NIA Project Registration and PEA Document

Date of Submission

Mar 2015

Project Reference Number

NIA_NGET0159

Project Registration

Project Title

Black Start Alternative Approaches

Project Reference Number

NIA_NGET0159

Project Licensee(s)

National Energy System Operator

Project Start

March 2015

Project Duration

0 years and 4 months

Nominated Project Contact(s)

Nicola Lond

Project Budget

£125,000.00

Summary

The Scope of the Project is intended to investigate the potential future option available for Black Start by looking at all possible technologies available and including but not limited to the following areas for consideration..

1. Future Energy Scenarios - 2020

2. Technical - Energisation Scenarios

3. Technical Requirements

4. International benchmarking

5. Additional system benefits of approaches

6. Regulatory and commercial arrangements.

Nominated Contact Email Address(es)

box.so.innovation@nationalgrid.com

Problem Being Solved

National Grid has an obligation under the Grid Code to ensure that the National Electricity Transmission System (NETS) can be re-energised in the event of a total or partial system shutdown. Such re-energisation is known as 'Black Start'. The likelihood of a total or

partial system shutdown occurring is considered extremely remote due to the security standards employed by National Grid to ensure system safety and reliability.

However, it is the case that should a total or partial system shut-down occur anywhere on the NETS, contingency arrangements must be in place to enable a timely and orderly restoration of supplies and this capability is therefore maintained 24/7.

As the electricity generation mix changes and some existing thermal plant closes down, National Grid needs to look at the future options for Black Start capability. The current strategy for the economic and efficient procurement for Black Start therefore needs to be reviewed and alternative methods considered both Technically, Commercially and Regulatory in order to meet the Future requirement.

Method(s)

Research

We propose independent research studies into the credible future options. The studies will investigate possible alternative future options for Black Start.

- Phase 1 – Call for proposals – brief, timescales, estimated costs. (~4 weeks) – This is complete.
- Phase 2 – Review and shortlist providers for presentations on proposal/further details. (~2 weeks) – complete
- Phase 3 – Studies (~3 months) – The funding sought in this Project is for this phase. This is expected to be March/April to May/June 2015. 2 preferred suppliers have been selected for this process.
- Phase 4 – Potential for further Detailed Studies depending on the outcome of the Phase 3 studies.

The output will be a report(s) with recommendations for credible options.

Scope

The Scope of the Project is intended to investigate the potential future option available for Black Start by looking at all possible technologies available and including but not limited to the following areas for consideration..

1. Future Energy Scenarios - 2020
2. Technical - Energisation Scenarios
3. Technical Requirements
4. International benchmarking
5. Additional system benefits of approaches
6. Regulatory and commercial arrangements.

Objective(s)

The objective of this project is to complete a desktop study to investigate the potential of alternative Black Start options for the future. In particular to Identify credible Alternative approaches for the procurement of Black Start in GB in the future considering both Technical and Commercial /Regulatory frameworks.

This is a short initial study which may lead to further detailed studies on specific preferred options.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Alternative approaches will be identified. These should be credible alternatives that can be taken forward though either further studies or implementation plans.

Project Partners and External Funding

 The Stage 1 Initial call for proposals (mini-tender) has allowed us to shortlist and select 2 preferred providers covering both technical and commercial.

Potential for New Learning

National Grid are undertaking this study work to research and enhance understanding on how different technologies and methods can be used to meet the Black Start needs in the future. External and Independent studies provides an opportunity for National Grid to widen the thinking on Black Start procurement by seeking alternative solutions from a range of sources, not just relying on internal

knowledge and resources. There is an opportunity to learn by researching alternative technologies, Worldwide Benchmarking against other networks and challenging our current thinking, which has been fit for purpose in the past but not necessarily so for the future.

There is also the opportunity to share the innovative thinking with Industry which may be valuable to other networks, current and potential future providers of the Black Start service.

Scale of Project

The project is a desktop study to research and further our understanding. At this stage this is a 3 month project. This may lead on to further more detailed study work on preferred options depending on the outcome of these initial studies.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

The whole of the GB National Electricity System should be considered in terms of applying the Black Start approach but the scope of approach could be sought worldwide. Within the GB system geographical considerations should be given to restoration.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

The indicative NGET NIA expenditure for this project is £125,000

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:

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)

Potentially cost savings can be made by having alternative approaches for Black Start. Efficient procurement of Black Start services delivers benefit to consumers. Potentially several £m's could be saved depending upon the options implemented. An efficient restoration of the network in the event of a Black Start event is also of benefit to consumers, the quicker that electricity is restored less impact on their businesses/home. If we can optimize this through alternative methods then this is also a benefit.

Please provide a calculation of the expected benefits the Solution

Not required, this is a research project.

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

The ability to re-energise the system after total black out is something of a whole system nature and relates to 100% of the GB System operators system.

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

The costs implications of adopting new approaches to black start will form part of future stages of investigation after the technical potential have been establish during this project.

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

Other TSOs, DNOs could utilize the learning to enhance their own Black Start provisions into the future. Current and Potential Providers could use the learning to inform their own decisions on offering potential Black Start Services and how these services may be developed into the future could help develop and shape future services to the System Operator. This could also highlight further studies that may provide further benefits.

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

☑ 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.

To the best of our knowledge there are no other projects that are investigating alternative approaches to Black Start in the future to this scope and that would be applicable to the GB network.

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