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.
Network Licensees must publish the required Project Progress information on the Smarter Networks Portal by 31st July 2014 and each year thereafter. The Network Licensee(s) must publish Project Progress information for each NIA Project that has developed new learning in the preceding relevant year.

NIA Project Close Down Report Document

Date of Submission

Jul 2025

Project Reference Number

NIA2_NESO099

Project Progress

Project Title

AI First design discovery and prototyping

Project Reference Number

NIA2_NESO099

Project Start Date

April 2025

Project Duration

0 years and 3 months

Nominated Project Contact(s)

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Scope

This project will focus on identifying and demonstrating potential AI use cases through prototyping and end-to-end visioning, so NESO can potentially leverage AI to enhance its operations, build digital products, and deliver services

Objectives

- To explore and envision AI's transformative potential across two key strategic AI initiatives.
- Develop a prototype for Vanguard – AI-driven strategic energy planning, leveraging AI to plan future energy system.
- Develop a prototype for Volta – AI in the control room, augmenting control room operations and decision support.

Success Criteria

- **Actionable AI Insights for how AI will drive innovation and change** that helps NESO ensure that its AI transformation efforts are focused, cohesive, and aligned with its new role and AI ambitions, ultimately driving innovation in how NESO uses AI.
- **Demonstration of AI Possibilities:** Effective demonstration of AI capabilities through workshops and prototypes, showcasing how AI can transform NESO's operations, digital products, and service delivery.

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

National Energy System Operator ("NESO") has endeavoured to prepare the published report ("Report") in respect of AI Transformation NIA2_NESO099 ("Project") in a manner which is, as far as possible, objective, using information collected and compiled by NESO 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 NESO and the Project partners).

Actionable Insights into NESO's Artificial Intelligence (AI) Opportunity Landscape:
The Vanguard and Volta prototypes brought AI strategy to life, identifying how AI can shift NESO from process-heavy, document-based workflows to insight-rich, dynamic platforms across both strategic planning and control room operations.
The work uncovered high-impact AI patterns (e.g. agentic AI for scenario modelling, RAG+KAG for insight delivery, multi-modal interfaces) that can now guide NESO's wider AI transformation roadmap.
Effective Demonstration of AI Possibilities:
Workshops successfully engaged NESO staff and stakeholders in reimagining how AI could change their day-to-day work and decision-making.
The prototypes showed how AI could be embedded not just in tools, but in NESO's strategic approach to stakeholder engagement, forecasting, system planning, and operational decision support.
Creation of User Centric Prototypes
A user-focused approach was implemented to drive business buy in and adoption. A design thinking approach to capture comprehensive business requirements, build business buy in and excitement, collaboratively build a joint business and technology roadmap and drive towards NESO AI North Star.
The process that was undertaken to achieve this followed the steps below
Ideation sessions - "Ideation Sessions" were ran with the business to gather insights, test hypothesis and co-define future use cases. Output -Indicative Use Cases, Product Ideas, Low Fidelity Prototypes and Business Requirements.
Synthesise - Summarise insights captured and iterated hypothesis developed and shared it with user groups for validation. Output -: Business insights synthesised in PowerPoint. Business validation of priority use cases and requirements completed.
Prototype development - Develop new or iterate existing prototypes based on leading use cases using FIGMA third party tool to crate clickable process steps. Output – Baseline Prototype model
Iterate -Focus groups conducted to demo prototypes & solicit feedback. Joint sessions with Business, IT and Group Functions confirmed the implications on operational processes, technology, data acquisition and value case. Output – Product Feasibility and roadmap steps

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

No modifications required.

Lessons Learnt for Future Projects

Embracing Multi-Modal Interactions:
We discovered that AI-driven products can greatly benefit from offering various interaction modes, such as traditional mouse and keyboard interfaces, voice commands, and proactive alerts. This flexibility is especially important in high-stakes environments like control rooms, where different modes of interaction can enhance efficiency and usability.
Proactive vs. Reactive AI Design:
A key takeaway was the importance of balancing proactive AI features, like suggestions and alerts, with reactive ones that respond to user queries. This dual approach helps in creating a more intuitive and supportive user experience, ensuring that AI is not only reactive but also anticipates user needs. One of the biggest opportunities is rethinking AI not as a chatbot, but as a system that pushes context-aware insights and guidance to users, helping shift NESO from reactive to predictive in both planning and operations.
Building Trust Through Design:
Trust is crucial when introducing AI-driven tools. We learned that clear, transparent UI elements that explain AI-generated insights and suggestions help users feel more comfortable and confident in relying on AI.
Personaliszation for Diverse Personas:
With Vanguard, we recogniszed the necessity of tailoring AI outputs to different user personas. Even when using the same underlying data, the presentation and emphasis needed to be adjusted to meet the specific needs and expectations of different user groups, like local authorities versus internal modelers.
Design Opportunities and Challenges:
Overall, the project highlighted that incorporating AI into digital products opens up new design possibilities, such as adaptive user interfaces and predictive assistance, but also presents challenges in ensuring usability, transparency, and user trust. Workshops and

prototype testing reinforced that trust in AI grows when outputs are explainable and traceable. Building in audit trails, access to source data, and alignment with NESO's codes/methodologies supports safe adoption.

Clarity in AI Value Requires Demonstration:

Prototypes such as Vanguard and Volta showed that conceptual discussions alone aren't enough: staff and stakeholders grasp the value of AI best through tangible, hands-on demonstrations that ground the possibilities in their day-to-day roles.

Internal-External Continuity Matters:

Innovation is maximised when AI tools work seamlessly across internal users (e.g. NESO modelers, operators) and external ones (e.g. DNOs, TOs, developers), improving alignment, transparency, and data reuse across the energy system.

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

Vanguard Prototype:

Established a foundational vision for the digital experience in strategic energy planning.
Demonstrated how AI can personalise and adapt to the diverse needs of different user groups, such as local authorities and internal modelers.
Provided a clear pathway for enhancing user engagement through AI-driven insights and tools.

Volta Prototype:

Delivered a robust prototype that reimagines the control room experience with adaptive AI models.
Showcased how AI can transform decision-making processes, making them more data-driven and efficient.
Laid a solid foundation for future innovations in control room operations, highlighting the potential of AI to enhance real-time scenario planning and optimization.

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 NESO can be found in our publicly available "Data sharing policy related to NIA projects (and formerly NIC)" and Innovation | National Energy System Operator.

National Energy System Operator already publishes much of the data arising from our 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

Two prototypes with design (UX and UI) elements. Please contact NESO innovation for further information about these prototypes.

Planned Implementation

- Expand User Research and Engagement for Vanguard:

Conduct comprehensive user research involving all relevant personas, including transmission and distribution network operators, local authorities, and technology providers.

- Iterate and Enhance Vanguard's Design:

Use insights gathered from the expanded user research to iterate on the Vanguard prototype. Focus on creating a seamless and intuitive digital experience powered by that can easily adapt to different user requirements in strategic energy planning.

- Advance the Volta Prototype:

Build upon the initial Volta design by developing more detailed scenario simulations. Explore various control room scenarios to showcase how the AI-driven interface can improve decision-making and response times.

- User-Centric Testing and Feedback Loops:

Implement a continuous feedback loop with end-users for both Vanguard and Volta. Regular testing and iterative improvements based on user feedback will ensure the products are aligned with real-world needs and expectations.

- Codify a AI Design Framework:

Turn the design and capability patterns explored in the prototypes into a reusable AI product playbook, covering things like explainability standards, integration with modelling pipelines, and interface patterns for proactive AI delivery.

- Deepen Use Case Discovery with End Users:

Conduct expanded user research with system planners, DNOs, operators, and policy stakeholders to refine and prioritise use cases for future sprints, especially in the context of live planning and regulatory milestones (e.g. CP30, SSEP).

Net Benefit Statement

This project has successfully explored how AI can transform NESO's strategic energy planning and control room operations. It delivered prototypes that explore how GenAI and agentic AI capabilities, can power such digital experiences and automations and set the foundations for an AI-powered knowledge base and digital product suite.

By aligning with the tool's outcome categories, "Increase digitalisation/automation of the network", "Facilitate adoption of innovative technologies", and "Improve stakeholder engagement" the project demonstrated how AI can:

- Automate complex planning tasks and scenario modelling,
- Surface insights that are currently locked in static documents or spreadsheets,
- Improve decision-making and reduce manual effort for NESO staff,
- Deliver more accessible, explainable outputs to external stakeholders
- Create repeatable digital experiences that increase trust and transparency for AI

Even if full-scale deployment lies ahead, this work has already unlocked significant value by shaping NESO's AI strategy and proving how AI can drive practical digital experiences that can be learning for driving the industry forward in using AI for digitisation solutions.

Other Comments

The Project outcomes and results contain confidential information and intellectual property rights that cannot be disclosed in this Report due to their proprietary nature. Should the viewer of this Report ("Viewer") require further details this may be provided on a case by case basis following consultation of all Publishers. In the event such further information is provided each and any Publisher that owns such confidential information or intellectual property rights shall be entitled to request the Viewer enter into terms that govern the sharing of such confidential information and/ or intellectual property rights including where appropriate formal licence terms or confidentiality provisions. Dependent upon the nature of such request the Publishers may be entitled to request a fee from the Viewer in respect of such confidential information or intellectual property rights.

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