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

Jan 2014

Project Reference Number

NIA_NGGT0024

Project Registration

Project Title

BIM (Building Information Modelling)

Project Reference Number

NIA_NGGT0024

Project Licensee(s)

National Gas Transmission PLC

Project Start

June 2013

Project Duration

0 years and 11 months

Nominated Project Contact(s)

Paul Lee

Project Budget

£202,000.00

Summary

The current design process requires additional time and resources to develop specifications, process flow diagrams, and engineering line diagrams through to general arrangements. The process generates a number of Technical Queries (TQs) and Requests for Information (RFIs), requiring additional time and resource. It can take up to three further months for a design to go through the assurance process; including the conceptual design phase, developing the preliminary process and mechanical designs.

Third Party Collaborators

Premtech Ltd

Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

Problem Being Solved

National Grid currently does not use a three dimensional design process capable of generating and managing all design and object data associated with construction projects. The current two dimensional design process provides functional and integrity assured design, however it can not provide optimum design potential (via quantitative technical, cost and carbon performance assessments). This limitation leads to design assurance process delays and adds risk to the delivery of an efficient, cost effective project within defined timeframes.

Method(s)

BIM real time trial:

1. 3D Modelling, Site Surveys and Visits
2. Drawings & Deliverables; Paull AGI, Goxhill AGI, Tunnel, Planning Inspectorate Statutory Consultation
3. Pipeline & Deliverables
4. Formal Process Safety Assessments
5. Carbon Performance

Also includes project management, cost management support, subsistence and review

Scope

The current design process requires additional time and resources to develop specifications, process flow diagrams, and engineering line diagrams through to general arrangements. The process generates a number of Technical Queries (TQs) and Requests for Information (RFIs), requiring additional time and resource. It can take up to three further months for a design to go through the assurance process; including the conceptual design phase, developing the preliminary process and mechanical designs.

Objective(s)

The aim of this innovation project is to develop and trial an intelligent 3D modelling process based on Building Information Modelling (BIM) level 2 maturity, within an existing construction project.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Attain knowledge of the BIM model in a working environment to understand if the intelligent 3D modelling process is fit for purpose within future National Grid construction projects.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

Demonstration of BIM Modelling in a working environment in the Yorkshire and the Humber region.

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL6 Large Scale

Geographical Area

Knowledge gathered will potentially be applied during future construction projects undertaken on the National Gas Transmission System, Tunnels, Security and Electrical Transmission in the UK.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£202k

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:

n/a

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)

An estimated saving of £66k/yr, with a total potential saving of £1.034M over the next 8 years on Gas Transmission projects.

Please provide a calculation of the expected benefits the Solution

Base cost – £600k, cost of 2 major projects per year using current process
Method cost – £468k, cost of 2 major projects per year using BIM process*

The BIM process provides an opportunity to reduce whole life costs and improve carbon performance across the life of future projects by an estimated 20-30%. Use of BIM in this trial will provide an estimated reduction of:

- 29% (3490 versus 2704 hours) forecast against the original conceptual design hours, and
- 22% against the original tendered costs.

*Assuming 2 major projects sanctioned per year, at 22% cost savings on core design and engineering costs (based on an estimated £300k per future project), the BIM model could provide cost savings of £1.034M over the next 8 years in the design phase alone.

Greater savings will be achieved in the construction and operations/maintenance phase as the informed and optimised decisions are realised from the design phase.

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

This method can be applied to all construction projects undertaken on the National Transmission Network (NTS).

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

A Request for Information was issued to our tier 1 contractors, 8 out of 10 responded, all 8 have BIM capability in the building / architectural industry and therefore BIM software and license fees should not be incurred. The BIM project includes trialing bolt on packages, these packages are typically £5k per license; it is therefore estimated initial contractor costs would increase by £10k (2 seats) on the first project engaged upon, with an ongoing license update costing £1k per annum, per seat (£2k per year). These costs will however, be negated by the improvement in delivery time and cost.

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

Lessons learned register will be maintained throughout the trial and delivered upon competition. The intelligent 3D model will potentially form part of the training programme through Learning and Development.

Results will be disseminated on the National Grid website and ENA learning portal.

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

This project is aligned to New Technologies within the Strategic theme.

☑ Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees

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.

n/a

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

n/a

Relevant Foreground IPR

n/a

Data Access Details

n/a

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

n/a

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

n/a

This project has been approved by a senior member of staff

☑ Yes