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

Sep 2015

Project Reference Number

NIA_NPG_006

Project Registration

Project Title

Modelling Asset Risk

Project Reference Number

NIA_NPG_006

Project Licensee(s)

Northern Powergrid

Project Start

September 2015

Project Duration

1 year and 1 month

Nominated Project Contact(s)

NPg Asset Management Engineer – Gav Howarth, NPg Innovation Manager - Chris Goodhand

Project Budget

£332,000.00

Summary

This scope of this will include:

- Model refinement such as use-ability, dashboarding & data inputs
- Presentation of outputs (considering use of mapping tools to identify “hotspots”)
- Development of enhanced intervention methodology
- Establishment of “scheme allocation methodology” across all asset categories (just Primary Plant so far)
- Plant optimisation to achieve target levels of risk (with risk constraints)
- Plant optimisation to achieve unit cost reductions
- Alignment to the requirements of the Common Methodology

Development of the modelling capability around the high-volume low-value asset categories Based on our current understanding of NPg requirements decisionLab have developed this costed proposal for consideration.

Nominated Contact Email Address(es)

yourpowergrid@northernpowergrid.com

Problem Being Solved

Over the last decade Northern Powergrid has developed a suite of condition based risk models.

The parameters that drive these decision support tools are now relatively stable and the functionality well embedded into key internal

business processes. The models contain high levels of inherent complexity and uncertainty, in particular associated with the subjectivity of input data (condition bands and weightings) and forecasting model error. Further, the overall volume of data per asset, and the number of assets now covered in the suite of models, presents its own challenges in terms of the robustness of the models and the processes by which these models are updated, manipulated and interrogated. This project addresses these challenges.

Method(s)

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decisionLab is a consultancy which specialises in developing bespoke and customised Operational Research and statistical models. Northern Powergrid entered a project in May 2014 to evaluate the decisionLab modelling approach. The project was completed on 31/03/2015 with Northern Powergrid taking delivery of the populated and customised Asset Risk Model (ARM). Some enhancements have already been identified to the models and in addition a number of emerging requirements were identified during Part 1 of the project.

This project therefore considers a further iterative stage (Part 2) of this project which would be achieved through four discrete "delivery packages (DP)" of work:

DP1: TOOL ENHANCEMENT: During Part 1 of this project there were a number of areas for enhancement identified, and DP1 will capture the most important of these, including Target Risk, new asset categories (where no HI models exist) and enhanced input/output facilities.

DP2: METHODOLOGY ENHANCEMENT: The existing ARM brings together multiple asset classes onto the same platform, and primarily reproduces the existing NPg intervention methodologies being applied within these classes. DP2 will take the opportunity to innovate and to improve the underlying intervention methodology and in particular to look for synergies and smarter interventions.

DP3: INVESTMENT PLANNING: DP3 will include unit cost reductions as an alternative focus for reducing risk within a budget, and prioritising procurement efforts. Further functionality in this package will be refined in consultation with investment planning team members within NPg. More details of scope to be agreed over the coming months.

DP4: RISK CALCULATION AND OUTPUTS: Incorporation of common methodology risk calculation and advanced visualisation of outputs.

Scope

This scope of this will include:

- Model refinement such as use-ability, dashboarding & data inputs
- Presentation of outputs (considering use of mapping tools to identify "hotspots")
- Development of enhanced intervention methodology
- Establishment of "scheme allocation methodology" across all asset categories (just Primary Plant so far)
- Plant optimisation to achieve target levels of risk (with risk constraints)
- Plant optimisation to achieve unit cost reductions
- Alignment to the requirements of the Common Methodology

Development of the modelling capability around the high-volume low-value asset categories Based on our current understanding of NPg requirements decisionLab have developed this costed proposal for consideration.

Objective(s)

The objectives of the project are:

- To implement general model refinement such as usability, dashboarding & data inputs
- Presentation of outputs (use of mapping tools to identify "hotspots")
- Revisit intervention methodology

- Enhanced investment planning:
    - Revisit scheme allocation methodology (investment planning-focused workshops)
    - Optimise investment scenarios to achieve target levels of risk (with risk constraints)
    - Optimise investment scenarios to achieve unit cost reductions
    - Scheme associations across all asset categories
    - Planned interventions across all asset categories (just Primary so far)
- Align risk quantification to the requirements of the Common Methodology
- Develop the modelling capability around the high-volume low-value asset categories

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The project will be considered delivered once Northern Powergrid is in receipt of the final models with the agreed functionality.

(1) Tool Enhancement

o Optimise to achieve target levels of risk (with risk constraints) : Enhanced functionality over and above existing methodology successfully added to the existing model

o Develop NPg modelling capability around the high-volume low-value asset categories: HV cables, LV cables and pole mounted transformers added to the modelling environment

o Implement enhancements to functionality identified in Phases 1 to 4 during 2014/15: Enhanced functionality to existing methodology successfully added to the existing model

(2) Methodology Enhancement

o Evaluate and Improve underlying intervention methodologies: Internal workshops held to inform improved intervention modelling. Functionality added to models.

o Model synergies which can deliver efficiencies: Enhanced functionality over and above existing methodology successfully added to the existing model

(3) Investment Planning

o Optimise to achieve unit cost reductions: NPg able to carry out unit cost scenario analysis using the AIMMS model

o Incorporate an investment planning perspective: Enhanced functionality (over and above existing methodology) identified through targeted workshops and successfully added to the existing model

(4) Risk Outputs and Calculation

o To align to Common Methodology: Risk calculation methodology revised in accordance with the requirements of the Common Methodology

o Enhance model output functionality: The current sets of output pages would be fully reviewed with wider members of the NPg team.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

This project would be deliver a decision support tool providing an alternative and enhanced modelling platform for carrying our optimised intervention modelling.

Technology Readiness at Start

TRL6 Large Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

Not applicable for this type of project - no field trials are considered necessary. All data will come from the NPg network, although the outputs will be applicable to all other DNO networks.

Revenue Allowed for the RIIO Settlement

£0

Indicative Total NIA Project Expenditure

The total Project cost is £331,650 of which 90% is allowable NIA expenditure (£298,485).

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)

Assuming a realisation of these savings for the duration of the next price control period 2015-2023, this equates to total savings of £705,000.

The project NPV is £59,398

Please provide a calculation of the expected benefits the Solution

It is anticipated that the enhanced modelling capabilities offered under part 2 of this project would be equivalent to those estimated under part 1, which were:

· Reduce the internal resource associated with carrying out intervention plan modelling, optimisation and translation for regulatory reports. Assuming a saving of 25 man days per year at an average cost of £325 per man day, this equates to an annual saving of £8,125 per year.

· Further benefit would be realised from optimising the investment pipeline over and above the work already carried out in this area, as a result of the enhanced modelling capabilities and intervention strategies that could be evaluated. With ~£160m of expenditure associated with the asset replacement programmes each year, any efficiency that could be realised in this area could be significant. Assuming a 5% saving on 1% of schemes, this equates to an annual saving of £80,000.

Assuming a realisation of these savings for the duration of the next price control period 2015-2023, this equates to total savings of £705,000.

The project NPV is £59,398

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

The Method could be applied across all Network Licensees through the establishment of DNO specific data interfaces (to corporate asset systems).

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

this project produces a planning and decision support tool. Costs for full GB roll-out are estimated at >£300k.

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 DPCR5 introduced the requirement to report to Ofgem the output benefits delivered by our projects and to provide them with more detail on the volumes of assets removed, installed or refurbished in each year of the price control period. This formed one of the key performance metrics for the price control period (a "Secondary Deliverable" or "HI Δ" target) and an important benchmarking tool for Ofgem in RIIO ED1 price control negotiations. In DPCR5 DNOs were required to document the underlying health of the assets at the time of the intervention for the major asset categories including poles, towers, primary plant and EHV/132kV cable. The mechanism has been extended for RIIO ED1 to account for the criticality of individual assets and requires DNOs to work to a "Common Methodology".

A key objective of the project is to provide a suitable alternative and enhanced modelling platform for carrying intervention modelling and risk optimisation which is a feature of the business plans submitted by all Network Licensees for the RIIO ED1 price control period. This includes alignment of existing risk models to the requirments of this Common Methodology which is applicable to all UK DNOs.

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

The ability to model networks and activities, and to translate those models into useful information, is incredibly useful to Northern Powergrid, to other DNOs and to our regulator. Specifically recent innovation projects led by Northern Powergrid have developed health indices and condition-based risk models. The work to date involved developing mathematical models and translating these into software-enabled tools that can be used to support investment decision-making. We are committed to further developing the range of

models used for this purpose as outlined in our forward business plans. Work to further enhance this modelling capability was outlined in the NPg Innovation Strategy.

☑ 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