Notes on Completion: Please refer to the appropriate NIA Governance Document to assist in the completion of this form. The full completed submission should not exceed 6 pages in total.

NIA Project Registration and PEA Document

Date of Submission

Sep 2023

Project Reference Number

NGED_NIA_073

Project Registration

Project Title

Headroom – Whole System Thinking

Project Reference Number

NGED_NIA_073

Project Licensee(s)

National Grid Electricity Distribution

Project Start

September 2023

Project Duration

1 year and 2 months

Nominated Project Contact(s)

Laurence Hunter

Project Budget

£583,877.00

Summary

This project aims to evaluate the whole energy system to determine the benefit per unit of added headroom. This benefit will be quantified in terms of both the reduced cost of energy (£/MWh) and reduced grid carbon intensity (CO2/MWh) that can attributed to increased distribution network headroom, for each voltage level, at critical times of year, and different constraint scenarios. By understanding this, we will be able to drive timely and cost-effective innovation towards these opportunities.

The project consists of three phases with increasing detail and granularity. We begin by quantifying the magnitude of benefit available from increasing headroom, then delve deeper into how different asset classes and archetypical variances will vary the benefit, providing greater rigor to the results.

Problem Being Solved

The move towards increased use of the electricity vector will mean that whole electricity system[1] costs will have a higher dependency on distribution connected assets that can provide flexibility. As the rate of electrification increases, distribution network constraints are expected to have a higher impact on the optimisation of the costs, and carbon intensity of the whole electricity system.

Currently two models from the ENA, co-developed with Baringa, are used as part of operational decision-making on investment for network capacity. In their current form there is little consideration for the value of headroom on the distribution network.

- Common Evaluation Methodology (CEM): A methodology and MS Excel model to allow the GB Distribution Network Operators (DNOs) to evaluate the use of novel network management's solutions, e.g. including Demand Flexibility, against conventional network solutions, e.g. reinforcement.
- Whole Energy System CBA: A methodology and MS Excel model to reflect the costs and benefits of different interventions to a range of stakeholders, e.g. DNOs, TOs, ESO, Gas Distribution Networks (GDNs), Local Authorities and wider society.

It is expected that over time, distribution network headroom constraints will limit the extent to which demand side response can benefit the whole electricity system. An example might be where V2G services are blocked from providing benefit to wholesale markets due to headroom constraints on the LV or HV networks.

We want to address this challenge more effectively, but to do so we need to understand the value of distribution network headroom to the whole system. Understanding this value will allow us to drive targeted innovation and provide a metric to support investment decisions in Business as Usual.

[1] For the purposes of this report, the whole electricity system comprises wholesale electricity markets, transmission system constraint management, distribution network constraint management, system balancing (the balancing mechanism and ESO ancillary services).

Method(s)

To understand the benefit per unit of headroom, we will explore the difference between two scenarios - one where networks have sufficient headroom to allow distribution-connected assets to connect and dispatch freely, and one where there is a headroom shortfall that results in curtailed dispatch and - potentially - reduced or delayed connections.

- Consideration will be made of the voltage level and different constraint scenarios, including critical times of year when constraints are likely.
- We shall look across our network to identify illustrative instances (voltages, locations, network topologies, generation mixes) that we can study to understand the impact of headroom reduction, and to provide insights about how this varies across voltage levels.
- To quantify the benefit, the impact of headroom reduction on the capacity and dispatch behaviour of distribution-connected assets (generation, storage, demand) will be reflected as an input in PLEXOS and a Balancing Mechanism model, which will be run to model the impact on system prices and system carbon emissions.
- We shall review this benefit across two different time periods to be selected between today and 2035 that have different generation mixes and demand profiles.

The project consists of three stages with analysis from each stage increasing in detail and granularity.

Stage 1: Theoretical development of project and initial modelling while modelling the whole system as a single GB block.

Baringa will lead the work, drawing on data and insight from National Grid, and expertise from EA Technology.

- Baringa:

– Lead the work, drawing on data and insight from NGED, and expertise from EA Technology.

– Key objectives are to define an approach to represent headroom reduction, and translate it into installed capacity and generation impacts, to assess the impact on prices and carbon emissions, and to understand the impact on Ancillary Service participation

– Conduct two PLEXOS runs, with and without the headroom adjustment, to establish the order of magnitude of the headroom benefit to the whole system. Each asset class (e.g. solar) will be represented as a single GB block, with no distinction between T- or D-connected, or its location. Constraint availability factor will be applied to that block to represent the impact of network headroom informed by the modelling produced by EATL.

– Constraint information for each case study will input from the excel table produced by EATL

- EA Technology Ltd:

– Responsible for receiving asset, constraint and planning data from NGED

– Update the GB transform model to include Wind Generation uptake and profiles, HV and EHV connected demand and generation, update seasons used in the analysis to cover more than just worst case. i.e. maximum demand (winter peak), typical winter, minimum demand (summer minimum), typical summer, solar peak, intermediate warm, intermediate cool.

– Review of ratings and topology for HV and EHV networks.

– Identify the volume of constrained LV generation or demand due to LV network constraints

– Identify the volume of constrained LV and HV generation or demand due to HV network constraints.

– Identify the volume of constrained EHV generation due to EHV constraints.

– Provide outputs to Baringa in tabular form

- National Grid:

– Responsible for providing the asset, constraint and planning data to the project team

– Available to discuss the modelling approach and confirm way forward

– Provide clarity on how the resulting numbers are to be used (e.g. in justifying innovation) and verify the approach is consistent with that objective

– Provide clarity on how the resulting numbers are to be used (e.g. in justifying innovation) and verify the approach is consistent with that objective

Stage 2: Understand value of headroom to Distribution Network connected demand and generation assets that provide flexibility.

Key difference from Stage 1:

- Baringa:

– PLEXOS will be augmented to represent the constraint availability factor likely for distribution-connected assets separately from transmission-connected[MP1] [HL2] [MP3] [HL4] . This is different to Stage 1 where the GB system was modelled as a single block.

– Within this stage, we begin to understand the impact headroom has on the distribution network will have on the whole system.

– Greater granularity from the network study is included, to quantify the extent to which different classes of demand and generation are limited by distribution vs transmission network constraints.

– We plan for more PLEXOS runs to test the impact of different magnitudes of headroom shortfall, at different voltage levels, [MP5] [HL6] and with different market solutions (e.g. ANM). Case studies will be informed by the early workshops, but may include aspects such as clustering of specific types of generation

- EA Technology Ltd:

– Transmission bottlenecks modelled, GSP bottlenecks not modelled,

– Generic distribution network archetype constraint modelling on a non-geographic basis. Based on nominal numbers of archetypes per licence

– Refine headroom treatment at different voltage levels

– Provide insights into effect of constraints on asset curtailment e.g. through ANM

– Following the GB wide analysis performed in Stage 1, the NGED Licence Area specific Transform models will be used to obtain more geographical granularity.

- National Grid:

– Provide data (as available and permissible) on ANM curtailment of existing assets

– Engage in discussions with the project team e.g. on the impact at different voltage levels, and curtailment market mechanisms

Stage 3: Detailed zonal model development and consolidation

Key difference from Stage 2:

- Baringa:

– The difference between Stage 2 and Stage 3 is not the resolution of the constraint modelling but how assets are defined to match geographic resource availability. Stage 3 builds on the archetypical Stage 2 by skewing the amount of dispatchable load and generation by considering renewable wind and solar availability, or land availability for batteries or EV chargers.

– Baringa's separate GB Zonal Model will be used to show zonal representation of generation, batteries and demand across different geographic aspects of the network, in contrast to the more singular GB block based models used in previous stages.

– The specific case studies built will be refined in the highest granularity tailored to the NGED network.

– Further refinement of curtailment logic is likely as our understanding of the dynamics improve

– Describe the potential impact of how locational marginal pricing may impact the modelling employed in this project. Identify how different wholesale market structures would vary the extent to which headroom benefits the wholesale market.

– Study the effect of headroom if the DSO/ESO were to adopt flex dispatch that maximises the consumption of electricity when the grid is at least carbon intensity

- EA Technology Ltd:

– Support any further refinement of the curtailment logic

– Transform models will be run again, with outputs being given to cover each of the 11 LV and 5 HV archetypes.

- National Grid:

– Continue to provide timely review of proposed approaches and interim deliverables.

– Organise project workshop sessions.

Scope

Stage 1: Theoretical development of project and initial modelling

D1.1: Conceptual Translation of headroom on generation, storage, and demand (Baringa)

- Slides presenting case studies of where headroom provides benefit to generation, storage, and demand within a national network

D1.2a: Confirmed Headroom Archetypes for PLEXOS (EATL)

- Completion of stage 1 workshops and agreement of modelling parameters for updates to Transform analysis

D1.2b: Outputs from Headroom Analysis for PLEXOS (EATL)

- Tabulated data outputs from the analysis as set out for Stage 1 PLEXOS analysis
- Short report providing an overview of the approach and any key assumptions or data inputs necessary to carry out the analysis for Stage 1
- Existing asset curtailment/turn-down volume and timing (MWh per asset class per hour of year)
- New asset installed capacity restrictions (MW) if applicable
- More granular description of individual assets to feed into non-PLEXOS impacts

D1.3: Stage 1 Report (Baringa)

- Provide a breakdown of an example energy bill and explain how the markets and price mechanisms may be affected by distribution headroom availability
- Qualitatively describe the endogenous variables limited by network headroom availability both now, and with the levels of LCT and DER forecast to connect to the distribution network, linking to the breakdown of a customer bill
- Describe how higher-cost and higher-carbon alternatives may be required to maintain system balance and stability when distributed connected Low Carbon alternatives are blocked, due to headroom issues
- Using the theoretical framework and initial modelling, explain the magnitude of benefit available from headroom increases at the national scale
- Detailed report explaining conceptually how headroom creates whole system value
- Research/modelling plan defining the way that headroom is to be modelled

Stage Gate Review

Stage 2: Understand value of headroom to National Grid connected DER

D2.1: Updated theoretical understanding of headroom (Baringa)

- Draft slides detailing conceptually how headroom creates whole system value
- Research/modelling plan defining the way that headroom is to be modelled

D2.2a: Updated headroom archetypes for PLEXOS (EATL)

- Completion of stage 2 workshops and agreement of modelling parameters for updates to Transform analysis

D2.2b: Outputs from headroom analysis for PLEXOS (EATL)

- Tabulated data outputs from the analysis as set out for Stage 2 PLEXOS analysis
- Updated short report highlighting any key changes in assumptions or data inputs necessary to carry out the analysis for Stage 2
- Existing asset curtailment/turn-down volume and timing (MWh per asset class per hour of year)
- New asset installed capacity restrictions (MW) if applicable
- More granular description of individual assets to feed into non-PLEXOS impacts

D2.3: Stage 2 Modelling Report (Baringa)

- PLEXOS modelling will represent NGED-connected assets separately from non-NGED-connected
- With- and without-headroom data including:

– Hourly day-ahead and within-day prices for the modelled period (for 2028, 2035 and 2050)

– System carbon emissions

– Ancillary Service participation and cost to ESO

- Collated information to give a £/MWh headroom whole system value, which will vary depending on archetype grouping

Stage Gate Review

D3.1: Updated translation of headroom on generation, storage, and demand (Baringa)

- Slides presenting updated case studies
- Following a successful stage gate review, develop the scenarios adding greater depth and detail using zonal modelling

D3.2a: Agreed headroom archetypes for NGED PLEXOS modelling (EATL)

- Completion of stage 3 workshops and agreement of modelling parameters for updates to Transform analysis.

D3.2b: Outputs from Headroom Analysis for PLEXOS (EATL)

- Tabulated data outputs from the analysis as set out for Stage 3
- Updated short report highlighting any key changes in assumptions or data inputs necessary to carry out the analysis for Stage 3
- Existing asset curtailment/turn-down volume and timing (MWh per asset class per hour of year)
- New asset installed capacity restrictions (MW) if applicable
- More granular description of individual assets to feed into non-PLEXOS impacts

D3.3: Stage 3 Modelling Report (Baringa)

- PLEXOS will be rebuilt to show zonal representation of generation, batteries and demand
- Explain how increased distribution network headroom may allow key stakeholders in the energy system to deploy low carbon assets more freely.
- Explain the financial impact this may have on an average customer energy bill
- Outline the benefit additional headroom can offer the whole energy system both in terms of £/MWh and CO2/MWh, following a more detailed study
- Describe the potential impact of how locational marginal pricing may impact the modelling employed in this project. Identify how different wholesale market structures would vary the extent to which headroom benefits the wholesale market

Project Closedown and Implementation (National Grid)

- Produce closedown report and publish to the ENA Smarter Network Portal
- Disseminate key project findings

Objective(s)

- Develop a methodology to calculate the whole system value of network headroom.
- Produce representative headroom archetypes that demonstrate where headroom provides value to the energy system
- Quantitatively understand what parts of the network added headroom has the most significant financial benefit to the whole energy system. This will be discussed in terms of voltage level, types of connected generation, and types of connected demand

- Understand the constituent parts of customer bills which are most impacted by added headroom, i.e. wholesale price savings, balancing market savings, carbon savings
- Collated information to give values for £/MWh and CO2/MWh headroom whole system value, which will vary depending on archetype grouping

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

This project has the potential offer cost savings to the whole energy system which will be directly passed onto customers and entities within the market. The delivery of this project is led by identifying our network needs, rather than led by specific technologies. By adopting this approach, we can eliminate the potential for money being spent on headroom increases in areas that do not offer strategic benefit and direct them closely to where it offers the most benefit to the whole energy system.

An in-depth cost benefit analysis is the basis of each Delivery Stage, so more detailed benefits will become part of the project's learning.

Success Criteria

The delivery of this project is split into three stages of increasing granularity. Results from Stage 1 will inform the project board whether there is value in continuing into Stage 2. Similarly, results from Stage 2 will inform the project board whether there is value in continuing into Stage 3. Therefore, the success criteria for this project is segmented per delivery stage. If all three stages are completed, the Stage 3 Success Criteria can be used to assess the value created by the project as a whole.

Stage 1 Success Criteria

- A successful expert workshop is held, with attendance from National Grid DSO, ESO, and project partners. The outcomes of the workshop have successfully directed the project towards maximum value.
- A comprehensive methodology to understand the value of network headroom is produced. This should be completed in collaboration with National Grid, Baringa and EA Technology LTD.

– A conceptual translation of headroom on generation, storage, and demand is produced in Stage 1, which helps understand exactly how to model headroom availability.

– An understanding of how the value network headroom availability differs according to voltage level, and according to time-base scenarios.

– Following detailed PLEXOS studies, understand how headroom availability changes the carbon intensity of the grid and consequently offers carbon savings.

- Incorporate constraints based on a national view into PLEXOS to understand the proportion of available low carbon generation that is curtailed, which otherwise supports the merit order effect.
- Develop an understanding of how the proportion of renewable generation affects the wholesale price. During Stage 1, this will be at a national level with only qualitative consideration of whether demand and generation assets are connected to the distribution network or transmission network.
- Provide an understanding of the scale of benefit increased distribution headroom may have in terms of £/MWh, and CO2/MWh. At Stage 1, this will explore what times of the year the benefit is largest.
- Detailed summary reports are produced for Stage 1 that outlines the methodology in detail, the sources of any data used, and presents key findings in a clear and understandable way. This should incorporate the effect additional network headroom has on other aspects of the customer bill, including balancing system costs, network costs, and carbon accounting costs.

Stage 2 Success Criteria

- A successful expert workshop is held, with attendance from National Grid DSO, ESO, and project partners. The outcomes of the workshop have successfully directed the project towards maximum value.
- Incorporate constraints based on individual voltage levels into PLEXOS to understand the proportion of available low carbon distribution connected generation that is curtailed, which otherwise supports the merit order effect.
- Develop an understanding of how the proportion of renewable generation affects the wholesale price. During Stage 2, this will be at a national level with detailed consideration of whether demand and generation assets are connected to the distribution network or transmission network.

· Provide an understanding of the scale of benefit increased distribution headroom[MP3] [HL4] may have in terms of £/MWh, and CO2/MWh. At Stage 2, this will explore what times of the year the benefit is largest but also consider the relative split between GB wide free dispatch and the benefit gained from increased distribution network headroom.

Detailed summary reports are produced for Stage 2 that outlines the methodology in detail, the sources of any data used, and presents key findings in a clear and understandable way. This should incorporate the effect additional network headroom has on other aspects of the customer bill, including balancing system costs, network costs, and carbon accounting costs.

Stage 3 Success Criteria

- A successful expert workshop is held, with attendance from National Grid DSO, ESO, and project partners. The outcomes of the workshop have successfully directed the project towards maximum value.
- Incorporate constraints based on geographic zones and voltage levels into PLEXOS to understand the proportion of available distribution connected generation that is curtailed, which otherwise supports the merit order effect.
- Develop an understanding of how the proportion of renewable generation affects the wholesale price. During Stage 3, this will be at a zonal level with detailed consideration of whether demand and generation assets are connected to the distribution network or transmission network in different parts of Great Britain.
- Provide an understanding of the scale of benefit increased headroom may have in terms of £/MWh, and CO2/MWh. At Stage 3, this will explore the impact of geographic differences as explored in the PLEXOS GB zonal model.
- Detailed summary reports are produced for Stage 3 that outlines the methodology in detail, the sources of any data used, and presents key findings in a clear and understandable way. This should incorporate the effect additional network headroom has on other aspects of the customer bill, including balancing system costs, network costs, and carbon accounting costs.
- Describe the potential impact of how locational marginal pricing may impact the modelling employed in this project. Identify how different wholesale market structures would vary the extent to which headroom benefits the wholesale market.
- Provide insight on how available distribution network headroom influences ESO/DSO dispatch strategies that seek to promote electricity consumption at least carbon intensive times.

Project Partners and External Funding

National Grid Electricity Distribution have a proven track record of delivering successful innovation projects that influence strategy and change DNO policy. We are always looking for ways to develop our innovation strategy to ensure we prioritise the most critical areas, aiming to be capability driven. The Innovation Team have robust project management governance and business engagement, to ensure successful delivery of projects like this.

National Grid will:

- Coordinate the project and ensure delivery is to the objectives specified in this report
- Provide relevant data and information regarding current practices
- Complete project closedown and dissemination activities
- Project sponsor is Ben Godfrey, the DSO Director
- National Grid are providing a financial contribution of £51,618.28.

Baringa Partners:

Baringa Partners are a leading economic consultancy, with a strong energy practice. Prior to this project, they have produced the two most widely used CBA models in collaboration with the ENA, and have demonstrated experience working on leading innovation projects such as Project LEO. The internationally used PLEXOS tool is the most suitable way to evaluate the whole system impact of network constraints when considering energy markets including wholesale and the balancing mechanism. In addition to the European-wide model used during Stage 1 and 2, they have developed a detailed GB Zonal model which will provide the greater granularity on how constraints effect parts of our network more specifically.

Baringa Partners will:

- Develop the project in conjunction with NGED using inputs from EA Technology
- Conduct the modelling of system benefits from PLEXOS and network benefits from CEM modelling
- Conduct offline evaluation of value of headroom at different voltage levels
- Create the reports for each Stage and present the findings to NGED
- Baringa are providing a financial contribution of £38,050 to the project

EA Technology Ltd:

EA Technology Ltd are an experienced Electrical Engineering Consultancy, with a specialism working for Distribution Network Operators. They have a strong track record of delivering similar work, such as our SILVERSMITH project, using the same toolsets as this project utilises.

EA Technology Ltd will:

- Lead network evaluation studies using the Transform tool
- Present findings in tabular form and create a short report per Stage.
- EA Technology Ltd are providing a financial contribution of £2,308.95 to the project

Supporting the project:

ESO:

ESO are responsible for coordinating the UK's electricity system, which includes managing supply and demand in real time via the balancing mechanism. In addition, they operate several of the ancillary markets low carbon technologies may participate in. Their support in the project will help validate assumptions made, and give greater strength in the work produced.

- ESO will are providing support to the project on a zero cost contribution.

Potential for New Learning

The project provides a standardised methodology that enables improved decision-making when faced with multiple options for innovation spending or infrastructure projects and a fairer allocation of limited funds.

This project creates a standardised methodology to determine the whole electricity system value of headroom and provides a value at different voltage levels. The application of the methodology and the model for other Network Licensees enables each to evaluate competing innovation projects or infrastructure projects on a fair and equitable basis across the industry.

Understanding the value of headroom will allow us to innovate effectively to add capacity on our network that can facilitate decarbonisation and net zero. To date, our projects have helped shape critical areas of our business such as alternative connections, data and digitalisation, flexibility services and network management systems. This project aims to build on existing work to help understand the whole system benefit of network headroom, allowing us to justify further innovation activities in this space.

Scale of Project

The project is desktop only. Reports and network analysis studies will be produced with no technical demonstrations

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

This project will consider the benefit headroom could bring to the entire GB electricity system, this includes all license areas of National Grid's network.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

Total Project Cost:	**£583,876.82**
Agreed Partner Contributions (Baringa):	£38,050
Agreed Partner Contributions (EA Technology Ltd.):	£2,308.95
Funding from ED1:	£0.00
Sub Total:	£543,517.87
National Grid DNO Contribution:	£54,351.79
Funding from NIA:	**£489,166.08**

Project Eligibility Assessment Part 1

There are slightly differing requirements for RIIO-1 and RIIO-2 NIA projects. This is noted in each case, with the requirement numbers listed for both where they differ (shown as RIIO-2 / RIIO-1).

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations (Please complete sections 3.1.1 and 3.1.2 for RIIO-2 projects only)

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

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

The energy system transition relies on coordinated thinking across all energy vectors and networks. Efforts to decarbonise the electricity sector rely on increased renewable generation being able to supply increased demands from Low Carbon Technologies such as electric vehicles and heat pumps. An effectively planned electricity network is needed for all aspects of the energy system transition, therefore a quantified assessment of the benefit increased headroom brings is a crucial step in prioritising the most important areas.

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 (RIIO-1 projects only)

N/A

Please provide a calculation of the expected benefits the Solution

This is for Development or Demonstration Projects, not required for Research Projects. It should be (Base Cost – Method Cost, Against Agreed Baseline) and include a description of the recipients of the benefits.

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

The output of this project will be relevant for all GB electricity network operators and can be implemented with no additional work.

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

As the project is a research piece relevant to all GB electricity network operators, no costs apply to rolling the project out.

Requirement 3 / 1

Involve Research, Development or Demonstration

A RIIO-1 NIA Project 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

RIIO-2 Projects

☐ 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

This project creates a standardised methodology to determine the whole electricity system value of headroom and provides a value at different voltage levels. The application of the methodology and the model for other Network Licensees enables each to evaluate competing innovation projects or infrastructure projects on a fair and equitable basis across the industry.

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

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, LCNF, NIA, NIC or SIF projects already registered, being carried out or completed.

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

The methodology for this project has been reviewed against other projects registered on the Smarter Networks Portal and circulated with other DNOs and TNOs ahead of registration to ensure no unnecessary duplications will occur.

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

N/A

Additional Governance And Document Upload

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

There are issues with headroom in distribution networks today that cause constraints. As the penetration of LCTs and renewables increase, this will become more acute and could ultimately become a barrier to the delivery of Net Zero. Currently, we cannot accurately compare the value of headroom in different scenarios, which means the comparison of competing innovation projects or competing infrastructure projects does not consider the wider whole system benefit. This project will estimate the benefit additional network headroom may have on the wider energy system which enables us to create stronger business cases for future work. Once tested and proven, this approach could be rolled out to other DNOs.

Relevant Foreground IPR

The Relevant Foreground IPR is:

- All deliverable reports and documents produced during the project delivery

The Relevant Background IPR required to produce this is:

- National Grid’s network modelling data
- The PLEXOS model used by Baringa under licence from Energy Exemplar
- Baringa’s proprietary market data sets for UK and Europe
- EA Technology Ltd’s Transform Model®

Data Access Details

All project findings will be published on the Smarter Network Portal, and on National Grid’s website.

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

We would not be able to fund this type of investigative work as a BAU activity. The methodology is not proven and too high-risk for BAU.

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

We would not undertake this project without NIA funding as the technology readiness level (TRL) would be too low and risk involved would be too high.

This project has been approved by a senior member of staff

☑ Yes