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NIA Project Registration and PEA Document

Date of Submission

Mar 2016

Project Reference Number

NIA_NPG_010

Project Registration

Project Title

Pollywood - Alternative wooden pole system for OHL

Project Reference Number

NIA_NPG_010

Project Licensee(s)

Northern Powergrid

Project Start

March 2016

Project Duration

3 years and 7 months

Nominated Project Contact(s)

Andrew Webster (Project Manager)

Project Budget

£120,000.00

Summary

The scope of this 14 month programme of work by Pollywood is to assess and identify a material that would be fit for purpose as a replacement to traditional wooden poles.

The Project will:

- Develop the best combinations of veneers and resin formulations which will be assessed against the technical requirements of the DNOs.
- Take the most suitable combination and produce scaled prototypes.
- Subject the scaled prototypes to representative structural strength tests which will provide evidence that the claims of weight strength ratio are valid.
- Provide evidence that the prototypes can support the deployment of the networks equipment and fixtures.
- Explore the possibilities of new concepts of pole design which will fully utilise the characteristics of the new material.

Nominated Contact Email Address(es)

yourpowergrid@northernpowergrid.com

Problem Being Solved

Traditionally wooden power distribution poles have been preserved using creosote a chemical that is coming under EU and UK Government pressure to be replaced. Therefore, there is a need to find alternative preservatives to creosote or find alternative materials that can be used to replace traditional wooden poles.

Any alternative to traditional wooden poles would need to meet the requirements of network operators. New materials and designs would have to demonstrate longevity, ease of installation and operation, correct mechanical strength, appropriate electrical properties, be eco-friendly and cost effective.

Method(s)

Ultimately this Project would lead to the development of a material that could be used to manufacture power distribution poles or components that would give the network operators –

- * Poles or components that would be produced using spiral winding machines an industrial process allowing products to be manufactured to order.
- * A pole manufactured from eco-friendly sustainable resources.
- * A pole with a projected lifespan in excess of 50 years without the need to be treated with creosote.
- * A lightweight pole, which for network operators would have benefits for installation in difficult to access locations, since it will require less heavy plant for handling (could be man handled).
- * A pole which would still permit linesman to climb with the preferred inexpensive method of spiked boots.
- * A design of pole more cost effective than other traditional pole replacements
- * A hollow pole which will allow cabling to be trunked internally, giving a better performance from a safety perspective as well as being more aesthetically pleasing.

The development of this technology will open other possibilities beyond the direct replacement of existing wooden poles. Modular designs, replacement of cross arms are all potential developments once the material has been proven fit for purpose for the power industry requirements.

Scope

The scope of this 14 month programme of work by Pollywood is to assess and identify a material that would be fit for purpose as a replacement to traditional wooden poles.

The Project will:

- * Develop the best combinations of veneers and resin formulations which will be assessed against the technical requirements of the DNOs.
- * Take the most suitable combination and produce scaled prototypes.
- * Subject the scaled prototypes to representative structural strength tests which will provide evidence that the claims of weight strength ratio are valid.
- * Provide evidence that the prototypes can support the deployment of the networks equipment and fixtures.
- * Explore the possibilities of new concepts of pole design which will fully utilise the characteristics of the new material.

Objective(s)

The objective of this Project is to –

- * Develop a new material based on wood veneers and bio resins that will pass DNO's criteria for being used as an alternative to traditional wooden power distribution poles.
- * Develop a material that is eco-friendly.
- * Develop a new design of pole using this material that possesses all the characteristics required for a power distribution pole.
- * Develop a replacement pole design that would be cost effective to deploy.
- * Explore new possibilities of utilizing the properties of this new material.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The success criteria for the Project are:

- * The development of a material that meets DNOs specifications that could be used for new innovative designs in power distribution.
- * The demonstration of a prototype pole, which could be used as a replacement to traditional wooden power distribution poles.
- * The demonstration of a manufacturing technique to produce an alternative pole.
- * The results of this Project that would allow the manufacture and testing of full scale alternative poles using the new material development in this Project produced on a spiral winding machine.

Project Partners and External Funding

N/A

Potential for New Learning

The potential for new learning is high. The use of spiral wound wood composite based poles for overhead lines has, as far as we can see, never been investigated before. This project will assess the viability of such an approach and assess if it is feasible candidate technology for replacing system based on ceosote preserved solid wood poles.

Scale of Project

N/A. Benchtop/laboratory study.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL4 Bench Scale Research

Geographical Area

N/A. Benchtop/laboratory study.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£120,000

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)

If the use of creosote to preserve wooden poles is banned there will be a need to find either an alternative preservative or a replacement for wooden poles on OHL systems. Currently all other alternatives such as carbon fibre composites, steel, aluminium, concrete are costlier than wooden poles. It is believed that a Pollywood pole could potentially be of a comparable cost to the current fleet of wooden poles. The chief financial benefit would therefore be in avoided additional network costs.

Please provide a calculation of the expected benefits the Solution

Benefits are currently not clear. This is a low TRL project.

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

This trial seeks to give us indicative information about the strength of this technology. An assessment of that information will allow us to better determine the range over which this type of system could be applied.

The approach is potentially replicable across the entire GB network, wherever wooden poles are used, as part of the OHL system. There are currently over 4 million wooden poles on the entire system and the Pollywood system might potentially replace all of them over the replacement lifecycle.

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

Poles would be replaced on an as-needed basis. Until costs of the new technology can be identified determining the cost is not possible although the target is to match the cost of current poles, over their entire lifetime, in which case the marginal cost would be insignificant.

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 trialed 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

This project is expected to identify a new material that could potentially be used to replace traditional asset designs such as wooden power distribution poles. These assets are common to all network operators. The generated learning would be relevant to all DNOs on the GB network who need to establish alternative technology options in the event that creosote is no longer available as a preservative system.

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.

Consultation with our peers and technology searches have not indicated that this approach has been investigated for utility pole use before.

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

Legacy change to finish date.

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

Legacy change to finish date.

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

Legacy change to finish date.

This project has been approved by a senior member of staff

Yes