

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

Dec 2013

Project Reference Number

NIA_NGET0043

Project Registration

Project Title

Live Line Working Equipment

Project Reference Number

NIA_NGET0043

Project Licensee(s)

National Grid Electricity Transmission

Project Start

August 2010

Project Duration

6 years and 11 months

Nominated Project Contact(s)

Chris Land

Project Budget

£1,883,000.00

Summary

Live Line working was initially introduced in the 1960s and actively utilised in the 1990s. This was a high profile project and an example of how an integrated Transmission Company can use innovative Transmission Owner techniques to deliver benefits to the System Operator. These benefits are primarily around minimising system outages to carry out work and system operator costs. Since the introduction of Live Line in the 1990s, the system has been less constrained and deadline access more easily available (hence the decline in use).

To enable the re-establishment of Live Line Working within National Grid, it has already been approved internally and discussions with OFGEM on this matter have been undertaken. This project develops Live Line working techniques and develops current knowledge as well as developing live line working equipment and rope access techniques.

Nominated Contact Email Address(es)

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Problem Being Solved

The Transmission System is likely to become increasingly constrained over the next 5-10 years, based on forecast constraint costs, new access arrangements, continued asset investment requirements and new generation connections.

Live Line working offers significant opportunities in enabling maintenance and defect overhead line (OHL) work to be carried out however significant investment and commitment is required order to re-establish previous Live Line capability and this project is planned to develop and identify the best equipment and working practices to ensure an economic, efficient and effective technology and process.

Method(s)

The methods that are proposed for this project are;

- Identification of potential suppliers for basket and trolley
- Factory visit to discuss options
- Delivery of finished helicopter equipment

(Specialist Aviation design company has already been identified and discussions around scope undertaken)

- Delivery of new basket and trolley

Scope

Live Line working was initially introduced in the 1960s and actively utilised in the 1990s. This was a high profile project and an example of how an integrated Transmission Company can use innovative Transmission Owner techniques to deliver benefits to the System Operator. These benefits are primarily around minimising system outages to carry out work and system operator costs. Since the introduction of Live Line in the 1990s, the system has been less constrained and deadline access more easily available (hence the decline in use).

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Objective(s)

The re-establishment of Live Line working within National Grid.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The preliminary investigation into the project has indicated a high likelihood of success due to evidence of successful implementation by other utilities around the world. This is further enhanced following National Grid's representation on to the IEC and CIGRE International Live Line working groups (based on IFI project success to date).

Project Partners and External Funding

Bond Helicopters Europe

No external funding is being contributed to this project.

Potential for New Learning

This project means that there is potential for new learning,, currently the only feasible provider to National Grid, Scottish Hydro Electric Transmission and Scottish Power for Live Line work is RTE, based on different asset dimensions and requirements to the UK. Development of National Grid capability would introduce competition in this market and potentially allow the other British network licensees to also make financial savings.

Scale of Project

This is a field based trails to ensure the live line working techniques comply with all safety rules.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

This project is applicable to the whole of the UK (National).

Revenue Allowed for the RIIO Settlement

Increased Operational costs for OHL maintenance were included in NGET business plan to take account of Live- Line working. These capital acquisitions were not allowed for.

Indicative Total NIA Project Expenditure

IFI- £1.5m NIA - £0.333m

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)

Benefits of Live Line Working

Increased System Security and potential avoidance of System Outage Costs

Reduced estimated return to service time (when using helicopter access on de-energised lines) due to no requirement to isolate and earth and apply double dress earth systems to allow access to the circuits.

Increased productivity levels when dealing with larger volumes, e.g. de-spacing. Typical rates of de-spacing using traditional techniques are approximately 4 - 6 span per day, whilst at the peak of Live Line use, the team were achieving up to 15 spans per day (and typically 10 spans a day).

Elimination of hazards associated with dead line working i.e. manual handling, management of induced voltages and circulating currents (this risk has significantly increased since Live Line working was first introduced)

Additional contingency providing a further option/method of working when responding to major faults or incidents.

There is some works that can currently only be carried out using helicopter access live line techniques (although the circuit may be de-energised), e.g. high crossing work on XL Severn River Crossing.

MEWP Equipment - The access platform would expand the current skills base within the live line team for providing different options to carry out live line repairs to existing or emergency defects without the need to switch out circuits, this would enhance the security of the system where defects are identified on strategic circuits and outages are not available, ultimately increasing system capacity where circuits have been down rated due to a defect. The use of the MEWP would ensure the minimum equipment is required which will in turn reduce the manual handling of equipment required by the live line staff and provide a stable working position.

2 Key Drivers For Increase in Live Line Working

2.1 Current Potential Usage Of Live Line Working

Going forward due to adjustments in our capital plan, aging assets and operating cost pressure, we will increasingly be taking an approach of Dynamic Asset Management. This will require having the capability to respond quickly and effectively to significant defects. Live Line working would strongly support this asset management approach, removing any system access issues, which could

otherwise delay defect rectification.

In addition, based on current OHL outage defect levels, approximately £27,600 is spent per annum on monitoring of defects that could be rectified using Live Line techniques.

Over the next five years there are a minimum of three schemes that will require helicopter access work. These include the re-conductoring of the Severn crossing, in 2014/15, which will require the dampers to be removed and then to be replaced (i.e. 2x helicopter access work). In 2011 we will be introducing our first capital scheme which will replace fittings on AAAC (All Aluminium Alloy Conductor), as the outer aluminium strands are very soft, a trolley will not be used to access the conductor, and helicopter access will be required.

If Live Line/helicopter access techniques were developed by National Grid, the in-house cost for this work would be approximately £40K for each piece of Helicopter access work (i.e. £120K). If this work had to be outsourced based on previous RTE contract costs, this would be at least £190K for each piece of Helicopter access work (i.e. £570K, £450K more than in-house costs).

Please provide a calculation of the expected benefits the Solution

An outage can be in the region of £100,000 per day, typically for 1 week duration. Therefore £700,000 base cost.

With the liveline method, we can keep the circuit in, so the costs are labour - approximately £120,000

$$B-M = 700,000 - 120,000 = £580,000$$

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

This is applicable to all areas of Overhead lines in England & Wales.

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

The increased operational costs were funded under the R10 deal, the capital cost of new equipment including testing etc, will be included in this scheme. This means there will be no unfunded work left to roll out afterwards.

Requirement 3 / 1

Involve Research, Development or Demonstration

A R10-1 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

R10-2 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

n/a

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 addresses connections, specifically the need for improved system access with minimum disruption and cost to customers. The Transmission System is likely to become increasingly constrained over the next 5-10 years, based on forecast constraint costs, new access arrangements, continued asset investment requirements and new generation connections.

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.

Although live line working exists this there had not been a review of techniques or equipment used since the early 90's and this work has not previously been completed in the UK since the 90's there has been significant advances in modeling and materials.

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