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

Aug 2025

Project Reference Number

NIA2_NGET0099

Project Registration

Project Title

Improved Role Based Access Control for Intelligent Devices

Project Reference Number

NIA2_NGET0099

Project Licensee(s)

National Grid Electricity Transmission

Project Start

September 2025

Project Duration

1 year and 1 month

Nominated Project Contact(s)

Ibukunolu Oladunjoye

Project Budget

£277,000.00

Summary

This project aims to enhance Role-Based Access Control (RBAC) within Intelligent Electronic Devices (IEDs) across a defined segment of the network. By addressing traditional access control limitations, the initiative will establish a scalable framework that improves security, operational efficiency, and compliance with industry standards. Key objectives include assessing existing IEDs for necessary upgrades, launching a pilot project for real-world testing, and collaborating with technology partners and cybersecurity experts. The project will also involve implementing a robust monitoring system to evaluate effectiveness. Ultimately, this initiative will fortify the security of the National Grid, ensure reliable service delivery and contributing to the energy sector's stability.

Third Party Collaborators

Arceptive

Nominated Contact Email Address(es)

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Problem Being Solved

As the energy sector continues to advance with the integration of sophisticated Intelligent Electronic Devices (IEDs), the limitations of early security measures have become increasingly evident. Initially, these devices relied on basic password protection for operations and administration tasks; however, this approach is no longer sufficient in the context of modern energy management. Current advancements in IED technology necessitate a more robust access control framework, as traditional passwords require ongoing management and fail to accommodate the diverse levels of access needed for various users interacting with a single device. While Role Based Access Control (RBAC) has been implemented in many modern IEDs to enhance security and streamline access management, gaps still exist in its adoption and effectiveness. Inconsistent implementation, legacy systems lacking RBAC capabilities, and the complexity of integrating these controls can lead to vulnerabilities. Therefore, addressing these challenges is essential to ensure that users are granted appropriate access rights, thereby enhancing the security of the energy network and

improving service reliability for all consumers, particularly those in vulnerable situations.

Method(s)

NGET will adopt a practical solution method to enhance the implementation of RBAC in IEDs. This approach would begin with a pilot project to assess the current state of certain major National Grid's IEDs across the network, this is to identify and establish those that require upgrades to support advanced access control features. NGET will collaborate with technology partners to develop and deploy a tailored RBAC framework that includes user role definitions, permissions, and access levels specific to operational needs. Additionally, NGET will implement a robust monitoring and auditing system to evaluate the effectiveness of the RBAC implementation continuously. Though not in the scope of this particular project, the follow – up project would incorporate training sessions for staff to ensure proper understanding and adherence to the new access control policies.

Scope

The scope of this project encompasses a comprehensive initiative to enhance the security and access control of IEDs within the National Grid Electricity Transmission network. The project will begin with an assessment phase, where a thorough evaluation of existing IEDs will be conducted to identify vulnerabilities and determine which devices require upgrades to support advanced access control features. This phase will involve gathering data on current access control measures, user roles, and operational requirements to inform the development of a tailored Role-Based Access Control (RBAC) framework. Following this, a pilot implementation will be executed involving a representative sample of IEDs to test the effectiveness of the new framework, with continuous monitoring and evaluation to gather insights for further enhancements.

In addition to the pilot, the project will focus on developing a robust RBAC framework in collaboration with technology partners, operational teams, and cybersecurity experts, ensuring it accommodates diverse access requirements. A comprehensive monitoring and auditing system will be established to continuously evaluate the effectiveness of the RBAC implementation. The project aims to create a scalable model that can be expanded across the entire electricity transmission network, ensuring long-term sustainability and compliance with industry standards. Regular progress reports will be prepared for stakeholders, detailing findings and recommendations for ongoing improvements, ultimately enhancing the reliability of energy delivery to all consumers.

Objective(s)

- Conduct comprehensive assessment and pilot implementation: evaluate the current state of Intelligent Electronic Devices (IEDs) and launch a pilot project to test the effectiveness of a tailored Role-Based Access Control (RBAC) framework.
- Develop and implement tailored RBAC framework: collaborate with technology partners and cybersecurity experts to design a robust RBAC framework with clearly defined user roles, permissions, and access levels.
- Establish monitoring and auditing: create a comprehensive monitoring and auditing system to assess RBAC effectiveness.
- Ensure scalability and compliance: design a scalable model for expanding the RBAC framework across the entire electricity transmission network, ensuring compliance with industry standards and providing regular progress reports to stakeholders.

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 a neutral impact on customers in vulnerable situations.

Success Criteria

- Effective RBAC implementation: successful deployment of the tailored Role-Based Access Control (RBAC) framework across the pilot sample of IEDs, with clearly defined user roles and permissions.
- Positive pilot evaluation: completion of the pilot implementation with measurable improvements in security and access management, demonstrating the framework's effectiveness.
- Robust monitoring system: establishment of a continuous monitoring and auditing system that effectively tracks user access and identifies potential security issues, ensuring compliance with industry standards.

Project Partners and External Funding

None.

Potential for New Learning

- Enhanced understanding of RBAC implementation: gaining insights into the practical challenges and best practices associated with implementing Role-Based Access Control (RBAC) in complex environments, particularly within Intelligent Electronic Devices (IEDs). Exploration of novel enhancements to RBAC technology for IEDs.
- Identification of security vulnerabilities: discovering specific vulnerabilities and weaknesses in existing access control measures, leading to a deeper understanding of how to mitigate risks in future projects. This includes technology as well as process related vulnerabilities.
- Stakeholder collaboration dynamics: learning effective strategies for engaging and collaborating with diverse stakeholders, including technology partners, operational teams, and cybersecurity experts, to achieve project goals.
- Training effectiveness: evaluating the impact of training materials and sessions on staff understanding and adherence to new access control policies, providing insights into how to improve future training initiatives.
- Monitoring and auditing best practices: developing a comprehensive approach to monitoring and auditing user access, which can inform future security measures and compliance strategies across the organization.
- Scalability insights: understanding the factors that contribute to the successful scalability of security frameworks, enabling the organization to expand effective practices across the entire electricity transmission network.
- Regulatory compliance knowledge: gaining a clearer understanding of industry standards and regulations related to access control and cybersecurity, which can enhance future compliance efforts.
- User behaviour patterns: analysing user behaviour and access patterns to identify trends that can inform future access control policies and improve overall security posture.

The learnings will be disseminated across the business through presentation sessions, seminars and externally through conferences and related activities.

Scale of Project

The project scale will encompass a comprehensive assessment and upgrade of IEDs across a defined segment of the electricity transmission network. This initiative will involve a pilot implementation covering a representative sample of devices to evaluate the effectiveness of the new RBAC framework. The project will engage multiple stakeholders, including technology partners, operational teams, and cybersecurity experts, to ensure a holistic approach to access control. The scale of the project aims to create a scalable model that can be expanded to the entire network, ultimately enhancing security and operational efficiency while ensuring compliance with industry standards and regulations.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL6 Large Scale

Geographical Area

The project will take place at the supplier's site.

Revenue Allowed for the RIIO Settlement

n/a

Indicative Total NIA Project Expenditure

IA Spend = £249, 300

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 project has the potential to significantly facilitate the energy system transition by enhancing the security and efficiency of Intelligent Electronic Devices (IEDs) within the electricity transmission network. By implementing a robust Role-Based Access Control (RBAC) framework, the project ensures that access to critical infrastructure is tightly controlled and monitored, reducing vulnerabilities and increasing resilience against cyber threats. This improved security posture not only protects existing energy assets but also fosters greater confidence in the integration of renewable energy sources and advanced technologies. As the energy sector evolves towards a more decentralized and digitized model, the project's emphasis on secure access management will be crucial in supporting the transition to a sustainable and reliable energy system.

How the Project has potential to benefit consumer in vulnerable situations:

The project has the potential to greatly benefit consumers in vulnerable situations by enhancing the security and reliability of the electricity transmission network. By implementing a robust Role-Based Access Control (RBAC) framework, the project ensures that critical infrastructure is protected from unauthorized access and cyber threats, thereby reducing the risk of service disruptions. Improved security measures will lead to more stable and reliable energy delivery, which is particularly important for vulnerable consumers who may rely heavily on consistent energy access for essential services such as heating, medical equipment, and communication. Ultimately, by safeguarding the energy system, the project aims to provide peace of mind and greater assurance of service continuity for all consumers, especially those in need.

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

The project delivers significant net benefits to both consumers and the National Grid by enhancing the security and efficiency of the electricity transmission network. For consumers, particularly those in vulnerable situations, the implementation of a robust Role-Based Access Control (RBAC) framework ensures a more reliable energy supply, reducing the risk of outages and service disruptions. This increased reliability translates into greater peace of mind and consistent access to essential services. For the National Grid, the project enhances operational efficiency by streamlining access management and reducing the likelihood of costly security incidents. The potential savings from preventing breaches and minimizing outages can lead to lower operational costs, which may ultimately be passed on to consumers in the form of reduced energy prices. Together, these benefits foster a more resilient energy system, ensuring that both consumers and the National Grid can thrive in a secure and efficient environment.

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

There is an on-going plan within National Grid to roll out a significant number of new substations in a short time, both Brownfield and Greenfield.

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

The cost estimation for replicating the proposed method for enhancing Role-Based Access Control (RBAC) across Great Britain's substations will depend on several factors, including the number of substations, the complexity of existing systems, and the specific technological solutions implemented. Though this is a low TRL project as we will be gaining some learnings from the project, however, the structured approach allows for economies of scale, as lessons learned from initial pilot projects can inform subsequent deployments, potentially reducing costs associated with training, implementation, and system integration. Additionally, leveraging partnerships with technology providers can lead to more competitive pricing and streamlined processes. Overall, while specific values cannot be provided, the method's replicability is expected to yield significant cost efficiencies when rolled out across the network.

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

The learning generated from the project can provide significant benefits to relevant Network Licensees by establishing best practices for implementing Role-Based Access Control (RBAC) and standardizing security processes across the network. Fostering collaboration among Network Licensees will encourage knowledge sharing and collective improvements in security practices. Ultimately, these insights will help Network Licensees enhance their security frameworks, improve operational efficiency, and ensure better compliance with regulatory requirements, contributing to a more resilient energy infrastructure across Great Britain.

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.

This idea is a growing focus within the utility industry and limited work is around this area, hence National Grid intends to gain some learnings. Role based access control (RBAC) is a common technology in IT systems. However, it is not widely used within Operational Technology (OT) spaces because it requires additional communications and standardization. Even though it relies on common technologies, devices have begun to adhere to the new specifications recently and therefore an early investigation into how the technology can be applied to Electricity Transmission substations needs to be conducted to ensure the right choices are made.

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

The project is innovative due to its implementation of a tailored Role-Based Access Control (RBAC) framework specifically designed for Intelligent Electronic Devices (IEDs), moving beyond traditional password protection to enhance security in modern energy management. It employs a pilot implementation model for real-world testing and iterative improvements, ensuring a holistic approach that includes stakeholder engagement, and continuous monitoring. The framework's scalability and replicability across various substations facilitate consistent modernization of energy infrastructure nationwide. Additionally, the project prioritizes the security and reliability of energy supply for vulnerable consumers, demonstrating a commitment to social responsibility within the energy sector.

Relevant Foreground IPR

The project will generate foreground intellectual property rights (IPR) in the form of software components and methods that enable enhanced Role-Based Access Control (RBAC) for Intelligent Electronic Devices (IEDs), as well as a high-level architecture for advanced RBAC systems in critical infrastructure, complete with associated security, performance, and scalability assessments. This architecture and assessment can be utilised by stakeholders without any requirement for background IP.

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:
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 already publishes much of the data arising from our innovation projects here so you may wish to check this website before making an application.
Via our Innovation website at https://www.nationalgrid.com/uk/electricity-transmission/innovation
Via our managed mailbox box.NG.ETInnovation@nationalgrid.com
Due to the sensitve nature of this project certain outputs will be readacted. In-case of a request, National Grid reserves the right to withhold certain information or data considered sensitive .

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

The project involves considerable research, development, and proof of concept, making it fit well as an innovation project.

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 project involves considerable research with the potential for new learning, which will ultimately result in a higher Technology Readiness Level (TRL) and offer significant benefits to the business. It aligns with the relevant NIA criteria.

This project has been approved by a senior member of staff

☑ Yes