirement for operating standards alongside planning standards.
 2. Influencing customer behaviour, which in turn affects peak demand and assigned levels of security.
 3. Introducing new risks to security of supply alongside outages of circuits and busbar:
 1. Outages of power electronics, SCADA systems and telecommunications
 2. The impact of distribution-connected demand and generation responding to system-level markets and signals. This raises questions about what markets and behaviours capacity or network access should be reserved for.

- A literature review of prior research and calls for change, including but not limited to:
 1. The National Infrastructure Commission's report on Electricity Distribution
 2. The government response to that report
 3. The ENA's ongoing research into the Value of Lost Load (VoLL)
 4. BEIS (now DESNZ) Electrical Engineering Standards Review, 2020
 5. IEEE standards for smart grids

WP3: Recommendation and next steps for selection and implementation of future changes to standards and regulation

UoB will deliver WP3, setting out recommendations and next steps for how the sector can move forward in relation to security of supply.

The University of Bath will:

- Set out options for future changes to standards and regulation. These will include:
 1. Deterministic vs probabilistic vs output-based
 2. Planning vs operating
- Each option will be presented as:
 1. Summary
 2. Pros and cons
 3. Interactions with other options where they are not mutually exclusive
 4. Route to commercialisation
- Recommended next steps to select and implement changes. This discovery phase project will not recommend for or against particular options, but will highlight particularly promising options as worthy of further investigation.

WP4: Closedown report and dissemination

Closedown report and dissemination activities will be delivered in accordance with NGED Innovation governance and NIA governance. WP4 will be led by NGED. UoB will contribute into closedown report writing and dissemination activities as required.

Objective(s)

- Undertake a comprehensive review of the current state of electricity distribution security of supply standard and regulations, comparing with relevant examples from other utility networks nationally and internationally.
- Evaluate increasing socio-economic reliance on electricity.
- Assess the current state of electricity distribution security of supply standards and make well justified recommendation as to whether any changes are needed (options for change proposed with rationale provided); or no changes are required.

Consumer Vulnerability Impact Assessment

The findings and recommendations of this research project will be relevant to all customers including customers in vulnerable situations.

Success Criteria

- Finalised comprehensive review of the current state of security of supply standard and regulations for electricity distribution. Comparison with gas and electricity transmission security of supply standards and regulations to be included where relevant in the context of decarbonisation and electrification of heat, transport and other processes focusing on increased socio-economic reliance on electricity.
- Well-justified conclusion, either:
 - Why and when electricity distribution security of supply needs to change, with credible options for change in security of supply proposed; or
 - That no change in electricity distribution security of supply is needed and rationale for that recommendation provided.

Project Partners and External Funding

UoB is a technical lead on the project and will be responsible for completion of WP1-WP3 and providing recommendations.

Potential for New Learning

The main output of this research project is a summary report. It will set direction for further research and subsequent development of standards and regulation across the industry.

Before the final output is produced, a workshop will be organised to allow representatives from other distribution networks to review the initial findings and recommendations. Their input and feedback will be incorporated in the final version of the report.

Upon completion of the project a webinar will be organised to ensure the learning is disseminated across the industry.

Scale of Project

This project is a desk-top research study with primary focus on UK standards and regulations. Examples of other networks standards (i.e. gas, transmission, etc) will be included along with relevant international examples for comparison.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL6 Large Scale

Geographical Area

The results of the research will be relevant for all NGED licence areas and other network operators, specifically electricity distribution network operators.

Revenue Allowed for the RIIO Settlement

Indicative Total NIA Project Expenditure

Funding required from the NIA is £86,074.56. The remaining budget of £9,563.84 is covered by NGED.

Project Eligibility Assessment Part 1

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations

Please answer **at least one** of the following:

How the Project has the potential to facilitate the energy system transition:

Decarbonisation and network security are key areas of focus and priority in NGEDs Innovation Strategy.

'Our innovation work focuses on enabling us to facilitate the lowcarbon transition, so that our network can support the connection of lowcarbon technologies while remaining safe and reliable.'

This research will create a strong starting point for updating the rules and standards that keep our electricity networks reliable. As more local carbon technologies connect to our network, we need to make sure supply stays secure. The project will help prepare our electricity system for the future, so it can handle growing demand while keeping costs fair for customers.

How the Project has potential to benefit consumer in vulnerable situations:

N/a

Requirement 2 / 2b

Has the potential to deliver net benefits to consumers

Project must have the potential to deliver a Solution that delivers a net benefit to consumers of the Gas Transporter and/or Electricity Transmission or Electricity Distribution licensee, as the context requires. This could include delivering a Solution at a lower cost than the most efficient Method currently in use on the GB Gas Transportation System, the Gas Transporter's and/or Electricity Transmission or Electricity Distribution licensee's network, or wider benefits, such as social or environmental.

Please provide an estimate of the saving if the Problem is solved

n/a

Please provide a calculation and/or description of the expected benefits of the solution

This project will not result in a direct benefit as at this discovery stage it is seeking to develop options for further consideration rather than to provide solutions.

Independent Electricity Engineering Standards Review (BEIS 2020)[1] identified that standards as currently framed will cost customers money as we move forward through the energy transition. There is a potential saving in the range of £2-6bn per annum that could partly be realised once supply security standards fully recognise the potential of changes in the energy system.

This is initial research project will guide future benefits. These are anticipated to include facilitating a faster transition to net zero.

An analysis of electricity system flexibility for Great Britain[2] by Carbon Trust and Imperial College in 2016 on behalf of the government gave a range of cumulative distribution capex saving between £8 and £13 billion. To realise these savings, security standards need to reflect the benefits of smart grid technology.

[1] [Electrical Engineering Standards Review: Independent Panel Report \(publishing.service.gov.uk\)](https://publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/864441/EEIS_Review_Independent_Panel_Report.pdf)

[2] [An analysis of electricity flexibility for Great Britain.pdf](#)

Please provide an estimate of how replicable the Method is across GB

The findings and recommendation from this project will be applicable to all networks and specifically be relevant to electricity distribution operators.

Please provide an outline of the costs of rolling out the Method across GB.

This initial research project aims to establish whether changes to the security of supply standard is required. Once recommendations are finalised it would be possible to outline the cost of proposed options across GB.

Requirement 3 / 1

Involve Research, Development or Demonstration

Projects must have the potential to have a Direct Impact on a Network Licensee's network or the operations of the System Operator and involve the Research, Development, or Demonstration of at least one of the following (please tick which applies):

- ☐ A specific piece of new (i.e. unproven in GB, or where a method has been trialled outside GB the Network Licensee must justify repeating it as part of a project) equipment (including control and communications system software).
- ☐ A specific novel arrangement or application of existing licensee equipment (including control and/or communications systems and/or software)
- ☐ A specific novel operational practice directly related to the operation of the Network Licensees system
- ☐ A specific novel commercial arrangement

Involve Research, Development or Demonstration - Please select all that apply

- ☐ A specific piece of new equipment (including monitoring, control and communications systems and software)
- ☐ A specific piece of new technology (including analysis and modelling systems or software), in relation to which the Method is unproven
- ☒ A new methodology (including the identification of specific new procedures or techniques used to identify, select, process, and analyse information)
- ☐ A specific novel arrangement or application of existing gas transportation, electricity transmission or electricity distribution equipment, technology or methodology
- ☐ A specific novel operational practice directly related to the operation of the GB Gas Transportation System, electricity transmission or electricity distribution
- ☐ A specific novel commercial arrangement

Specific Requirements 4 / 2a

Please explain how the learning that will be generated could be used by the relevant Network Licensees

n/a

n/a

Is the default IPR position being applied?

☒ Yes

Project Eligibility Assessment Part 2

Not lead to unnecessary duplication

A Project must not lead to unnecessary duplication of any other Project, including but not limited to IFI, LCNE, NIA, NIC or SIF projects already registered, being carried out or completed. Networks must explicitly mention similar projects that they have considered and how these differ.

Please demonstrate below that no unnecessary duplication will occur as a result of the Project.

Project undertaken by ENW in 2015- NIA_ENWL003 Engineering Recommendations P2 Review– have covered a similar topic but had a different focus and didn't evaluate the pressures from decarbonisation of heat and transport.

If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

Not applicable

Additional Governance And Document Upload

Please identify why the project is innovative and has not been tried before

Security of supply in electricity distribution will be researched specifically in the context of anticipated decarbonisation of heat, transport and industry by electrification. This is the first research project that specifically focuses on the interaction between security of supply and decarbonisation.

The addition of distributed generation, storage and the use of customer and network flexibility requires greater consideration of the link between the security standard and operating standards.

Relevant Foreground IPR

The main outputs of the project will be a summary report which will include:

- Review of the history of security of supply standard evolution and comparison across different network requirements and international experience
- Thorough analysis of the trigger points for changes in security of supply specifically linked to decarbonisation targets
- Recommendation for next steps for selection and implementation of future changes to standards and regulations for security of supply

Data Access Details

Any data will be shared in accordance with NGED's data sharing policy.

Please identify why the Network Licensees will not fund the project as a part of it's business and usual activities

DNOs are required by their licence obligations to comply with the security of supply standard and regulations. Adoption of LCTs and national decarbonisation ambitions more widely are increasing socio-economic reliance on electricity networks and therefore may require changes to the current standards.

During the course of the normal planning and operational activities DNOs are required to comply with the security of supply standard and regulations and therefore the opportunity to explore potential need for review and update is limited and require external funding.

Please identify why the project can only be undertaken with the support of the NIA, including reference to the specific risks (e.g. commercial, technical, operational or regulatory) associated with the project

This project aims to take a first step in modernisation of security of supply standards and regulation for electricity distribution in GB which is not fit within business as usual activities and require NIA funding support. It is envisaged that the output of this research will trigger more detailed research into specific topics within security of supply and will subsequently inform code modifications, licence changes, or even legislative changes.

This project has been approved by a senior member of staff

☒ Yes