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

Oct 2017

Project Reference Number

NIA_CAD0011

Project Registration

Project Title

Automated Pipeline BIM Modelling and Cost Estimating Tool – Stage 1

Project Reference Number

NIA_CAD0011

Project Licensee(s)

Cadent

Project Start

October 2017

Project Duration

0 years and 4 months

Nominated Project Contact(s)

Christine Gunter - Cadent Project Manager

Project Budget

£75,066.00

Summary

The scope of this project is to develop the business requirements for an automated design software system for >7bar pipelines and diversions, which would be capable of delivering 3D “end to end” BIM models for the permanent and temporary works, Capex and Opex cost estimates (+/- 25% accuracy).

In this stage, key stakeholders will be engaged to establish and document the agreed project deliverables. This will include:

- Agree scope for the automated design application
- Agree the detail of the application outputs
- Agree platform hosting and Cadent IS integration
- Agree application security requirements
- Agree user community and interfaces
- Agree administration and ongoing maintenance requirements

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

Cadent Gas has to process hundreds of requests each year for pipeline diversions and demand reinforcements necessitating new pipeline infrastructure. Cadent Gas utilise established “in house” design and cost estimating software solutions for MDPE pipelines, however due to the relative complexities the existing solutions aren’t suitable for the design and cost estimation of >7bar steel pipelines.

The development of route corridor options and subsequent optioneering to determine the optimum pipeline route for >7bar pipelines is time consuming, costly and requires the engagement of external design consultants. Furthermore existing designs are based on traditional design processes. The utilisation of BIM (Building Information Modelling) for the design of pipelines would provide numerous benefits and efficiencies in the lifecycle of the asset.

Method(s)

The aim of this project is to develop the business requirements for an automated design software platform, which, when developed, would deliver fully costed BIM models for the permanent and temporary works required for >7bar pipelines and diversions.

BIM is a collaborative structured process that is used to assist the strategic planning, design, construction, operation and maintenance of a building or infrastructure project. BIM software and technology facilitate the exchange and interoperability of the information gathered during the life of the project in a structured and intelligent manner.

BIM provides an opportunity to challenge the current design process. Traditionally, at contract launch several hundred specifications are issued to the designer to read and ultimately translate into designs and drawings. Too often designs commence with a blank “piece of paper” The final design is a functional and safe design, however, potentially not the optimum design in terms of cost and carbon, due to the time limited period and the traditional, sequential design process.

BIM is becoming increasingly ubiquitous in industry, with the UK Government stipulating that its construction projects must use BIM. Historically, Cadent have had no in-house BIM expertise and this innovative project may have the added benefit of paving the way to realise the benefits that BIM technology can bring to the business and to our customers.

Scope

The scope of this project is to develop the business requirements for an automated design software system for >7bar pipelines and diversions, which would be capable of delivering 3D “end to end” BIM models for the permanent and temporary works, Capex and Opex cost estimates (+/- 25% accuracy).

In this stage, key stakeholders will be engaged to establish and document the agreed project deliverables. This will include:

- Agree scope for the automated design application
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- Agree application security requirements
- Agree user community and interfaces
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Objective(s)

To deliver an approved and agreed business requirements document for an automated design software platform, which, if developed, would deliver fully costed BIM models for the permanent and temporary works required for >7bar pipelines and diversions.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

An approved and agreed business requirements document.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The key element of this project is to develop Cadent’s requirements for an automated design software platform which, if developed, will lay the groundwork for Cadent’s BIM transition.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL2 Invention and Research

Geographical Area

The project will be delivered from the Aqua Consultants facilities in Bradford.

Revenue Allowed for the RIIO Settlement

No revenue allowed for in the RIIO settlement.

Indicative Total NIA Project Expenditure

£75,066

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)

Currently, the cost of designing pipeline diversions is passed through directly to our customers with a typical design costing c. £130k and this is expected to significantly reduce with software that could be developed from the business requirements delivered by this project.

As such, when the benefits tracking methodology employed by Cadent to assess innovation projects was applied, this also shows a positive business case.

Please provide a calculation of the expected benefits the Solution

Cadent Gas has 50+ >7bar pipeline diversions to construct over the next 10 years for the HS2 scheme. Furthermore we receive an average of 25 applications each year for reinforcements and diversions of the existing >7bar network.

Each pipeline design costs on average C. £130k in external design costs and, were a software tool to be developed from these business requirements, we anticipate being able to pass the savings directly onto our customers by removing the need for external design houses in the initial phases of the project.

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

Applicable to all network licensees required to design >7bar pipelines and diversions as part of their operations.

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

If an automated BIM design and costing tool is developed from the business requirements delivered by this project, then preloading of the BIM design platform with network shape files and user specifications will be required. This is estimated to cost £25,000.

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 business requirements that will be developed by this project could be adopted and utilised by all GDN's in delivering an automated software platform for >7bar pipeline and diversion projects within their networks.

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 supports Cadent Gas' drive to serve our customers efficiently and effectively.

☑ 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