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

Mar 2026

Project Reference Number

NIA_SPEN_0133

Project Registration

Project Title

BioConnect

Project Reference Number

NIA_SPEN_0133

Project Licensee(s)

SP Energy Networks Transmission

Project Start

March 2026

Project Duration

1 year and 2 months

Nominated Project Contact(s)

Parham Momeni

Project Budget

£730,000.00

Summary

BioConnect will transform SPEN's existing inhouse cost estimation tool to better support future regulatory, environmental and digital requirements. The project proposes the development of a proofofconcept solution that enhances current capabilities by embedding carbon and biodiversity considerations alongside traditional cost data. It addresses limitations in the legacy tool, including lack of scalability, environmental intelligence and effective integration with teams such as Land & Planning, BIM and Sustainability. The transformed solution will be configurable without deep technical expertise, provide robust audit trails and improve collaboration across business units. By modernising the current approach, BioConnect aims to reduce operational and compliance risks, streamline workflows and establish a scalable foundation for future digital transformation across SPEN.

Third Party Collaborators

AECOM

Nominated Contact Email Address(es)

innovate@spenergynetworks.co.uk

Problem Being Solved

Whilst suitable for current T3 requirements, the current legacy, in-house cost-estimation tool used by Scottish Power Energy Networks lacks a scalable infrastructure capable of integrating carbon and biodiversity considerations, resulting in operational inefficiencies, non-compliance risks, and disconnected workflows with critical teams such as Land & Planning and BIM. The existing solution needs to be transformed to support a more regulated, digitally integrated, and environmentally conscious project delivery environment.

Method(s)

The project will propose a new, modern and scalable approach, resulting in the development of a Proof of Concept (PoC). This solution aims to be configurable without deep technical expertise and capable of integrating carbon emissions, biodiversity costs, and at a future stage, support structured data suitable for integration with other SPEN data, such as BIM. It will also support audit trails, improve collaboration across business units and meet SPEN's compliance guidelines.

This transformation will significantly reduce operational and compliance risks that would enable proactive environmental cost planning and streamline workflows across teams. It will also lay the foundation for broader digital transformation across SPEN by enhancing data transparency, integration, and governance within project estimation processes.

Scope

The project aims to:

- Support a comprehensive system for combining and analysing relevant cost datasets during the application stage with sustainability measures, such as carbon emission and biodiversity datasets, to ensure regulatory compliance and proactive environmental stewardship,
- Enhance the ability to control, audit and maintain integrated datasets to improved efficiency and project decision making,
- Provide a future roadmap for potential integration to BIM and Land & Planning workflows for more effective, connected digital construction workflows

The scope of works to be undertaken comprises three key phases: Phase 1: Discovery, Phase 2: Proof of Concept Design, Design, Development & Testing, and Phase 3: Documentation and Handover.

Objective(s)

Key objectives for each phase are listed below:

1. Phase 1: Discovery
   - Agree vision for proposed solution with SPEN stakeholders
   - Understand and define the as-is capabilities, personas/stakeholders, processes, workflow and data used by the existing solution to establish a baseline of existing user needs
   - Review existing datasets & support in defining future dataset requirements
   - Define the detailed functional, non-functional and data requirements for the potential solution
   - Design data governance framework required of the solution
   - Document to-be solution architecture, integrations and data flows
   - Undertake rapid technical feasibility assessment to determine if required solution components are available and supported
   - Define success criteria/definition of done for Proof of Concept (POC) solution
   - Develop a rapid, iterative approach, timeline and delivery methodology for a POC and agree next steps with SPEN.
2. Phase 2: POC Design, Development & Testing (DDT)
   - Design and document a suitable solution architecture to address the desired capability
   - Design and document an appropriate data governance approach to support effective deployment and adoption
   - Design and document appropriate user workflows, processes and data flows to support the capability
   - Ensure alignment with biodiversity work package, and potentially other sustainability measures, into the potential proposed solution
   - Develop a POC solution within the agreed timeline and budget
   - Test and refine POC solution with agreed SPEN users and stakeholders to support validation of requirements
3. Phase 3: Documentation & Handover
   - Conduct a cost-benefit analysis comparing legacy 'as-is' tooling to proposed solution to demonstrate ROI
   - Develop a high-level business case and recommendations on next steps, identifying additional innovation opportunities linked to this project
   - Develop a phased rollout plan for potential implementation
   - Handover solution to SPEN team to ensure successful ownership transfer of any technical and written documentation and knowledge.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

BioConnect is expected to have a positive impact on consumers in vulnerable situations by embedding sustainability considerations into the connection design process, enabling more efficient, lower carbon, and lower cost network solutions over time. By improving the environmental performance and long term sustainability of design choices—such as optimising asset specifications, minimising unnecessary reinforcement, and reducing whole life carbon—the project helps avoid future system costs that would otherwise be

passed on to all consumers, including those experiencing financial vulnerability. Vulnerable customers also benefit from more resilient, futureproofed network designs that reduce the likelihood of faults and outages, indirectly supporting wellbeing for those dependent on reliable electricity for medical or essential needs. As the project involves internal process and design method improvements rather than direct consumer participation, there is no risk of exclusion, and no negative technical, financial, or wellbeing related distributional impacts are anticipated for vulnerable consumers.

Success Criteria

A Proof of Concept (PoC) will be developed to address current issues related to the existing cost modelling tool. The following key aspects will be evaluated to determine the level of success of the PoC:

- **Integration of sustainability intelligence** - The PoC successfully demonstrates the ability to integrate carbon emissions and biodiversity considerations alongside traditional cost data within early stage cost estimation, in a structured and auditable manner, without reliance on downstream or manual assessments.
- **Improved data governance and auditability** - The PoC provides clear audit trails showing how cost, carbon and biodiversity inputs are sourced, processed and applied within estimates, improving transparency, traceability and compliance compared to the legacy tool.
- **Configurability and ease of use** - The PoC can be configured and adapted by SPEN users without requiring deep technical expertise, reducing reliance on specialist support and improving accessibility compared to the existing solution.
- **Cross-functional usability** - The PoC demonstrably supports improved collaboration between cost estimation, sustainability, Land & Planning and digital teams, through shared datasets, aligned workflows and common data structures.
- **Scalability and future readiness** - The PoC demonstrates a scalable architecture capable of supporting future expansion, including the potential for structured data integration with systems such as BIM, without requiring fundamental redesign.
- **Reduction in operational and compliance risk** - The PoC evidences a reduction in known limitations of the legacy tool (e.g. manual workarounds, disconnected datasets, limited environmental insight), thereby reducing operational and compliance risks associated with early stage cost estimation.
- **Decision-making value** - The PoC demonstrates that the inclusion of sustainability intelligence at an earlier stage provides additional insight that can materially inform option selection, cost planning or investment decisions compared to the legacy tool.

Project Partners and External Funding

AECOM Ltd - AECOM is the global infrastructure leader, committed to delivering a better world. As a trusted professional services firm powered by deep technical abilities, AECOM solves clients' complex challenges in water, environment, energy, transportation and buildings. AECOM teams partner with public- and private-sector clients to create innovative, sustainable and resilient solutions throughout the project lifecycle — from advisory, planning, design and engineering to program and construction management. AECOM is a Fortune 500 firm that had revenue of $16.1 billion in fiscal year 2025.

Potential for New Learning

The nature of the project lends itself to generating new, transferable and shared learning for all parties. Shared learning specifically includes:

- How early stage cost estimation can embed sustainability intelligence (carbon and biodiversity) rather than treating it as an add on later in the lifecycle
- How to run a discovery phase that surfaces requirements, constraints, and architectural guardrails before locking into technology or procurement decisions
- How to define success criteria and "definition of done" for innovation POCs that may or may not proceed to Business as Usual.

This is valuable institutional learning for future digital and innovation initiatives, not just BioConnect.

Specific learning opportunities for SPEN:

- **How to embed sustainability intelligence at the earliest stages of cost estimation** - Learning how carbon and biodiversity considerations can be integrated alongside traditional cost data during early stage planning, rather than treated as downstream or parallel assessments.
- **Effective discovery led approaches for digital innovation** - Learning how to run a structured discovery phase that surfaces user needs, data constraints, governance requirements and architectural guardrails before committing to technology or procurement decisions, reducing delivery and investment risk.
- **Improving data governance and auditability in cost modelling** - Learning how improved data structures, audit trails and governance frameworks can enhance transparency, traceability and compliance within cost estimation processes.
- **Designing configurable tools that reduce reliance on specialist support** - Learning how cost estimation solutions can be

designed to be configurable and adaptable by business users without deep technical expertise, improving accessibility and resilience.

- **Cross-functional working between cost, sustainability and digital teams** - Learning how shared datasets, aligned workflows and common data standards can improve collaboration between cost estimation, sustainability, Land & Planning and digital functions.
- **Defining success criteria and "definition of done" for innovation PoCs** - Learning how to set clear, proportionate success measures for innovation proofs of concept, and how to assess whether a PoC should progress to business-as-usual adoption or remain a learning exercise.
- **Understanding the scalability and future integration potential of digital solutions** - Learning how early architectural and data design decisions can enable (or constrain) future integration with systems such as BIM and other enterprise data platforms.

These learning outcomes will inform SPEN's future digital, sustainability and innovation activities beyond BioConnect, supporting more consistent, transparent and environmentally informed decision-making across network investment planning.

Specific learning opportunities for AECOM:

- **Applying sustainability intelligence within early-stage cost modelling for regulated networks** - Learning how carbon and biodiversity considerations can be practically embedded alongside traditional cost data in early-stage estimation for electricity transmission and distribution projects, within a regulated network environment.
- **Delivering discovery-led digital innovation in a RIIO-2 context** - Learning how to structure and deliver a discovery phase that balances user needs, regulatory constraints, data governance and architectural considerations, to inform proportionate and low-risk digital innovation for Network Licensees.
- **Designing scalable, configurable digital proofs of concept** - Learning how to design and deliver configurable proof-of-concept solutions that can be adapted by client teams without deep technical expertise, while remaining scalable and suitable for potential business-as-usual adoption.

· Data governance and auditability in cost estimation solutions - Learning how to define and implement data governance, audit trails and transparency mechanisms within cost modelling tools to support compliance, assurance and decision-making requirements for regulated infrastructure clients.

· Supporting cross-functional collaboration through digital solutions - Learning how digital cost estimation tools can be designed to support collaboration across cost, sustainability, Land & Planning and digital teams, through shared datasets, aligned workflows and common data standards.

· Assessing innovation success and readiness for scale - Learning how to define success criteria, "definitions of done" and evaluation approaches for innovation PoCs, and how to assess whether outcomes justify progression to wider deployment or inform future innovation activity.

· Understanding future integration pathways for digital cost tools - Learning how early architectural and data design decisions can enable future integration with enterprise systems such as BIM and other digital delivery platforms commonly used across infrastructure programmes.

These learning outcomes will strengthen AECOM's capability to support Network Licensees with digital, sustainability-led innovation, and inform future advisory, design and delivery approaches across regulated infrastructure projects.

Scale of Project

The scale of the BioConnect project is proportionate to the nature of the challenge being addressed and the potential learning and benefits that could be realised. The Project is designed as a structured discovery and proof-of-concept exercise that spans multiple business functions, datasets and governance considerations, reflecting the complexity of modern early-stage cost estimation within a regulated network environment.

A smaller-scale project would limit the ability to explore the full range of technical, data, governance and organisational factors required to demonstrate whether sustainability intelligence (carbon and biodiversity) can be effectively embedded into cost estimation processes in a scalable and auditable way. Specifically, meaningful learning requires engagement across cost estimation, sustainability, Land & Planning and digital teams, as well as sufficient scope to assess data integration, auditability, configurability and cross-functional workflows.

The chosen scale enables the Project to test the approach across representative use cases, assess technical feasibility, validate user needs, and define clear success criteria, while remaining appropriately constrained through a proof-of-concept rather than full business-as-usual deployment. This balance ensures that the Project generates robust, transferable learning without committing to premature large-scale implementation.

As such, the scale of the BioConnect project is necessary to generate meaningful and credible learning that would not be achievable through a smaller or more limited exercise and is appropriate relative to the potential long-term benefits and applicability across SPEN and the wider GB networks sector.

This project covers Phase 1, development of a PoC. A second phase is envisaged on completion of Phase 1 that will be influential for the whole transmission business.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL5 Pilot Scale

Geographical Area

The project will cover the SPT and SPM licence areas

Revenue Allowed for the RIIO Settlement

0

Indicative Total NIA Project Expenditure

£730,000

Project Eligibility Assessment Part 1

There are slightly differing requirements for RIIO-1 and RIIO-2 NIA projects. This is noted in each case, with the requirement numbers listed for both where they differ (shown as RIIO-2 / RIIO-1).

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations (Please complete sections 3.1.1 and 3.1.2 for RIIO-2 projects only)

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

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

BioConnect supports the energy system transition by enabling earlier, more informed decision‑making that integrates carbon and biodiversity considerations into project cost estimation. By embedding sustainability intelligence at the application and planning stages, the project helps SPEN better anticipate and manage the environmental impacts associated with network reinforcement and expansion required to support decarbonisation. The proposed proof of concept improves data transparency, auditability and cross‑functional collaboration, creating a scalable digital foundation that supports net zero delivery, environmental stewardship and more efficient investment decisions as the energy system becomes increasingly complex and constrained.

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

N/A

Requirement 2 / 2b

Has the potential to deliver net benefits to consumers

Project must have the potential to deliver a Solution that delivers a net benefit to consumers of the Gas Transporter and/or Electricity Transmission or Electricity Distribution licensee, as the context requires. This could include delivering a Solution at a lower cost than the most efficient Method currently in use on the GB Gas Transportation System, the Gas Transporter's and/or Electricity Transmission or Electricity Distribution licensee's network, or wider benefits, such as social or environmental.

Please provide an estimate of the saving if the Problem is solved (RIIO-1 projects only)

N/A

Please provide a calculation of the expected benefits the Solution

The project is not directly targeted at consumers in vulnerable situations and does not introduce new customer‑facing interventions. However, BioConnect has the potential to deliver indirect benefits by improving the efficiency, transparency and environmental robustness of network investment decisions. By enabling earlier integration of carbon and biodiversity considerations into cost estimation, the project supports more informed and proportionate investment, helping to reduce long‑term network costs and delivery risks. Over time, these efficiencies may contribute to improved value for money for all consumers, including those in vulnerable situations, through reduced exposure to inefficient spend and better‑planned network reinforcement.

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

The BioConnect method is highly replicable across the GB electricity transmission and distribution sectors. The proposed approach focuses on transforming early‑stage cost estimation processes through the integration of sustainability intelligence (carbon and biodiversity) alongside traditional cost data, supported by improved data governance, auditability and cross‑functional workflows. These challenges are common across GB Network Licensees, particularly as networks respond to increasing regulatory, environmental and digital requirements.

The method is designed to be technology‑agnostic, configurable and not dependent on bespoke local systems, enabling it to be adapted for use across a wide range of network planning, design and investment decision‑making contexts. It is anticipated that the approach could be applied to most major network investment and reinforcement projects where early‑stage cost estimation is undertaken, including transmission and distribution schemes.

Following successful demonstration, the method could be replicated across a significant proportion of GB Network Licensees' project portfolios, supporting more consistent, transparent and environmentally informed investment decisions. The learning generated will be transferable to other Network Licensees seeking to embed sustainability considerations earlier in the project lifecycle, reduce delivery and compliance risk, and improve value for money for consumers.

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

At this stage, only a high-level outline of potential GB roll-out costs can be provided, as the detailed requirements will depend on the outcomes of the Proof of Concept. The PoC will determine the level of system development, integration, data requirements, user interfaces, training needs, and change-management activities required for wider adoption. Once these elements are validated, a more accurate estimate of GB-wide deployment costs—including configuration, licensing, process adaptation, and ongoing support—can be produced. Therefore, a more robust assessment of roll-out costs will be feasible following successful completion of the PoC and the detailed evaluation of its technical and operational implications.

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 BioConnect project will generate learning that is directly applicable to other GB electricity transmission and distribution Network Licensees facing similar regulatory, environmental and digital challenges. The learning will focus on how early-stage cost estimation processes can be modernised to embed sustainability intelligence, including carbon and biodiversity considerations, alongside traditional financial data in a structured, auditable and repeatable way.

Key areas of transferable learning include how Network Licensees can design and run an effective discovery phase to surface user needs, data constraints, governance requirements and architectural guardrails before committing to technology or procurement decisions. This will help other Licensees reduce delivery risk and avoid premature investment in solutions that are not scalable or compliant with evolving regulatory expectations.

The project will also generate learning on defining clear success criteria and "definitions of done" for innovation proof-of-concepts, including how to assess whether a PoC should progress to business-as-usual adoption. This is particularly relevant for Network

Licensees managing large innovation portfolios under RIIO‑2, where not all innovation activity is expected to proceed to full deployment.

In addition, BioConnect will provide insight into practical approaches for improving data governance, auditability and cross‑functional collaboration across cost estimation, sustainability, land and planning, and digital delivery teams. These lessons can be applied by other Network Licensees seeking to improve transparency, compliance and value for money in network investment decision‑making.

Overall, the learning generated by BioConnect will be transferable across the GB networks sector and can be used by other Network Licensees to inform their own digital, sustainability and innovation strategies, supporting more consistent, environmentally informed and efficient network planning and investment outcomes.

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.

The BioConnect project will not lead to unnecessary duplication of existing or completed innovation activity. While there are other innovation projects across the GB networks sector that consider sustainability, digitalisation or cost estimation in isolation, BioConnect addresses a specific and currently unmet gap: the integration of carbon and biodiversity intelligence directly into early‑stage cost estimation processes, supported by appropriate data governance, auditability and cross‑functional workflows.

To the best of the Funding Licensee’s knowledge, there are no registered IFI, LCNF, NIA, NIC or SIF projects that replicate the specific combination of scope, methodology and application proposed by BioConnect. The project does not seek to re‑develop existing tools or duplicate known solutions but instead focuses on demonstrating a novel methodology and proof of concept that has not previously been trialled within this context.

Where relevant learning exists from other innovation activity, BioConnect will build upon this rather than duplicate it, ensuring that the project complements the wider innovation portfolio across the GB networks sector. The discovery‑led approach adopted by the project will explicitly consider existing initiatives and available learning to avoid overlap and ensure that the outcomes generated are additive and provide new, transferable insight for other Network Licensees.

As such, BioConnect represents a distinct and justified innovation activity, targeted at addressing a specific challenge not currently met through business‑as‑usual processes or existing innovation projects.

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

BioConnect is innovative because it proposes a new and unproven approach to early‑stage cost estimation within GB electricity networks by embedding sustainability intelligence, including carbon and biodiversity considerations, directly into the cost modelling process rather than treating these factors as separate or downstream assessments.

While cost estimation tools are widely used across Network Licensees, these tools are typically focused on financial and engineering costs and lack the capability to integrate environmental data in a structured, auditable and repeatable way. BioConnect seeks to address this gap by developing a configurable, data‑driven proof of concept that combines traditional cost datasets with sustainability

measures, supported by improved data governance, audit trails and cross-functional workflows. This represents a step change from business-as-usual approaches.

The innovation lies not only in the potential technical solution, but in the methodology being demonstrated. The project adopts a structured discovery-led approach to define user needs, data requirements, governance arrangements and architectural guardrails before committing to technology or procurement decisions. This approach is unproven at scale within the context of early-stage network cost estimation and introduces delivery, technical and organisational risks that warrant support through NIA funding.

In addition, the project explores how early integration of sustainability intelligence can improve decision-making, reduce compliance risk and create a scalable foundation for future digital integration with functions such as Land & Planning, BIM and sustainability teams. These outcomes have not previously been demonstrated within existing network cost estimation processes.

As such, BioConnect is not a business-as-usual activity. It involves the development and demonstration of a novel methodology and supporting digital capability with an unproven business case, where the learning generated will inform future investment decisions across SPEN and the wider GB networks sector.

Relevant Foreground IPR

N/A

Data Access Details

The SP Energy Networks Data Sharing policy can be found here.

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

The Project is not being funded through business-as-usual activities because it involves developing a novel Method that has not yet been proven, validated, or demonstrated at sufficient scale to justify BAU investment. The approach introduces new sustainability-driven processes and tools for connection design that go beyond existing regulatory and operational obligations. As such, there is inherent uncertainty in its effectiveness, feasibility, and cost-efficiency, which must be resolved before BAU adoption can be considered. The NIA funding mechanism is specifically designed to de-risk this type of early-stage innovation, enabling the Network Licensee to explore new methods that could deliver long-term benefits for customers and the wider GB system. Following successful proof-of-concept testing and clear evidence of value, the Method may then be justified for integration into BAU.

Please identify why the project can only be undertaken with the support of the NIA, including reference to the specific risks(e.g. commercial, technical, operational or regulatory) associated with the project

The Project can only be undertaken with NIA support because it seeks to develop and test a new, sustainability-driven Method for connection design that falls outside current BAU funding allowances and carries several uncertainties that require de-risking before full adoption. There are commercial risks, as the level of investment required to create new digital tools, data models, and design processes cannot be justified through BAU without evidence of cost-effectiveness or demonstrable long-term customer benefit. There are also technical risks, including uncertainty around the feasibility of integrating sustainability metrics into existing design systems, the accuracy and interoperability of new assessment approaches, and the scalability of the Method across different connection types and geographies. Operational risks arise because the project may require modifications to current engineering workflows, training requirements, and change-management processes, all of which cannot be committed to without proof that the Method is robust and practical. In addition, there are regulatory uncertainties, as sustainability-based design optimisation is not yet mandated within current RIIO-ED2 baselines, meaning the costs cannot be recovered under existing licence obligations. NIA provides the appropriate mechanism to explore and validate innovative methodologies such as this, allowing SPEN to test the concept, manage these risks, and build the evidence base necessary to consider future BAU integration.

This project has been approved by a senior member of staff

☑ Yes