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

Jan 2025

### Project Reference Number

NIA_ENWL_039

## Project Registration

### Project Title

LV Futures

### Project Reference Number

NIA_ENWL_039

### Project Licensee(s)

Electricity North West

### Project Start

February 2025

### Project Duration

1 year and 7 months

### Nominated Project Contact(s)

InnovationTeam@enwl.co.uk

### Project Budget

£1,537,000.00

### Summary

The energy system transition will have the greatest impact on LV demand and capacity due to the mass adoption of LCTs. Understanding this impact on demand, available capacity and investment required requires granular long term forecasting for LV feeders.

LV Futures will analyse data from recently deployed LV monitoring and smart meters along with trends on LCT uptake to produce power flow and feeder load allocation for LV feeders. The outputs of this analysis will provide relevant information to inform interventions such as reinforcement or flexible services requirements.

### Third Party Collaborators

Kelvatek

Environmental Resources Management (ERM)

### Nominated Contact Email Address(es)

innovation@enwl.co.uk

### Problem Being Solved

The energy system transition will have the greatest impact on LV demand and capacity due to the mass adoption of electric vehicles and heat pumps. Understanding this impact on demand, available capacity and investment required requires granular long term forecasting on LV feeders. Access to this level of forecasting will then allow networks to procure flexible services or reinforce the network in a more proactive manner.

Due to the availability of data, previous innovation projects focused on granular long term demand forecasting on EHV / HV networks

but a gap exists for the LV network.

The recent deployment of LV monitoring and the increased availability of smart meter data provides an opportunity to explore the development of more granular forecasting of demand and capacity on LV feeders.

## Method(s)

LV Futures will analyse data from recently deployed LV monitoring and smart meters along with trends on Low Carbon Technology uptake to produce power flow and feeder load allocation for LV feeders. The outputs of this analysis will provide relevant information to inform interventions such as reinforcement or flexible services requirements.

Additionally, the outputs will be presented in a format to allow them to be used as an input to the LV Predict condition assessment tool. This tool will predict any condition related issues which result from the increased power flow in the LV cables and inform the asset replacement programme.

The measurements to be used to inform the forecasting will be taken from deployed LV monitoring and smart meters. These devices are manufactured, tested and certified in accordance with the relevant measurement standards.

Any data generated during the project will be managed in line with the RIIO ED2 Data Best Practice Guidance and Data Assurance Guidance

## Scope

This project will conduct detailed analysis on data from recently deployed LV monitoring and smart meters along with trends on Low Carbon Technology uptake. This analysis will produce forecasts of HV/LV substation and LV feeder demand for a 5 year time horizon which will be regularly refreshed.

The project will produce and publish all the relevant specifications and functional requirements for the forecasting tool as well as a demonstration of a limited area of LV network on a prototype tool.

**Net Benefits for consumers**

By reducing unplanned outages on LV networks, consumers will benefit from fewer disruptions, minimising financial losses and inconvenience to daily routines, work and leisure activities. Knowing that outages are less likely reduces stress and anxiety associated with the uncertainty of potential disruptions.

**Financial benefits to network**

Having a better understanding of the load and condition of LV cables, maintenance and replacement efforts can be implemented more effectively, maximising the lifespan of assets and optimising investment decisions. Unplanned outages require emergency repairs which are more expensive than planned work. By reducing these unplanned outages, it is anticipated the project will save £410,000 per annum.

## Objective(s)

The objectives are:

- Establish a methodology to ingest analyse LV monitoring and smart meter data.
- Combine above analysis with trend data for Low Carbon Technologies to produce power flow and LV feeder load allocation for a 5 year horizon.
- Build a prototype tool to demonstrate the outputs of the forecasting for a limited area of LV network.

## Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

An assessment of distributional impacts (technical, financial and wellbeing related) for this project has been carried out using a bespoke assessment tool, which assesses the project as having a positive, negative or neutral effect on consumers in vulnerable situations. To help inform the assessment, this tool considers the categories of consumers identified in the Priority Services Register

This project has been assessed as having an overall positive impact on consumers in vulnerable situations. The assessment has identified that this project will look to reduce the costs for households while reducing the amount of disruptions to them in the home. Other considerations including the projects impact on supply, immediate health and safety in the home have been made in carrying out this assessment

## Success Criteria

- A technical report detailing all the specifications and functional requirements of the forecasting tool.
- A demonstration of forecasting outputs for a limited area of LV network on a prototype tool.

## Project Partners and External Funding

Kelvatek, Environmental Resources Management (ERM)

## Potential for New Learning

LV Futures will develop a methodology to provide long term granular forecasting for low voltage networks which can be used to inform future investment plans.

The outputs from the project will be disseminated on the ENA Smarter Networks Portal, the Energy Innovation Summit and any other relevant conferences. The reports will also be published on the Electricity North West website.

## Scale of Project

The forecasting tool will cover the Electricity North West Low Voltage Network.

## Technology Readiness at Start

TRL5 Pilot Scale

## Technology Readiness at End

TRL8 Active Commissioning

## Geographical Area

North West England

## Revenue Allowed for the RIIO Settlement

£0

## Indicative Total NIA Project Expenditure

£1,383,000

# 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 long term forecasting that LV Futures provides will allow DNOs to understand the impact the energy system transition will have on the LV network. This will allow DNOs to plan interventions, such as reinforcement or flexible services requirements, in a more proactive and cost effective manner and provide the necessary capacity for increasing LCT uptake.

## 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)

Not applicable

## Please provide a calculation of the expected benefits the Solution

Electricity North West has on average over a 5-year period 3309 faults on LV networks attributed from deterioration and wear of LV cables costing £4,165,540 per annum. Proactive interventions made possible through granular LV forecasting and predicting cable wear from increased power flows are anticipated to reduce unplanned outages from faults by 10%, equating to a potential annual saving of over £410,000 per annum compared against baseline scenario of doing nothing.

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

If successful, the solution can be applied to all GB DNOs and their LV networks. Other DNOs can use the LV data they collect to produce forecasts for their networks.

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

Assuming that other DNOs collect the same LV data, the costs to roll out will be mainly in the data processing. It is difficult to provide an estimate of this for other networks as it will depend on the data format and resolution.

## 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

Network Licensees can use the published methodologies and processes to apply to LV monitoring data for their network to produce a 5 year forecast of LV demand which can then be applied to their investment plans

### 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.

A review of the Smarter Networks Portal and discussion with the ENA Innovation Manager's Group has not revealed any other projects in this area.

### 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

LV Futures will, for the first time, provide granular long term forecasting at LV feeder level. This level of forecasting has not been researched in this manner as detailed data did not exist for the LV network.

Granular long term demand forecasting already exists for EHV / HV networks but not for LV feeders. This project addresses a gap in our forecasting capabilities and will allow networks to understand the impact the mass adoption of electric vehicles and heat pumps will have on LV demand and capacity.

### Relevant Foreground IPR

Forecasting algorithms implemented in the system will constitute Foreground IPR generated in this project. The forecasting algorithm

design documentation will be disseminated and made available to other network operators so that they may replicate if required.

## Data Access Details

All data will be shared in line with the Electricity North West data sharing policy as published on our website. (https://www.enwl.co.uk/future-energy/innovation/our-innovation-strategy/our-innovation-data-sharing-policy/)

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

LV network data currently sits in a number of different systems and each system holds the data in different formats, resolutions, etc. Additionally, the number of data points for even a small area of the LV network could reach tens of thousands. The scale of the data processing required, and whether a meaningful output could be provided, is currently unknown. As the success of the solution is uncertain there is no mechanism to fund this from business as usual activities.

## 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

As stated above, the solution is unproven particularly whether the data could be integrated and processed in a cost effective manner to provide the long-term forecasting. Using NIA, we can understand the business case for the solution, how to integrate it effectively with the rest of the forecasting tools and provide a clear path to transition to business as usual for all GB networks.

## This project has been approved by a senior member of staff

☑ Yes