

## Network Innovation Allowance Closedown Report

*Notes on Completion:* Please refer to the appropriate NIA Governance Document to assist in the completion of this form.

Network Licensees must publish the required Project Progress information on the Smarter Networks Portal by 31st July 2014 and each year thereafter. The Network Licensee(s) must publish Project Progress information for each NIA Project that has developed new learning in the preceding relevant year.

### Project Closedown

#### Project Title

Black Start Alternative Approaches

#### Project Reference

NIA\_NGET0159

#### Project Licensee(s)

National Grid Electricity Transmission

#### Project Start Date

Mar 2015

#### Project Duration

3 Months

#### Nominated Project Contact(s)

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#### 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.

#### Success Criteria

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

#### Performance Compared to the Original Project Aims, Objectives and Success Criteria

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### Project Overview

This project was to undertake short initial desktop studies to investigate the potential or alternative options for Black Start in the Future.

#### **Problem:**

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. 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.

#### **Studies:**

These studies have been completed by 2 providers, Mott Macdonald and DNV.GL and provide a high level view on Future Black Start alternative approaches. NGET have worked with both providers to review research and comment. Limited input was provided by NGET so as not to lead or influence the study work in order to get independent perspectives on the problem.

The 2 studies are published with this report and the summaries are given at the end of this report. They have covered the scope agreed and offer conclusions and next steps to this work. This has allowed NGET to learn from independent research and consolidate our thinking on the future approaches to Black Start. The objective of the study has therefore been met and has provided some credible options for a way forward and identified a number of areas for further work, as anticipated.

### **Required Modifications to the Planned Approach During the Course of the Project**

#### Changes to scope and approach

There have been no changes to the Scope of the Project.

#### Changes to cost

There have been no changes to the external costs of the project. More National Grid Electricity Transmission resources have been required than first forecast.

#### Changes to programme

The initial programme was to take 3 months. There was some delay in the starting of the project and in the completion of the reports which resulted in the final reports being submitted in August/September 2015. This was agreed and re-planned with no impact on external costs. It was agreed that the reports would be of better quality if more time was taken to review and consult with NGET and that we would prefer to take time to do this than to meet the initial agreed deadlines.

Initial Kick off - Planned for March - Project started on 13th April 2015

Mid Review – Planned for April – Took place in May/June 2015

Final Studies – Planned for May/June 2015 – Replanned and received August/September 2015

### **Lessons Learnt for Future Projects**

#### Review of benefits case

The anticipated benefits of the project were to seek out more efficient ways of approaching Black Start in GB and therefore to

potentially save money for the end consumer in delivering the Black Start service into the future. The realisation of these benefits is in the long term (~5- 10years) and it was not anticipated that this would be realised without further work.

Further potential innovation areas have been identified such as in relation to Storage, Embedded generation and Interconnectors for example.

It was anticipated that other TSOs, DNOs could utilize the learning to enhance their own Black Start provisions into the future and also that Current and Potential Providers could use the learning to inform their own decisions on offering potential Black Start Services. NGET believe that these completed studies are of benefit in informing the industry on the potential development of the Black Start service.

#### Further Work

There are a number of next steps that NGET is proposing to pursue following the completion of these studies. This includes further study work and potential future trials. This was anticipated in advance of commencing the studies as these were high level with the objective of providing options to further pursue.

The reports also confirm that in some areas NGET should continue with their existing strategy to pursue providers which are best suited to provide Black Start such as CCGTs, Interconnectors.

**Note:** The following sections are only required for those projects which have been completed since 1<sup>st</sup> April 2013, or since the previous Project Progress information was reported.

### **The Outcomes of the Project**

#### Project outcomes

- | The conclusions from the work undertaken are as follows:
- | There is no single answer to the problem.
- | The Technology that is best suited to provision of a Black Start service in the future broadly confirms that which National Grid Electricity Transmission is pursuing ie CCGT, Interconnectors. Some other technologies i.e. Nuclear and renewables/batteries can also be further investigated.
- | Smaller plant should be considered and Aggregation of embedded providers into the future. This requires further investigation to prove its effectiveness.
- | Network Assets and Network Flexibility should be reviewed for Black Start into the future.
- | The commercial frameworks/ Regulatory frameworks should be reviewed for Black Start.

It is recommended that some further studies and development work are undertaken with engagement with DNOs to further investigate the potential use of smaller scale plant for Black Start into the future. NGET are planning to follow up on the above outcomes as detailed in Next Steps.

NGET are carrying out this work on behalf of industry and consider this as an industry problem to resolve and not just a System Operator issue. NGET will therefore be engaging with a number of stakeholders in furthering this work.

A copy of the Summaries for each of the two reports is appended to this report.

### **Planned Implementation**

The studies have provided NGET with an independent view of alternative approaches to Black Start into the future. This has allowed NGET to be better informed and, alongside our own thinking, review these options and consider the most appropriate actions to take this work further. This has allowed us to include this learning into the 2015 System Operability Framework (SOF) for System Restoration.

#### **Work streams**

The areas identified fit into the workstreams of Technology, Restoration Strategy, Commercial Frameworks and Procurement Strategy.

#### Technology

- | New CCGT/ Interconnectors – continue
- | New Nuclear – Develop
- | Renewables/Storage – Study/Develop (Trial)
- | Embedded/ Smaller scale Generation – Develop

## Network Restoration Strategy

- 1 DNO/TO Co-ordination
- 1 Network Asset Solutions/Flexibility
- 1 Spine/Bottom Up Approaches
- 1 Frequency Tripping Standards & Protection settings
- 1 Use of Strategic Storage

## Commercial & Regulatory Frameworks

- 1 Obligations review
- 1 Restoration Expectations review
- 1 Incentives & Funding review

## Procurement Strategy

- 1 Procurement Methods review
- 1 Engagement with industry
- 1 Economic & efficient assessment – enhance.

## **Next Steps**

The Next Steps can be summarised under the Headings of Continue, Engage, Review/Develop and Study/Develop.

### Continue

- 1 New CCGTs/CHP
- 1 New Interconnectors
- 1 Existing Providers

### Engage

- 1 DNOs
- 1 OFGEM
- 1 DECC & ONR
- 1 Industry Feedback
- 1 Industry Experts

### Further Innovation - Review/Develop

- 1 TO/DN Co-ordination
- 1 Commercial & Regulatory Frameworks
- 1 New Nuclear
- 1 Restoration expectations
- 1 Procurement

### Further Innovation – Study/Develop

- 1 Renewables
- 1 Storage
- 1 Smaller/Embedded generation
- 1 Restoration Approaches
- 1 HVDC interconnectors

NGET are currently planning this work into the next 12 month horizon and are seeking feedback from industry on the proposed way forward via the System Operability Framework (SOF) and other industry Forums in order to consolidate the plan.

If you have any questions or would like to provide feedback regarding this project please contact Nicola Lond  
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## **Other Comments**

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Attached Reports:

1. DNV GL: Future Black Start Report
2. Mott MacDonald: Black Start Alternative Approaches Report