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

Jan 2022

Project Reference Number

NIA_ENWL030

Project Registration

Project Title

Hyperspectral Imaging

Project Reference Number

NIA_ENWL030

Project Licensee(s)

Electricity North West

Project Start

January 2022

Project Duration

1 year and 7 months

Nominated Project Contact(s)

InnovationTeam@enwl.co.uk

Project Budget

£275,000.00

Summary

Until now utility companies have come under an exemption in the regulations around the classification of excavated waste from utilities installation and repair. This exemption comes to an end in June 2022, and following a transition period it will be necessary to classify spoil and process any contaminated/hazardous material in line with environmental regulations.

This project will look to prove that existing hyperspectral imaging technology can be used to detect contaminants in spoil under laboratory conditions at the levels needed to meet the standard. Once this has been completed the project will look to develop a prototype, handheld device suitable for use on site and carry out field trials.

Third Party Collaborators

The Manufacturing Technology Centre

Nominated Contact Email Address(es)

innovation@enwl.co.uk

Problem Being Solved

Until now utility companies have come under an exemption in the regulations around the classification of excavated waste from utilities installation and repair. This exemption comes to an end in June 2022, and following a transition period it will be necessary to classify spoil and process any contaminated/hazardous material in line with environmental regulations.

Method(s)

Phase One

Following review of related prior work, this will involve the identification of appropriate, commercially available hyperspectral camera

suitable for identification of chemicals of interest (hazardous contaminants) within soil, e.g. with spectral range including key characteristic features.

This will then progress to the identification and development of processing techniques to identify and quantify contaminants. Creation of necessary code to acquire data from hyperspectral camera, process data, and sentence imaged soil. Phase One will conclude with experimental trials to demonstrate the efficacy of the system and to train any appropriate machine learning for predictive analysis.

Phase Two

Design and development of the most cost-effective solution for the deployment of the camera and system in line with customer requirements.

Scope

This project will consist of two phases, the first will be a development phase were testing is carried out to demonstrate the capability of the device. This will be followed by a series of field tests to confirm suitability for use in real world conditions

Objective(s)

Trial the use of hyperspectral imaging for detecting and classifying contaminants in spoil.
Demonstrate the ability to utilise this technology under field conditions

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

N/A

Success Criteria

Successfully create a prototype device that demonstrates the viability of using hyperspectral imaging on site to detect and identify spoil contaminants

Project Partners and External Funding

N/A

Potential for New Learning

If successful, the project will demonstrate the viability of hyperspectral imaging for identifying contaminants in spoil under field conditions

Scale of Project

The project will initially take the form of laboratory testing and if successful move to field trials of a prototype device

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

North West England

Revenue Allowed for the RIIO Settlement

0

Indicative Total NIA Project Expenditure

£250,000

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)

Currently to test spoil for contaminants requires transporting it to a specialist laboratory at a cost of £230 per sample. Currently ENW carries out on average ~10 jobs per day that require excavations. If the spoils at 50% of these can be shown to be clear of contaminants on site that leads to a saving of of ~£345k per annum

Please provide a calculation of the expected benefits the Solution

£230 x 5 jobs per day x 300 working days per year

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

All NOs will be facing this issue. Should the prototype prove successful the MTC will work with industry to translate this into a commercially available device

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

The device would be commercially available should the prototype prove successful. Part of the project is to ensure that the potential price point is acceptable to DNOs

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):

- [x] 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

☐ 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

The removal of the exemption around spoil affects all utilities, the outcome of the project would be a design for a device which could then be made commercially available to help meet this challenge

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 will address the reduce environmental impact objective which sits in our Optimised Assets and Practices theme

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.

A search of the ENA Smarter Networks portal does not indicate any similar projects have been carried out

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

Previously the spoil from our excavations was covered by an exemption when under a certain volume. This exemption has now ended bringing an additional cost into the disposal of this spoil

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

This is a research project into the viability of the technology to accurately detect the contaminants. It will also look to see if it’s possible

to miniaturise the device

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

This is an R&D project, looking to test the technology in a laboratory setting initially to prove the concept before moving to field trials.

This project has been approved by a senior member of staff

☑ Yes