

NIA Project Registration and PEA Document

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.

Project Registration

Project Title

Artificial Intelligence and Machine Learning

Project Reference

ENWL020

Project Licensee(s)

Electricity North West Limited

Project Start Date

October 2018

Project Duration

3 years and 0 months

Nominated Project Contact(s)

Geraldine Paterson

Project Budget

£825,000.00

Nominated Contact Email Address(es)

InnovationTeam@enwl.co.uk

Problem(s)

Large volumes of data have become available over the last few years due to the intelligent devices fitted to the network as BAU or innovation projects. This large dataset holds information regarding to network operation and performance, asset health, development of faults and abnormalities on the network. Analysis of this data is currently a time consuming manual process so only clearly defined small pieces of analysis takes place. The data may hold hidden trends which could not be manually investigated and may offer valuable insight into network operations which could influence investment decisions as well as response to events. Finding an alternative way to interrogate this data could be crucial to the future management of DNO networks. This project proposes to investigate whether modern techniques such as machine learning and artificial intelligence could assist with this interrogation.

Method(s)

This project will investigate the application of artificial intelligence and machine learning to datasets already collected to provide additional insight into the network and its assets.

Scope

This project will be a research piece investigating the application of machine learning and artificial intelligence to data already being collected by low voltage monitoring equipment and transformer monitoring equipment already deployed on the network. The research will investigate whether machine learning can be used to identify hidden trends and make recommendations for network investment.

Objectives(s)

1. Collate data from the various systems
2. Build, train and evaluate a model to classify and work with the data
3. Produce recommendations for network operation and investment.

Success Criteria

1. Report on the methodology for collating the data
2. Production of a model to interrogate the data sets
3. Report detailing outputs from the model and recommendations for network operation and investment.
4. Report detailing how the model can be transferred to business as usual.

Technology Readiness Level at Start

TRL 3

Technology Readiness Level at Completion

TRL 6

Project Partners and External Funding

Kelvatek

Potential for New Learning

This project will produce a model which can interrogate large data sets to uncover hidden trends and make recommendations on appropriate actions to take.

Scale of Project

The project will look at a defined data set already collected by Electricity North West

Geographical Area

North West of England

Revenue Allowed for in the RIIO Settlement

0

Indicative Total NIA Project Expenditure

£750000

Project Eligibility Assessment

Specific Requirements 1

1a. A 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 the GB the Network Licensee must justify repeating it as part of a Project) equipment (including control and communications systems and 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 Licensee's System

A specific novel commercial arrangement

Specific Requirements 2

2a. Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees

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

The model will be available to other DNOs to allow them to apply it to their data.

Please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the Project.

This model will allow Electricity North West to target investment and event response more efficiently which helps us make the most of our existing assets and provide value for money for customers which are both a fundamental part of our innovation strategy.

2b. Is the default IPR position being applied?

Yes

2c. Has the Potential to Deliver Net Financial Benefits to Customers?

Yes

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

This project is a research and investigative piece and it is not possible to estimate savings at this point

Please provide a calculation of the expected financial benefits of a Development or Demonstration Project (not required for Research Projects). (Base Cost - Method Cost, Against Agreed Baseline).

Not required as this is a research project

Please provide an estimate of how replicable the Method is across GB in terms of the number of sites, the sort of site the method could be applied to, or the percentage of the Network Licensees system where it could be rolled-out.

If successful the model can be used by any network operator to interrogate their own data.

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

There is no rollout cost. The methodologies will be made available to all DNOs.

2d. Does not Lead to Unnecessary Duplication

Yes

X

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

A review of the smarter networks portal has not revealed any projects in this area.

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

Additional Governance Requirements

Please identify

that the project is innovative (ie not business as usual) and has an unproven business case where the risk warrants a limited Research and Development or Demonstration Project to demonstrate its effectiveness

X

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

Machine learning and artificial intelligence techniques are still in their infancy and to date have only been used in the IT industry.

ii) Please identify why the Network Licensee will not fund such a Project as part of its business as usual activities

The project is investigating a possible new solution which currently has a low TRL level which warrants research

iii) Please identify why the Project can only be undertaken with the support of the NIA, including reference to the specific risks (eg commercial, technical, operational or regulatory) associated with the Project

The project is investigating a possible new solution which currently has a low TRL level which warrants research

This project has been approved by a senior member of staff