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NIA Project Registration and PEA Document

Date of Submission

Oct 2022

Project Reference Number

NIA2_NGESO0021

Project Registration

Project Title

AI Centre of Excellence

Project Reference Number

NIA2_NGESO0021

Project Licensee(s)

National Grid Electricity System Operator

Project Start

September 2022

Project Duration

0 years and 4 months

Nominated Project Contact(s)

Lyndon Ruff (ESO)

Project Budget

£266,000.00

Summary

There is an ever-increasing demand for Artificial Intelligence (AI) & Machine Learning (ML) to deliver innovation projects needed for achieving net zero targets.

This project will assess the value and business impact of advancing the data science and AI/ML capabilities available to the ESO. It will determine whether an AI Centre of Excellence (CoE) model is the optimal route for building this capability and driving innovation in collaboration with external stakeholders.

By engaging with key industry stakeholders and securing senior sponsorship, the ambition is to design a programme to deliver the CoE based on a set of potential use cases to drive innovation in business-as-usual activities and data science capabilities to support the Net Zero transition.

Nominated Contact Email Address(es)

box.so.innovation@nationalgrid.com

Problem Being Solved

There is an ever-increasing demand for Artificial Intelligence (AI) & Machine Learning (ML) to deliver innovation projects and address the complex issues of evolving the ESO's capabilities and reaching our Net Zero targets. The current capability for AI/ML within National Grid ESO is unable to fulfil current and future project pipeline, with over 20% of the innovation portfolio requiring the use of AI/ML for delivery.

There are several challenges to developing the data science capability to meet this demand including market competition, low data science maturity, limited collaboration and lack of a central framework. A new approach is needed to accelerate the adoption and democratisation of AI/ML in the ESO so that the future pipeline of projects to achieve Net Zero can be fulfilled.

Method(s)

The project will run several workstreams to set the foundations for establishing an AI Centre of Excellence.

WP1 – define the key use cases that the AI CoE will deliver. It will provide a template for assessing and triaging potential AI use cases in a structured manner, comprising a list of use cases with high-level benefits, definitions, stakeholders and priority scores.

Deliverable (D1): Use case framework & backlog

WP2 – assess the options and requirements to build an AI CoE that meets the ambitions of the ESO, facilitating a series of workshops to discuss the options, assess feasibility and develop requirements with key stakeholders. The outcome of this workstream will agree the immediate priorities and roadmap to inform a programme design for delivering a CoE.

Deliverable (D2): Roadmap & programme design

WP3 – focus on how to build a strong partner & engagement framework across industry, other networks, and academia to enhance AI capability in the ESO, providing a list of candidate organisations and institutes for potential engagement on creating the CoE. This will also include the design of an academic partnership model with the ESO, identifying potential education placement programmes to develop an ongoing pipeline of talent.

Deliverable (D3): Partner & engagement framework

WP4 – The conclusion of the project will set out the vision and objectives for the AI CoE, evaluating the options for meeting the needs of the ESO and the business case for the preferred option. An executive paper will be submitted to include a recommendation for further work following the foundation phase and potential investment funding routes to pursue.

Deliverable (D4): Foundation phase exec paper

In line with the ENA's ENIP document, the risk rating is scored Low.

TRL Steps = 1 (2 TRL steps)

Cost = 1 (£266k)

Suppliers = 1 (1 supplier)

Data Assumptions = 2

Total = 5 (Low)

Scope

The foundation of the AI Centre of Excellence (CoE) will address the need for increased AI & ML capabilities within National Grid ESO to enable projects required to meet Net Zero targets. The project will:

- Demonstrate the value and build a business case for an AI CoE
- Build stakeholder buy-in and develop senior sponsorship
- Design a programme with realistic phases and clear view of priorities for building a CoE
- Deliver a framework for industry and academic partnerships

Objective(s)

This project aims to determine whether an AI CoE model is the optimal route for building data science capability and driving innovation in collaboration with external stakeholders.

- Assess the value and business impact of advancing data science and AI capabilities available to the ESO.
- Determine whether an AI CoE model is the optimal route for building this capability and driving innovation in collaboration with external partners.
- Engage with key internal and external stakeholders to develop the vision for the AI CoE and create a list of founders.
- Design a programme to deliver the CoE across key components based on a set of use cases to drive innovation in Business-As-Usual activities and data science capabilities required to support the ESO.
- Identify immediate priorities and first steps that should be delivered in the first phase of the AI CoE.
- Deliver a framework for academic partnerships which focuses on engaging with academic establishments with relevant research areas to agree potential partnership models with the ESO.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

The ESO does not have a direct connection to consumers, and therefore is unable to differentiate the impact on consumers and those in vulnerable situations. Benefits to all consumers are detailed below.

This project has been assessed as having a neutral impact on customers in vulnerable situations because it is a transmission project.

Success Criteria

This project will be a success if the following is achieved:

- A clear roadmap set out to identify the phases needed to build an AI CoE.
- Positive feedback and engagement from key stakeholders on the development of an AI CoE.
- Demonstrate how investment in an AI CoE would shape the future of the ESO.
- A clear recommendation based on the foundation work to inform next steps for scaling up the CoE in future phases.

Project Partners and External Funding

Project Partner: Capgemini, no external funding contribution.

Potential for New Learning

This project has the potential to create a new, central hub with a clear framework for data science learning and stakeholder collaboration. Overall, it will deliver new data science maturity, increased workforce capability, IT competency and improved resource acquisition.

Scale of Project

This project will span 4 months with Capgemini delivering the foundation phase for the AI CoE. The project consists of desk-based research and workshops with the relevant internal and external stakeholders identified within the project.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

The project will be based upon the GB ESO area of operations.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£266,000

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 existing machine learning capability within the ESO is unable to fulfil the current and future pipeline of projects requiring AI & ML to facilitate the net zero transition. This project is an opportunity to create a central resource for data science best practice, increasing collaboration and focused work across the industry. It will also create potential opportunities for training and upskilling, increasing the overall data science maturity within the ESO and therefore the ability to undertake more AI/ML projects to facilitate the net zero transition.

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

Not required as this is a research project.

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

The developed CoE framework and best practice information can be disseminated to support GB Network participants in building their own data science maturity.

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

At this stage the costs are unknown for rolling out foundation learning into further development.

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

RIO-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 will explore if an AI CoE model is the optimal route for building increased data science capability and driving innovation in collaboration with external partners. The developed framework and best practice information can be disseminated within the energy industry to support Network participants in building their own data science maturity.

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

This project is a first and there should be no direct duplication of any existing activities.

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

This project will define a framework and use cases for creating a combined resource pool for the ESO, centralising a data science hub of best practice and talent pipeline. Working with potential partners across academia, industry, other networks and the tech ecosystem, the project will validate the CoE vision and help shape the partnership framework, kick-starting focus on data science capabilities in the energy industry. Without an innovation project to develop this framework foundation, we would not know what the optimal solution is to improve data science capability.

An AI CoE has the potential to expose world class resource to the energy industry and the ESO where they may previously have been unaware of the challenges and development available.

Relevant Foreground IPR

The following Foreground IPR will be generated from the project:

1. Use case framework & backlog - a template for assessing and triaging potential AI use cases in a structured manner, comprising a list of use cases with high-level benefits, definitions, stakeholders and priority scores.
2. Roadmap & programme design for delivering a CoE.
3. Partner & engagement framework - which will include the design of an academic partnership model, identifying potential education placement programmes to develop an ongoing pipeline of talent.
4. Foundation phase executive paper - setting out the vision and objectives for the AI CoE, evaluating the options for meeting the needs of the ESO and the business case for the preferred option. It will include a recommendation for further work following the foundation phase and potential investment funding routes to pursue.

Data Access Details

Data for this project and all other projects funded under the Network Innovation Allowance (NIA), Network Innovation Competition (NIC) or the new Strategic Innovation Fund (SIF) can be found or requested in a number of ways:

1. A request for information via the Smarter Networks Portal at <https://smarter.energynetworks.org>, to contact select a project and click 'Contact Lead Network'. National Grid ESO already publishes much of the data arising from our innovation projects here so you may wish to check this website before making an application.
2. Via our Innovation website at <https://www.nationalgrideso.com/future-energy/innovation>
3. Via our managed mailbox innovation@nationalgrideso.com

Details on the terms on which such data will be made available by National Grid ESO can be found in our publicly available "Data sharing policy relating to NIC/NIA projects" at <https://www.nationalgrideso.com/document/168191/download>.

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

Due to the nature of the project and that it is researching potential frameworks and stakeholder engagements for a future Centre of Excellence, this does not fall into current business as usual (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

- The TRL of the overall framework is relatively low. Therefore, innovation funding is more suitable for exploring the project's potential and increasing the TRL before transferring into subsequent development.
- Conducting this project with NIA funding will ensure that the project findings can be shared more widely with other interested Network Licensees.
- Collaboration with external organisations is required to identify key stakeholders making it more suitable for NIA funding.

A similar CoE within the industry does not exist and there is no pre-defined framework or use cases which can be implemented, therefore there are risks associated with building a central hub where interaction with other industry partners and programmes is required.

This project has been approved by a senior member of staff

Yes