

NIA Project Registration and PEA Document

Date of Submission

Oct 2026

Project Reference Number

NIA3_NGET0029

Project Registration

Project Title

i-GPT - Intelligent Grid Planning Tool

Project Reference Number

NIA3_NGET0029

Project Licensee(s)

National Grid Electricity Transmission

Project Start

December 2026

Project Duration

1 year and 1 month

Nominated Project Contact(s)

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Project Budget

£438,964.00

Summary

The Intelligent Grid Planning Tool (iGPT) project will assess the feasibility of using assured artificial intelligence to support transmission network planning within DlgSILENT PowerFactory. As the energy transition accelerates, planners face increasing volumes of reinforcement, generation connection and system development studies that are labour-intensive and dependent on specialist expertise.

The project will develop and evaluate a proof-of-concept platform combining conversational AI, engineering verification and auditable decision support. It will assess whether AI can reduce study times, improve consistency, strengthen knowledge retention and increase productivity while maintaining governance, transparency and human oversight.

The project will also generate learning on AI governance, assurance, auditability, cybersecurity and the use of large language models in regulated transmission planning, with findings shared across network licensees.

Third Party Collaborators

University of Exeter

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Problem Being Solved

National Grid Electricity Transmission (NGET) undertakes a large volume of power system planning studies to support generation connections, network reinforcement, operability assessments, system development and long-term network planning activities. These studies are essential to informing engineering decisions and ensuring the transmission network can continue to operate safely, securely and efficiently as the electricity system evolves.

Many transmission planning activities involve complex multi-stage workflows within DlgSILENT PowerFactory and associated engineering tools. Engineers are required to carry out activities such as model preparation, dataset selection, study configuration, network scaling, contingency definition, result assessment, reporting and documentation. These activities often require significant manual effort and must be completed in accordance with established engineering processes and standards.

The complexity of planning studies has increased over time as the volume of data, number of network scenarios and range of planning requirements have expanded. Engineers must work with large transmission network models, multiple assumptions and numerous study cases whilst maintaining appropriate levels of quality, consistency and traceability. The effort required to undertake routine planning activities can reduce the time available for higher-value engineering analysis and decision-making.

A significant proportion of planning knowledge resides within experienced engineers and is distributed across procedures, guidance documents, historical studies and team-specific practices. As a result, planning activities can be heavily dependent on specialist expertise and experience. This can create challenges in knowledge transfer, onboarding new engineers and ensuring that planning workflows are applied consistently across different users and teams.

Many planning workflows also involve repeated interactions between multiple software tools, datasets and reporting processes. Information may need to be manually gathered, interpreted and transferred between systems before studies can be executed and documented. Recreating previous studies, understanding historical assumptions or locating relevant information can require substantial engineering effort and time.

As study volumes continue to grow, planning teams face increasing pressure to deliver studies efficiently whilst maintaining engineering governance, reproducibility and confidence in study outputs. Variations in workflow execution, dependence on specialist knowledge and the time required to complete routine planning activities can present challenges in maintaining consistency and scalability across planning processes.

The challenge therefore relates to the increasing workload, complexity and knowledge dependency associated with transmission planning studies, together with the need to maintain consistent, traceable and repeatable planning activities. Understanding these challenges and their impact on planning efficiency, engineering resource utilisation and workflow consistency is essential as network planning requirements continue to increase in scale and complexity.

Method(s)

Transmission planning studies play a critical role in supporting network development, generation connections, reinforcement planning and operability assessments across the electricity transmission network. These studies rely on established engineering workflows within DlgSILENT PowerFactory and associated planning tools. However, many activities within these workflows remain highly manual, requiring engineers to spend significant time locating relevant information, configuring studies, executing routine processes and documenting outputs. As planning requirements continue to increase, there is a need to better understand how emerging digital technologies can support these activities whilst maintaining engineering governance, transparency and confidence in study outcomes.

The project will adopt a technical research and development approach to investigate the application of advanced artificial intelligence technologies within transmission planning environments. The project will focus on a number of high-volume planning workflows identified by NGET and will evaluate how engineering activities are currently undertaken, where inefficiencies exist and the extent to which planning workflows can be supported through digital tools.

The work will be delivered through four principal phases. The first phase will establish a baseline understanding of existing planning activities, including workflow mapping, process documentation, identification of engineering requirements and measurement of current study performance. This phase will provide the benchmark against which subsequent project outcomes will be assessed.

The second phase will focus on developing and integrating prototype capabilities within a controlled research environment. This will include investigation of workflow orchestration, natural language interaction, integration with planning software environments and management of engineering knowledge sources. The objective is to understand the technical feasibility of applying these approaches to transmission planning activities and identify any limitations or constraints.

The third phase will investigate methods for ensuring study outputs remain consistent, reproducible and traceable. Activities will include the development and assessment of approaches for recording workflow execution, validating study outputs and maintaining appropriate levels of transparency and engineering oversight. This phase will seek to improve understanding of how emerging digital technologies can be aligned with the governance requirements associated with transmission planning activities.

The final phase will involve evaluation of the developed capabilities against representative planning workflows. Performance will be compared against baseline activities to assess potential impacts on engineering effort, workflow consistency, repeatability, study execution time and usability. Lessons learned will be documented and disseminated to support future decision making and wider

industry learning.

A research and development methodology has been selected because significant technical uncertainty remains regarding the suitability, reliability and effectiveness of emerging AI technologies within regulated transmission planning environments. Currently, there is limited evidence regarding how such technologies may perform when applied to complex engineering workflows, how they can be effectively governed and the extent to which they can support planning activities whilst maintaining appropriate levels of engineering assurance. The project is therefore intended to generate evidence, learning and operational insight to reduce these uncertainties prior to any future deployment decisions.

The project will evaluate governance, transparency, cybersecurity and auditability requirements associated with the deployment of artificial intelligence within transmission planning environments. Assessment activities will include validation and verification of AI-generated outputs, human oversight requirements, traceability of recommendations, access control, data management and model performance monitoring. These activities will inform the development of an assurance framework suitable for future deployment within regulated engineering environments.

Data Quality Statement (DQS):

The project will be delivered under the NIA framework in accordance with Ofgem, ENA and NGET policies and procedures. Data generated throughout the project will be subject to appropriate quality assurance processes to ensure that information produced within project deliverables is accurate, traceable and supported by documented sources where applicable. Project outputs, reports and associated documentation will be stored within approved NGET information management systems, ensuring appropriate access control, version management and record retention. Relevant project learning and reports will be made available through the ENA Smarter Networks Portal and shared with relevant stakeholders.

Measurement Quality Statement (MQS):

The project methodology will be subject to the quality assurance processes of the project delivery partners and NGET project governance arrangements. Baseline measurements, workflow assessments, performance evaluations and any associated economic assessments will be undertaken using documented methodologies and clearly defined assumptions. Sources of data, measurement approaches and analysis methods will be recorded and made available for review. Any assessments of project outcomes will be undertaken against agreed performance indicators and documented within project deliverables and final reports to ensure transparency, repeatability and verification of project findings.

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

TRL Steps = 1 (1 TRL steps)

Cost = 1 (£438k)

Suppliers = 1 (1 supplier)

Data Assumption = 2 (data supplied by suppliers for analysis)

Overall Risk is **Low**

Scope

The project will investigate the feasibility and effectiveness of applying assured artificial intelligence technologies, including large language models (LLMs), to support transmission network planning activities undertaken within DlgSILENT PowerFactory. The solution will combine conversational AI, workflow orchestration, engineering verification, knowledge retrieval and auditable decision-support capabilities to assist engineers undertaking complex planning studies. The project will evaluate whether AI-assisted workflows can improve study efficiency, consistency, reproducibility and knowledge retention while maintaining appropriate engineering governance, transparency and human oversight.

The project scope includes the identification, analysis and assessment of seven priority planning workflows that represent a significant proportion of routine planning activities undertaken by NGET engineers. For each workflow, the project will investigate how AI-enabled assistance can support study preparation, model interrogation, knowledge access, workflow execution, result interpretation, documentation and engineering assurance while maintaining appropriate human oversight and governance.

Activities will include requirements gathering, workflow mapping, development and testing of prototype AI capabilities, evaluation against representative planning studies, and assessment against defined success criteria and baseline performance metrics. The project will investigate opportunities to improve efficiency, consistency, reproducibility, knowledge retention and accessibility of

specialist engineering expertise through the application of assured AI technologies.

The project will generate evidence on the technical feasibility, operational suitability, cybersecurity considerations and potential value of deploying AI-enabled planning assistants within regulated transmission planning environments. Expected consumer benefits include more efficient utilisation of specialist engineering resources, improved consistency and repeatability of planning studies, enhanced knowledge retention, reduced engineering effort associated with routine planning activities and the potential to reduce the time and cost required to undertake transmission planning studies. If successful, these improvements could support faster assessment of generation connections, network reinforcement requirements and future system needs, helping to reduce planning bottlenecks and support the timely delivery of infrastructure required for the energy transition.

The project will also generate transferable learning relating to AI governance, engineering assurance, auditability, cybersecurity and the application of large language models within regulated transmission planning environments. Learning will be disseminated to support adoption and evaluation by other network licensees and organisations undertaking similar planning activities.

Successful delivery could support more efficient network planning and reinforcement activities, helping NGET respond to increasing planning demands associated with generation connections, network investment and the transition to a low-carbon energy system.

Objective(s)

- Define and baseline seven priority transmission planning workflows.
- Assess the feasibility of applying AI technologies to support transmission planning activities within DigSILENT PowerFactory.
- Develop and evaluate prototype capabilities across selected planning workflows.
- Investigate approaches to improve workflow efficiency, repeatability and accessibility of engineering knowledge.
- Assess governance, assurance and reproducibility requirements for planning workflows.
- Quantify potential operational and financial benefits associated with future deployment.
- Generate learning and evidence to inform future adoption decisions.

Consumer Vulnerability Impact Assessment

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 consumers in vulnerable situations. This is because the project focuses on transmission network planning processes and engineering workflows and does not directly affect customer interactions, energy usage, billing arrangements, access to services or security of supply. The project is primarily concerned with investigating opportunities to improve the efficiency, consistency and scalability of transmission planning activities. Whilst successful implementation may contribute to broader network efficiency benefits over the longer term, no direct technical, financial or wellbeing impacts on consumers in vulnerable situations are anticipated during the project. Therefore, the project is not expected to create any positive or negative distributional impacts for consumers in vulnerable situations. Therefore, the project is not expected to create any positive or negative distributional impacts for consumers in vulnerable situations.

Success Criteria

The project will be considered successful if the following deliverables and associated acceptance criteria are achieved:

Milestone 1: Workflow specifications are defined and agreed, and a manual baseline established for all seven target transmission planning workflows.

Milestone 2: The execution layer is successfully developed and demonstrated across all seven target workflows.

Milestone 3: The conversational interface layer is successfully developed and demonstrated across all seven target workflows.

Milestone 4: The workflow orchestration layer is successfully developed and demonstrated across all seven target workflows.

Milestone 5: The assurance layer is successfully developed, and the complete four-layer architecture is integrated and qualified across all seven target workflows.

Milestone 6: A pilot deployment is completed within NGET, with all critical issues identified and appropriately addressed.

Milestone 7: Project evaluation, user training and knowledge transfer activities are completed, and all project deliverables are successfully handed over and accepted.

In addition, project success will be assessed against the achievement of agreed performance metrics covering workflow execution success rate, study reproducibility, engineering effort reduction, user acceptance, auditability, and compliance with defined governance and assurance requirements. Evaluation will be undertaken against the baseline established during the initial project phase.

Project Partners and External Funding

National Grid Electricity Transmission (NGET) will fund the project through the Network Innovation Allowance (NIA). The University of Exeter will act as the principal delivery partner and appointed external supplier, providing expertise in artificial intelligence, large language models, workflow orchestration and software development. The University of Exeter will be responsible for delivering the project scope, including requirements gathering, workflow analysis, development and testing of prototype capabilities, evaluation against representative transmission planning studies, and assessment of project outcomes. NGET will provide project governance, technical oversight, engineering assurance, access to planning expertise and representative study cases, and will lead project reporting, dissemination of learning and stakeholder engagement activities throughout the project lifecycle.

Potential for New Learning

The project will generate new learning regarding the application of artificial intelligence technologies, including large language models (LLMs), within regulated transmission planning environments and improve understanding of how such technologies can be applied to support complex engineering workflows while maintaining appropriate levels of governance, transparency, auditability and engineering oversight. The project will investigate the feasibility, effectiveness and limitations of applying AI to a range of transmission planning activities, including workflow execution, engineering knowledge access, study reproducibility, process consistency and engineering decision support.

Learning will be generated on the integration of AI technologies with DlgSILENT PowerFactory, the suitability of AI-assisted approaches for regulated engineering environments, approaches for engineering assurance and governance, methods for validating AI-generated outputs, workflow orchestration techniques, cybersecurity considerations, auditability requirements and the factors that influence user adoption and operational performance. The project will also generate evidence regarding the suitability of large language models for supporting complex engineering activities within transmission planning functions.

Project learning will be disseminated through project reports, knowledge-sharing workshops, technical presentations, industry engagement activities and publication of results through the ENA Smarter Networks Portal. A final project report will document findings, lessons learned, benefits achieved and recommendations for future deployment opportunities. Learning generated through the project will be made available to other network licensees to support wider industry understanding of the opportunities, limitations and governance requirements associated with AI-assisted transmission planning.

Scale of Project

The project has been intentionally scoped as a Proof of Concept (PoC) to investigate the feasibility, effectiveness and potential value of applying artificial intelligence technologies to transmission planning activities. The project will focus on seven priority planning workflows that represent a significant proportion of routine engineering activities within DlgSILENT PowerFactory. This scope provides sufficient breadth to evaluate the technology across multiple use cases whilst maintaining an appropriate level of investment for an early-stage innovation project.

The primary objective of this phase is to establish technical and operational feasibility, assess performance against defined success criteria and understand the opportunities and challenges associated with applying AI within a regulated transmission planning environment. The project will also generate evidence regarding potential efficiency improvements, governance requirements, user acceptance and implementation considerations.

A smaller project focusing on fewer workflows would limit the learning generated, reduce confidence in the transferability of results and make it more difficult to assess whether the approach can deliver value across a wider range of planning activities. The selected scope therefore provides an appropriate balance between cost, risk and learning opportunity.

This project represents the first stage of a longer-term innovation pathway. Should the Proof of Concept successfully demonstrate the expected capabilities and benefits, the learning generated will be used to inform future decisions regarding MVP development, and potential operational implementation. These subsequent phases will only be considered following successful completion and evaluation of the Proof of Concept, ensuring that any future investment decisions are supported by robust evidence and demonstrated value.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

The project will be delivered through desk-based research, development and testing activities undertaken by NGET and the University of Exeter. Activities will utilise representative transmission planning studies, network models, system configurations and equipment parameters within DlgSILENT PowerFactory rather than live network assets. No trials will be undertaken on operational substations or transmission equipment during the project. While testing will be conducted in development environments, the selected planning workflows represent activities routinely undertaken across a range of transmission planning scenarios, enabling the project to evaluate the applicability and potential benefits of AI-assisted planning within the wider NGET planning function.

Revenue Allowed for the RII Settlement

No specific RII funding is expected to become surplus as a direct result of this project during the project delivery period. The project is a Proof-of-Concept research and development activity intended to investigate the feasibility and potential benefits of applying artificial intelligence technologies to transmission planning workflows. Any future efficiency savings or reductions in resource requirements would be subject to successful project outcomes, subsequent development phases and future business implementation decisions. Therefore, no adjustment to current RII allowances is anticipated at this stage.

Indicative Total NIA Project Expenditure

The total project cost is £439,216, comprising supplier costs (£376,274), internal NGET costs (£18,864) and indirect costs (£44,078). The anticipated Total NIA Expenditure to be reclaimed is £394,864. The project will be delivered over a 12-month period and will progress the technology from TRL 3 to TRL 4 through a Proof-of-Concept assessment. Expenditure is expected to be incurred against the following project milestones:

Milestone 1: Workflow specifications are defined and agreed, and a manual baseline established for all seven target transmission planning workflows.

Forecast Cost: £62,712

Milestone 2: The execution layer is successfully developed and demonstrated across all seven target workflows.

Forecast Cost: £62,712

Milestone 3: The conversational interface layer is successfully developed and demonstrated across all seven target workflows.

Forecast Cost: £31,356

Milestone 4: The workflow orchestration layer is successfully developed and demonstrated across all seven target workflows.

Forecast Cost: £62,712

Milestone 5: The assurance layer is successfully developed, and the complete four-layer architecture is integrated and qualified across all seven target workflows.

Forecast Cost: £62,712

Milestone 6: A pilot deployment is completed within NGET, with all critical issues identified and appropriately addressed.

Forecast Cost: £62,712

Milestone 7: Project evaluation, user training and knowledge transfer activities are completed, and all project deliverables are successfully handed over and accepted.

Forecast Cost: £31,358

The remaining project expenditure relates to NGET internal resource, project management, indirect costs, governance, reporting and dissemination activities required to support project delivery. As NGET is the sole Funding Licensee, all NIA expenditure will be attributed to NGET.

The milestone costs total £376,274, which aligns closely with the supplier-funded delivery activities, while the remaining internal and indirect costs contribute to the overall project cost of £439,216

Project Eligibility Assessment Part 1

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations

Please answer **at least one** of the following:

How the Project has the potential to facilitate the energy system transition:

The GB electricity system is undergoing significant change as increasing volumes of renewable generation, electrification of heat and transport, growing demand for network connections and major network reinforcement programmes drive an increasing need for transmission planning studies. These studies are critical to assessing network capability, identifying reinforcement requirements and supporting efficient investment decisions across the transmission network.

The i-GPT project has the potential to facilitate the energy system transition by improving the efficiency, consistency and scalability of transmission planning activities undertaken within DlgSILENT PowerFactory. By investigating new approaches to supporting planning workflows, the project seeks to reduce the effort associated with routine engineering activities and improve the utilisation of specialist engineering resources. This could enable planning teams to respond more effectively to increasing study volumes associated with generation connections, network development and wider decarbonisation activities.

The project will focus on seven high-volume planning workflows that support core transmission planning activities. Learning generated through the project will improve understanding of how emerging digital technologies can support engineering teams in delivering planning studies more efficiently whilst maintaining appropriate levels of engineering governance, traceability and oversight. This has the potential to support the timely assessment of network reinforcements, generation connections and future network requirements that are necessary to facilitate the transition to a low-carbon energy system.

In addition, the project will generate new knowledge regarding the application of advanced digital technologies within transmission planning environments, helping to inform future approaches to network planning and supporting wider industry digitalisation objectives.

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

Not applicable. The project does not directly target or provide specific benefits to consumers in vulnerable situations. The project is being registered under the criterion of facilitating the energy system transition.

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

n/a

Please provide a calculation and/or description of the expected benefits of the solution

PoC intended to assess the feasibility and potential value of applying advanced artificial intelligence technologies to transmission planning workflows. A Cost Benefit Analysis (CBA) has been undertaken over a 10-year assessment period to estimate the potential benefits that could be realised if the approach is successfully developed and deployed.

The assessment is based on current transmission planning activities undertaken by NGET. It is assumed that approximately 3,000 engineering study activities are completed annually, with each study requiring around 8 engineering hours to undertake. Based on a fully loaded engineering labour rate of £70 per hour, this represents approximately 60,000 engineering hours per year, equating to an estimated annual engineering effort cost of £4.2 million.

The analysis assumes that successful deployment of the proposed approach could reduce planning study effort by approximately 50% for applicable workflow activities, resulting in estimated savings of around 12,000 engineering hours per year, equivalent to

approximately £840,000 of annual labour savings. The primary recipients of these benefits would be NGET and, ultimately, electricity consumers through more efficient utilisation of specialist engineering resources and more efficient delivery of transmission planning activities.

The CBA indicates a baseline cost of approximately £18 million over the assessment period, compared with an innovation scenario cost of approximately £2 million, resulting in an estimated Net Present Value (NPV) of £16 million and a benefit-to-cost ratio of 37.5:1. In addition to direct financial benefits, potential qualitative benefits include improved consistency, repeatability and traceability of planning studies, improved knowledge retention, reduced dependency on specialist expertise and increased capacity to support growing network planning requirements associated with generation connections, network reinforcement and the wider energy system transition.

As this is a PoC project, these benefits remain indicative and will be validated during project delivery. A key objective of the project is to refine the assumptions, quantify achievable benefits and establish the evidence required to support future investment and deployment decisions.

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

The method is expected to be highly replicable across the GB electricity sector. Whilst the Proof of Concept will focus on transmission planning workflows within NGET and DlgSILENT PowerFactory, many of the challenges being addressed, including repetitive study activities, workflow complexity, knowledge dependency and study reproducibility, are common across electricity transmission and distribution network operators. The approach is expected to be adaptable to a range of planning and engineering workflows and could be extended to other PowerFactory users, transmission owners, distribution network operators and potentially system planning functions across Great Britain. The learning generated through the project will be disseminated through project reports and industry engagement activities to support wider adoption and replication across the energy sector.

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

As this project is a Proof of Concept, the costs associated with a wider GB rollout remain indicative and will be refined based on project outcomes. Taking the PoC cost of approximately £439k as a baseline, a wider deployment across the GB electricity sector, including transmission and distribution network operators, is expected to require additional expenditure associated with software enhancement, integration with local systems and data environments, cybersecurity assurance, testing, governance, training and change management activities. A high-level estimate for a GB-wide rollout is in the range of £2m-£5m, depending on the number of organisations adopting the solution and the level of customisation required. Due to the software-based nature of the approach, rollout costs are expected to be significantly lower than those associated with traditional physical network technologies, while offering the potential for substantial scalability and replication across multiple planning and engineering workflows. Once the Proof of Concept has been completed, a more detailed deployment and commercialisation assessment will be undertaken.

Requirement 3 / 1

Involve Research, Development or Demonstration

Projects 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

Involve Research, Development or Demonstration - Please select all that apply

- ☐ 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 project will generate learning that is expected to be relevant to electricity transmission and distribution network operators across Great Britain. Many network licensees undertake complex power system studies and engineering assessments that rely on specialist expertise, established workflows and large volumes of planning data. The project will provide insight into the applicability of artificial intelligence technologies to support engineering planning activities, improve workflow efficiency, enhance knowledge accessibility and increase consistency in study execution. Learning will also be generated regarding the integration of AI technologies with engineering software environments, governance and assurance requirements, study reproducibility and user adoption considerations. If successful, the findings could be applied by other network licensees to improve planning, modelling and engineering assessment processes within their own organisations. The project will also provide a framework for evaluating the safe and effective application of AI technologies within regulated engineering environments, supporting wider digitalisation initiatives across the GB energy sector.

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. Networks must explicitly mention similar projects that they have considered and how these differ.

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

A review of existing and previous innovation activities was undertaken to identify projects with potential relevance to the proposed i-GPT project. This review included searches of the ENA Smarter Networks Portal, previous NIA, NIC and SIF projects, as well as wider industry initiatives relating to artificial intelligence, digitalisation, engineering productivity and network planning activities.

As part of this review, the project team considered a number of related innovation projects, including NIA2_NGESO064, NIA2_NESO114 and NIA_UKPN0123, which explored the application of artificial intelligence and digital technologies within the energy sector. These projects investigated areas such as operational decision support, information management, process optimisation and AI-enabled tools for energy system applications. Whilst they provide valuable industry learning on the use of AI within regulated energy environments, they do not specifically address the application of AI technologies to transmission planning workflows undertaken within DlgSILENT PowerFactory, nor do they focus on workflow orchestration, engineering assurance, reproducibility and governance for transmission planning studies.

The project also considered wider industry and academic developments relating to artificial intelligence, large language models, digital engineering and workflow automation. Whilst a growing number of generic AI tools exist, there is limited evidence of their application to regulated transmission planning environments where engineering governance, traceability, repeatability and assurance requirements are critical. The proposed project is therefore focused on addressing a distinct challenge associated with the execution of transmission planning studies and the supporting engineering workflows used by NGET.

The project builds on existing industry knowledge regarding artificial intelligence and digitalisation but advances this learning by investigating how these technologies can be applied to support high-volume transmission planning workflows while maintaining appropriate levels of engineering oversight and governance. The project will generate new learning regarding integration with PowerFactory-based planning processes, workflow execution, engineering knowledge accessibility, study reproducibility and assurance mechanisms. These areas have not been directly addressed by previous innovation projects identified during the review.

Consequently, the project does not represent unnecessary duplication of previous or ongoing innovation activities. Instead, it builds upon broader industry learning and applies it to a specific transmission planning use case, generating new evidence and insights that

are expected to be valuable to electricity transmission and distribution network operators across Great Britain. The learning generated through the project will be disseminated through project reports, the ENA Smarter Networks Portal and wider industry engagement activities to maximise sector-wide benefit and support future innovation.

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

Whilst the project explores the application of artificial intelligence technologies within the energy sector, it does not duplicate any previous or ongoing innovation activities identified across network licensees. A review of existing innovation projects has found no significant overlap in scope, objectives, or delivery activities.

Previous innovation projects have generally focused on broader applications of artificial intelligence, including operational decision support, information management, customer engagement, asset management, and business process automation. In contrast, the Intelligent Grid Planning Tool (iGPT) project is specifically focused on transmission network planning and the execution of engineering workflows within DlgSILENT PowerFactory..

The project has been designed to address challenges that are specific to transmission planning studies, including workflow complexity, knowledge dependency, study reproducibility, engineering governance and the efficient execution of high-volume planning activities. These challenges are directly relevant to NGET's planning environment and have not been comprehensively addressed through previous innovation projects identified during the project review.

Consequently, the project complements existing innovation activities and provides additional value by addressing a specific gap in current industry knowledge, while ensuring that the resulting learning can be shared and applied more broadly across the GB energy sector.

Additional Governance And Document Upload

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

The project is innovative because it seeks to apply advanced artificial intelligence technologies to transmission network planning workflows in a manner that has not previously been demonstrated within NGET's planning environment. Whilst artificial intelligence and large language models are increasingly being adopted across a range of industries, there is limited evidence of their application to regulated transmission planning activities where engineering governance, traceability, repeatability and assurance are critical requirements.

Existing planning processes within DlgSILENT PowerFactory rely heavily on specialist expertise, manual workflow execution and established engineering practices. Current automation approaches typically address individual tasks or scripts rather than providing support across complete planning workflows. The project will investigate whether AI technologies can be applied to support multiple planning activities while maintaining appropriate levels of engineering oversight and reproducibility.

The innovation lies not simply in the use of artificial intelligence, but in the investigation of an integrated approach that combines conversational interaction, workflow orchestration, engineering knowledge access and assurance mechanisms within transmission planning studies. The project will explore how these capabilities can be applied across seven high-volume planning workflows and will generate new learning regarding their suitability, effectiveness and governance requirements within a regulated electricity transmission environment.

A review of existing innovation projects, industry initiatives and commercially available solutions has not identified any projects that specifically address assured AI-enabled workflow support for transmission planning studies within DlgSILENT PowerFactory. The project therefore addresses a recognised gap in current industry knowledge and represents a novel application of emerging digital technologies to transmission network planning activities. As a Proof of Concept, the project will generate evidence regarding the technical feasibility, operational suitability and potential value of this approach before any future deployment decisions are considered.

Relevant Foreground IPR

The project is expected to generate Relevant Foreground IPR associated with the development of the i-GPT Proof of Concept, including software components, workflow methodologies, integration approaches, assurance frameworks and supporting technical documentation. Ownership of any Relevant Foreground IPR generated through the project will be shared on a 50:50 basis between NGET and the University of Exeter, reflecting the collaborative contribution of both parties. The project may also utilise existing Background IPR, including pre-existing software, tools, methodologies and know-how. Where required, appropriate rights to use

Background IPR in conjunction with the Relevant Foreground IPR will be governed through the project agreements. Project learning and non-confidential outputs will be disseminated in accordance with NIA requirements.

Data Access Details

The project is expected to generate Relevant Foreground IPR associated with the development of the i-GPT Proof of Concept, including software components, workflow methodologies, integration approaches, assurance frameworks and supporting technical documentation. Ownership of any Relevant Foreground IPR generated through the project will be shared on a 50:50 basis between NGET and the University of Exeter, reflecting the collaborative contribution of both parties. The project may also utilise existing Background IPR, including pre-existing software, tools, methodologies and know-how. Where required, appropriate rights to use Background IPR in conjunction with the Relevant Foreground IPR will be governed through the project agreements. Project learning and non-confidential outputs will be disseminated in accordance with NIA requirements.

Please identify why the Network Licensees will not fund the project as a part of its business and usual activities

NGET funds business-as-usual (BAU) activity where the method is established, the benefit can be evidenced in advance, and the output can be relied on in licensed work. iGPT does not yet meet any of these tests. The purpose of the project is to establish whether it can.

The business case is unproven. The benefit of iGPT rests on engineer time returned and rework avoided across routine PowerFactory studies. Current estimates of both rest on assumptions rather than measurement: there is no measured baseline for time per study or error types across the seven priority workflows, and no evidence of how those figures change when NGET engineers use an LLM-enabled assistant on NGET studies. The project itself generates that evidence.

The work is research and development, not deployment. The project starts at TRL 3 and ends at TRL 4.

There is no proven product to procure. The BAU route to new study tooling is to buy a proven product or to extend existing scripts. Chat assistants and script libraries for power-system tools exist, but to the best of our knowledge none provides safe, checked automation of approved study workflows for PowerFactory, with qualification against reference executions, runtime completeness and integrity checks, and auditable run records. NGET therefore cannot specify and purchase this capability; it has to be developed and tested before a BAU requirement can be written.

The learning extends beyond NGET. PowerFactory is widely used across GB network licensees, and the architecture adds new workflows by configuration rather than by building a separate assistant. Evidence on whether LLM-driven study automation can be made assured, and by how much it improves productivity and repeatability, would be directly useful to other licensees. Funded as BAU, NGET alone would carry the cost and the risk of failure, with no mechanism or requirement to share the results.

The route into BAU is defined. The pilot evaluation reports outcomes by workflow alongside the resources required for deployment, training and ongoing support, so that wider rollout is recommended only where the evidence supports a positive net benefit. The specific risks that prevent BAU funding now are set out in the answer to the following question.

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 step this project takes is from TRL 3 to TRL 4. That step carries risks that neither NGET's BAU budgets nor the University acting alone can absorb.

Technical risk. The assurance mechanisms have been shown to be feasible only in prototype and have not been engineered or validated for PowerFactory or for NGET-approved procedures. The LLM may select the wrong workflow or the wrong parameters, and one or more of the seven workflows may fail to meet the thresholds agreed at month 2 for result tolerance, workflow success rate, required-step detection or reproducibility. The integration is also exposed to changes in PowerFactory, library and model versions, which can break automation silently. The project manages these risks rather than removing them: the LLM can only select from an approved function library and never calculates an engineering number; every workflow is qualified against manually performed reference studies before release; every run is checked automatically and anything doubtful is flagged; software versions are pinned for each release; and a proof-of-concept gate at month 9 must be passed before the pilot starts. A partial result, in which some workflows qualify and others do not, is a credible outcome.

Operational risk. Network studies inform planning decisions, and the typical errors of automated study execution leave results that still look plausible. The tool therefore cannot be trialled in live work. It has to be proven alongside existing practice, in offline study environments, with engineers approving every consequential action and the assistant never signing off results. This requires NGET engineers' time for workflow capture, feedback between releases, and matched pilot tasks performed both with and without the assistant. There is also an adoption risk: engineers may not trust or take up the tool, or measured gains may be small once checking and approval time is included. Co-design of the workflows and working releases from month 5 mitigate this, but only the pilot can show whether it has been overcome.

Commercial risk. The financial benefit is not yet quantified, and the cost of deployment, training and ongoing support is not yet known. In particular, the cost of running local models on approved hardware or of enterprise API access, and of maintaining the function library and qualification suite as software versions change, will only become clear during the project. The project may conclude that the net benefit is positive for only some workflows. There is no proven product on the market to which this risk could be transferred through procurement, and the solution depends on third-party software (PowerFactory and LLM providers) whose terms and capabilities may change. A further part of the value lies in learning that other licensees can use, which NGET cannot recover if it funds the work alone.

Regulatory, security and compliance risk. Network models and study data are sensitive. Whether an LLM-based tool can be deployed in a way that satisfies NGET's security policies and relevant NCSC guidance is itself uncertain, and the project carries both deployment routes (locally deployed models on NGET infrastructure, or enterprise APIs under NGET's approved terms) until NGET selects one at month 1. To the best of our knowledge there is no established assurance standard for LLM-assisted engineering studies in network planning. A purpose of the project is to show what evidence of verification, completeness and reproducibility would be sufficient for NGET to rely on such a tool. Until that is demonstrated, the tool cannot be accepted into processes that support licensed activities.

This project has been approved by a senior member of staff

☒ Yes