NIA Project Close Down Report Document

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Date of Submission

Jul 2024

Project Reference Number

NIA2_NGESO0021

Project Progress

Project Title

AI Centre of Excellence

Project Reference Number

NIA2_NGESO0021

Project Start Date

September 2022

Project Duration

0 years and 4 months

Nominated Project Contact(s)

Lyndon Ruff (ESO)

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

Objectives

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.

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.

Performance Compared to the Original Project Aims, Objectives and Success Criteria

National Grid Electricity System Operator ("NGESO") has endeavoured to prepare the published report ("Report") in respect of AI Centre of Excellence, NIA2_NGESOXX ("Project") in a manner which is, as far as possible, objective, using information collected and compiled by NG and its Project partners ("Publishers"). Any intellectual property rights developed in the course of the Project and used in the Report shall be owned by the Publishers (as agreed between NG and the Project partners).

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The project conducted a thorough assessment of the current state and future needs of the ESO in terms of data science and AI capabilities. The team also developed a vision statement for the AI CoE and engaged with several key stakeholders to support its establishment and operation. Based on a set of use cases, the team designed a programme that covers the key components of the AI CoE, such as governance, infrastructure, talent, culture, and innovation. The team also identified the most urgent and impactful actions that should be taken in the first phase of the CoE implementation. Finally, the team delivered a framework for academic partnerships that outlines the criteria and process for selecting and engaging with relevant academic institutions.

Definition of use case framework and backlog
The project has defined the key use cases that the AI CoE will deliver to support the ESO. A template has been developed for assessing and triaging potential AI use cases in a structured manner, which includes a list of 107 use cases with high-level benefits, definitions, stakeholders, and priority scores. This template will help identify and prioritise the most impactful and feasible AI solutions for the ESO.

AI COE roadmap and programme design
The project has designed a programme and a clear roadmap to deliver the AI Centre of Excellence Minimum Viable Product (MVP) phase and beyond. Several workshops with key stakeholders and experts were conducted to identify the goals, scope, and benefits of the AI CoE. The project has also assessed the feasibility and requirements of the AI CoE in terms of resources, infrastructure, governance, and culture. A comprehensive slide deck has been produced that outlines the vision, mission, objectives, and roadmap of the AI CoE, as well as the best practices and recommendations for its implementation and evaluation.

Develop partner and engagement framework
The project has delivered a framework for academic partnerships that aligns with the strategic objectives and vision. The framework outlines the criteria and processes for identifying, evaluating, and engaging with academic establishments that have relevant research areas in AI to the ESO. The framework also provides guidance on the potential partnership models including lifecycle of engagement that can be established with the ESO, such as collaborative research projects, joint publications, knowledge exchange events and student placements. The framework aims to foster long-term and mutually beneficial relationships with the academic community and ensure the ESO has the necessary AI capabilities and skills to support the energy system transition.

Vision and objectives for the AI CoE
Requirements for the next phase of the project have been defined including a detailed breakdown of the timeline, and milestones for the MVP phase. A cost model template has also been developed that can be used to estimate the resourcing costs and map the funding sources for each activity. The cost model template is based on the best practices and standards of the NIA and is aligned with the project objectives and scope.

Phase 2:
The following deliverables have been completed with the aim of proving the value of ML/AI for the ESO and the wider industry, further developing the key pillars of the AI CoE as set out in the AI CoE Vision developed within the foundations of this project:

Memorandum of Understanding (MoU) and Memorandum of Agreement (MoA) Review

A thorough review of the current ESO templates for MoU and MoA documents has been completed. Several areas have been identified where the templates can be improved to better align with the goals and expectations of academic partners. Some changes have also been proposed to the language and structure of the templates to make them clearer and more concise. A detailed report has been prepared with the findings and recommendations, which will be shared on the Smarter Networks Portal.

AI Knowledge Hub Design

The design for the AI knowledge management hub has been completed, which aims to facilitate the sharing and reuse of AI-related knowledge across ESO. The design includes a proposed structure of the hub, which consists of four main components: data, models, tools and best practices. The design also outlines the key principles that guide the development and maintenance of the hub, such as accessibility, quality, security and ethics. Furthermore, the design specifies the knowledge management processes and standards that ensure the effective and efficient use of the hub, such as knowledge creation, capture, storage, retrieval and dissemination.

Funding Model & Op Model decision paper

An options paper has been completed that outlines the opportunities and considerations for ongoing funding for the AI centre of excellence and the ongoing operating model for delivering AI in the ESO. The paper provides a comprehensive analysis of the current state of AI in the ESO, the benefits and challenges of different funding models, and the best practices and recommendations for implementing and sustaining AI initiatives.

Use case backlog management

An enduring AI use case backlog management process has been defined that enables us to prioritise, track and measure the impact of our AI initiatives. The project has also quantified the benefits captured from each use case, such as increased revenue, reduced costs, improved customer satisfaction and enhanced operational efficiency. This process helps align the AI strategy with the ESO's strategy and demonstrate the value of AI to industry and stakeholders.

Marketplace Foundation

The project has created a skills requirement catalogue that links with the backlog of use cases. This catalogue will help the ESO to identify the skills and capabilities they will need to deliver future use cases. The catalogue is based on a thorough analysis of the current and projected needs of the ESO, as well as the best practices and standards in the industry. The catalogue is also aligned with the ESO strategy and vision.

Phase 3
The following deliverables were delivered as part of a final project extension to proceed with the transition of the project towards live operation.

Hackathon
The AI CoE Hackathon aimed to leverage hackathons for designing AI solutions to improve performance in the energy sector, fostering innovation, and driving the transition to net-zero carbon. The event focused on developing an AI solution for Battery Forecasting challenges, engaging industry experts, and demonstrating the benefits of AI to support the net-zero transition. It involved participants from various sectors and was held as a hybrid event with both in-person and virtual components.

Knowledge Hub
We had successful testing of the AI knowledge hub's functionalities, including the Vault, AI Exchange, and Thought Bank with users. The UAT focused on ensuring technical specifications were met and the platform was user-friendly. Key feedback included the need for a robust communication and engagement strategy, a content creation strategy, and features for instant gratification. Recommendations were made for content moderation, clear guidelines for internal and external content, and the identification of team champions to promote the hub's use.
Academy

For the academy deliverables in this phase, we created a set of data science learning pathways paired with a set of KPIs and an interactive survey to be able to roll out to the wider business, this has been essential to benchmarking the current capability we have within the ESO. During this phase, a Whole systems thinking / System Dynamics course was created and hosted on the AI knowledge hub for rolling out to the wider ESO. This has been designed for industry and will be available wider once the AI knowledge hub is available outside of ESO.

Required Modifications to the Planned Approach During the Course of the Project

The initial project phase included creating the foundations of the AI CoE and setting the overall ambition. Following a successful initial phase, a phase 2 extension was agreed to prove the value of ML/AI for the ESO and energy industry. Phase 2 changes included £313,000 over 3 months from March 2023 to June 2023. Key deliverables included:

- MoU and MoA review
- AI Knowledge Hub Design
- Strategic decision options, including funding model and operational model
- Use case backlog management
- AI CoE Marketplace foundations

The final project phase was agreed to proceed with the transition of the project towards live operation. Phase 3 changes included £320,000 over 3 months from June 2023 to September 2023. Key deliverables included:

- AI Hackathon
- Knowledge Hub
- Academy

Lessons Learnt for Future Projects

- Business engagement is key, having early and consistent stakeholder engagement with
- ESO staff has been critical to the success of the AI Centre of Excellence so far.
- Strategic alignment has been critical to making sure the AI CoE serves the needs of the business and helps deliver on priorities.
- Knowledge hub requires significant buy in from the business to maintain, key stakeholder engagement was required and more time could have been dedicated there.
- Hackathon was incredibly successful, one lesson from this competition was to be firm with your goal and set expectations ahead of time and be explicit with them. We were clear with the goal of a hackathon to provide a dataset and problem for people outside of the energy industry to engage and get excited.

Note: The following sections are only required for those projects which have been completed since 1st April 2013, or since the previous Project Progress information was reported.

The Outcomes of the Project

- Delivered vision, mission and ambition for the AI Centre of Excellence.
- Delivered an AI Use case framework and engaged with the ESO business extensively to identify over 100 AI/ML opportunities.
- Delivered a roadmap to deliver for MVP phase and beyond.
- Positive engagement with key stakeholders including ESO exec on development of the AI CoE
- Delivered an academic partnership framework to assess and establish partnerships with academia.
- Delivered an MoU and MoA framework review
- Delivered options paper on Funding and operating models for the AI CoHackathon launched and completed on Kaggle. We had 251 entrants and 569 submissions.
- Collated open data and curated it for public consumption and use in ML Hackathon.
- Delivered an AI knowledge hub, with a robust design to be opened up externally when required.
- KPIs in place and UAT sessions delivered to iterate the design

Data Access

Details on how network or consumption data arising in the course of NIA funded projects can be requested by interested parties, and the terms on which such data will be made available by National Grid can be found in our publicly available “Data sharing policy related to NIC/NIA projects” and www.nationalgrideso.com/innovation.

National Grid Electricity System Operator already publishes much of the data arising from our NIC/NIA projects at www.smarternetworks.org. You may wish to check this website before making an application under this policy, in case the data which you are seeking has already been published.

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.

Planned Implementation

The AI Centre of Excellence is poised for a transformative phase, with a focus on planned implementation, recommendations, and next steps that align with its core functions and strategic vision. The Centre is designed to serve as a hub for collaboration, knowledge sharing, and innovation in the energy industry, particularly in the realm of artificial intelligence (AI).

Moving forward, the Centre aims to expand its **central library** to foster open collaboration and best practice sharing, not only within the energy industry but also with the data science community. This will be complemented by the **Academy,** which will continue to develop a talent pipeline, enhance the AI workforce's knowledge, and design learning pathways for digital roles.

The **Resource marketplace** will be enhanced to provide even more accessible global AI expertise to address business challenges, ensuring secure and open data exchange among stakeholders. Additionally, the Resource exchange will build upon existing partnerships, facilitating the exchange of industry knowledge and resources, and providing opportunities for cross-industry work placements, secondments, and internships.

The Centre’s vision to unify and grow a collective AI workforce in the energy industry remains steadfast. It aims to create a collaborative space where individuals can use their skills to help decarbonise the entire energy system and meet net zero targets.

As for the next steps, the Centre should maintain and enhance an enterprise-wide peer review process to drive transformational change in how the machine learning community works. This will involved recruiting for key positions to support the Centre’s initiatives and ensuring that the Centre’s structure and roles are clearly defined and communicated within the organisation and to external stakeholders.

Other Comments

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