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

Mar 2024

Project Reference Number

NIA_SPEN_0098

Project Registration

Project Title

Environmentally Acceptable Wood Pole Pre-treatment Alternatives to Creosote (APPEAL) (ED-2)

Project Reference Number

NIA_SPEN_0098

Project Licensee(s)

SP Energy Networks Distribution

Project Start

April 2024

Project Duration

3 years and 9 months

Nominated Project Contact(s)

SPEN – Ralph Eyre-Walker (lead), UKPN – Matthew Reeves, NPG – Chris Goodhand, SHEPD /SEPD – Matthew Hamilton

Project Budget

£970,610.00

Summary

Creosote is the pre-treatment preservative of choice for UK Over-Head Line (OHL) wood poles and provides poles with a service life of 45-55 years. There are millions of these poles in GB. Creosote for amateur use was banned in the UK in 2003 and industrial creosote now has to conform to certain formulation restrictions. Further revision is planned for 2018 (EU Directive 2011/71/EU) and if this results in a full ban it will cause severe disruption to the supply of timber OHL supports and render UK energy provision more expensive unless a replacement preservative type which can provide similar efficacy is in place.

The project identifies a suitable preservative by firstly reviewing the literature in the area to identify candidate preservative types. It then tests these preservatives by carrying out an accelerated-ageing test of wood poles treated with different preservatives; and assessing the results by analysing samples at different times during the test.

Preceding Projects

NIA_SPEN0008 - Environmentally Acceptable Wood Pole Pre-treatment Alternatives to Creosote (APPEAL)

Third Party Collaborators

Energy Innovation Centre

Nominated Contact Email Address(es)

innovate@spenergynetworks.co.uk

Problem Being Solved

Creosote is the pre-treatment preservative of choice for UK Over-Head Line (OHL) wood poles and provides poles with a service life of 45-55 years. There are millions of these poles inGB. Creosote for amateur use was banned in the UK in 2003 and industrial creosote now has to conform to certain formulation restrictions. Further revision is planned for 2018 (EU Directive 2011/71/EU) and if this results in a full ban it will cause severe disruption to the supply of timber OHL supports and render UK energy provision more expensive unless a replacement preservative type which can provide similar efficacy is in place.

Identification of this alternative to creosote will therefore help to keep the cost of the Distribution system down, realised in lower costs for customers.

Method(s)

The project identifies a suitable preservative by firstly reviewing the literature in the area to identify candidate preservative types. It then tests these preservatives by carrying out an accelerated-ageing test of wood poles treated with different preservatives; and assessing the results by analysing samples at different times during the test.

Scope

Stage 1: Literature Review

Literature review of alternative wood preservative types to select several which appear to be the most efficacious and most likely to be permissible for 'Use Class 4 timbers' (i.e. those with ground contact) under existing and future EU pesticide directives. This selection will be based on:

- Proven anti-fungal efficacy
- Longevity of anti-fungal effect (leach resistance etc.)
- Absence of negative effects on treated timber physical properties (e.g. strength, conductivity, inability to take spikes)
- Environmental profile
- Simplicity of pole treatment (use of existing plant, seasoning requirements etc.)
- Potential for upgrade of anti-fungal longevity using supplementary products

The review will include research papers, scientific texts and web searches for new preservative types being promoted by existing companies for Use Class 4 and other timbers. Contact will be made with pole treatment organisations to determine whether efficacious alternative products are already being considered and for what reasons. In addition, the efficacy of existing alternatives to creosote in other countries will be examined.

Stage 2: Accelerated Testing

The construction of a fungal cellar facility – microbiologically active soil bed, elevated temperature, elevated humidity and rainfall simulation – for accelerated testing of timbers treated with the selected preservatives under simulated field conditions to determine whether the literature claims of anti-fungal efficacy are borne out by test comparisons with creosoted timbers (high and low retention) under conditions representing at least 20 years of UK field exposure. Up to 600 samples can be accommodated, 500 are expected.

This project will potentially provide at least one novel preservative type that can replace creosote with or without supplementary products (e.g. ground-line wraps). Reduced concentrations of creosote will also be investigated and performance compared with controls, to include at least creosote and copper-chrome.

The project has been successful in building an effective fungal cellar facility and has demonstrated the capability to decay timber stakes to provide representative accelerated aging that would be expected in the field. To ensure best value of this facility, a project extension was agreed between all parties early in 2022 with the addition of the following scope:

1. Extension of existing timber stake trial by an additional two years. This increases the equivalent aging to 50-60 years in the field to provide improved evaluation of the preservative methods against existing products.
2. Addition of a round timber sample trial. This utilises the space made available within the cellar following the annual sample removal of the original timber stakes for destructive testing.

Stage 3: Final Report

Provision of a report detailing selection criteria, test results and recommendations including adoption of preservatives.

Objective(s)

Stage 1: Literature Review

A detailed literature review of existing or novel preservative types offering at least 2 candidates (and low creosote alternative) as potential replacements for creosote (offering similar or greater decay prevention for timbers in Use Class 4 (ground contact)) for progression to testing at Stage 2. Recommended detailed project outline for Stage 2 (number of treatments, replicates and recommended duration of accelerated testing).

Stage 2: Accelerated Testing

Successful construction of fungal cellar facility and test bed deterioration results for timber posts/stakes treated with Stage 1 candidate preservatives and creosote (high & low retention).Pole lifetime will be predicted based on three samples of the specimens.

Stage 3: Final Report

Provision of final report detailing the outcomes of project Stages 1 and 2 and providing recommendations for further work with regard to any changes to existing treatment protocols and industry adoption.

Consumer Vulnerability Impact Assessment

The project is assessed to have no impact on consumer vulnerability.

Success Criteria

- The fungal cellar is constructed and operated successfully (i.e. provides the required high temperature – high humidity environment.
- The test method is proven to be effective and valid.
- The environmental variables are held constant across samples during the test.
- The test provides estimated lifetimes for the samples, (whether preservatives, ground-line wraps or other treatments) with reasonable confidence intervals

Project Partners and External Funding

N/A

Potential for New Learning

- Development of a list of alternative preservatives, drawing upon national and international experience
- Development of a method (and facility) for accelerated-testing to determine the service life of wood poles (in relation to preservatives)
- Observation of the process of ageing for different preservatives
- The estimated lifetimes of samples treated with preservatives, with their confidence intervals

Scale of Project

The literature review has been given a global scope in order to identify many possible alternative preservatives, to reduce the chances of candidates being discovered too late to be included in the test.

The size of the test facility has been set to accommodate:

- Up to 4 preservatives (1 being the normal creosote treatment), 2 ‘supplementary treatments’ such as ground-line wraps and a control (untreated)
- 3 sample times (sampling is a destructive process, samples being removed each period, subjected to bending tests, sawn-through and assessed)

The anticipated test duration of 24 months corresponds to 20 service years. Test duration can be extended or reduced according to funding partners’ decision after the Stage 1 literature review and potentially at any time before the last sample time. Service lifetime

will be estimated at each sample time for each treatment.

An independent review of the method used to estimate lifetimes is included to ensure robustness of the results.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL5 Pilot Scale

Geographical Area

At Freedom Group and chosen test location.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

The total Project cost is £330,032

SPEN NIA Expenditure: £82,508

UKPN NIA Expenditure: £82,508

NPg NIA Expenditure: £82,508

SHEPD/SEPD NIA Expenditure: £82,508

Project Eligibility Assessment Part 1

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations

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

N/A

Please provide a calculation and/or description of the expected benefits of the solution

This is a research project that seeks to provide an evidence base of the performance of alternative preservatives so that alternatives to creosote may be chosen in future. It seeks to generate knowledge of solutions, TRL3

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

All network licensees maintain wood pole OHLs and results are applicable to all licensees. It is estimated that there are in the order of several million wood poles across the license areas and the vast majority are treated with creosote.

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

Costs are not yet known. The main driver is the need for an alternative to creosote for wood poles. The project will provide more information after Stage 1 has been carried out, which identifies the treatments to be applied and evaluated.

Requirement 3 / 1

Involve Research, Development or Demonstration

Projects 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

Involve Research, Development or Demonstration - Please select all that apply

☑ 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

N/A

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. Networks must explicitly mention similar projects that they have considered and how these differ.

Please demonstrate below that no unnecessary duplication will occur as a result of the Project.

Alternatives to wood poles themselves are available and limited tests have been carried out. They have not been adopted due to their price premium. Creosote alternatives for wood poles have not yet been evaluated through trial by networks companies. This is a collaborative project being conducted by 4 DNOs to share learning and avoid duplication.

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

This project is a scientific study and controlled trial with the aim to improve understanding of the performance of environmentally friendly alternatives to Creosote for use as a wood pole preservative. Creosote has long been the sole preservative used on the network: with new environmental legislation soon to be enforced, it became a new requirement to look for alternative solutions

Relevant Foreground IPR

N/A

Data Access Details

N/A

Please identify why the Network Licensees will not fund the project as a part of it's business and usual activities

There is limited existing policy regarding environmentally friendly wood pole preservatives: all existing policy is based on the use of Creosote. The outputs from this project will be used to inform policy going forward and allow business as usual purchasing of wood poles treated with alternative preservatives.

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

Lack of existing policy is a barrier to operational spending. In addition, NIA funding has allowed cross-DNO participation for this key project. Outputs are critical to policy going forwards – these are key decisions and the involvement of four different DNOs will ensure that the decisions made are well informed for the UK industry – mitigating the commercial, technical and operational risks associated with these policy decisions.

This project has been approved by a senior member of staff

☑ Yes