WESTERN POWER DISTRIBUTION
Serving the Midlands, South West and Wales

Date of Submission

01/12/2020

NIA Project Registration and PEA Document

Notes on Completion: Please refer to the **NIA Governance Document** to assist in the completion of this form. Please use the default font (Calibri font size 10) in your submission. Please ensure all content is contained within the boundaries of the text areas. The full-completed submission should not exceed 7 pages in total.

Project Registration

Project Title		**Project Reference**
Temporary Event Charging		**WPD_NIA_056**

Funding Licensee(s)	**Project Start Date**	**Project Duration**	
		Years	Months
Western Power Distribution	December 2020	0	10

Nominated Project Contact(s)	**Project Budget**
Ryan Huxtable	£117,923.32

Contact Email Address

wpdinnovation@westernpower.co.uk

Lead Sector

Electricity Distribution	☒	**Gas Transmission**	☐
Electricity Transmission	☐	**Gas Distribution**	☐

Other Sectors

Electricity Distribution	☐	**Gas Transmission**	☐
Electricity Transmission	☐	**Gas Distribution**	☐

Research Area

Network improvements and system operability	☐
Transition to low carbon future	☒
New technologies and commercial evolution	☐
Customer and stakeholder focus	☐
Safety, health and environment	☐

Problem(s)

Temporary events, including festivals and sporting events, attract a large number of attendees each year, with a large proportion of these attendees needing to travel by car due to the limited travel infrastructure available in rural areas. Every year there are over 500 festivals across the UK which host 4.9 million festival goers. As the number of Electric Vehicles (EVs) increases in line with government targets to decarbonise transport there will be a need for significant charging capacity at these events. Currently events provide limited charging points and existing charging methods include utilisation of diesel generation or making permanent network connections which is not economically viable for a short period of use. Providing connections to these sites would come at a large cost which would be split between the site owner and the distribution network operator (DNO) and its customers, therefore an alternative solution is required for this problem.

Method(s)

Temporary Event Charging is a feasibility study which will design solutions for charging the EVs used to travel to events and assess their feasibility for further trial and development. Scenarios where charging infrastructure would be required will be defined and solutions to these will be developed and could include temporary network connections and battery storage. This will be split across two work packages:

1. **Site selection and case study development (4 months)**

This work package will consist of identifying sites that require temporary charging solutions and investigating the solutions that may be suitable. These sites will make up case studies for later work and as such will need to include the existing and required site capacity, current charging infrastructure, potential temporary charging solutions, and other use cases for the solutions (e.g. visual and audio, concession stands, hospitality etc.).
The output of this work package will be a report that includes the background, case studies identified, charging solutions identified and a plan for case study analysis.

2. **Case study analysis and designs (4 months)**

This second work package will analyse the case studies outlined in the first work package and in doing so feed into the further development of solutions. The solutions will need to be agreed within WPD to ensure connections are compliant with WPD policy. Cost Benefit Analysis (CBA) will then be carried out with a focus on the saving for DNO customers who would have met a proportion of the traditional connection cost.
The output of this work package will be a report containing a high level design solution for each case study, reporting on how this will be coordinated with WPD policy, projected costs including cost benefits for DNOs and their customers, a summary of learning, and conclusions and recommendations.

Scope

The Temporary Event Charging project will develop solutions for charging EVs at scale at temporary events held in areas where there is a need for attendees to travel by car. The project will ensure that these solutions will be possible for use on the distribution network while providing cost benefit to the DNO and its customers, before making a recommendation on if a trial project would be suitable.

Objective(s)

This project is a feasibility study with the aim to improve knowledge on how to accommodate charging at temporary events, design solutions for charging at a range of events, determine the benefits of using temporary connections to achieve this and determine whether a demonstration project is appropriate.

Success Criteria

- A set of concept designs for providing temporary event charging at festivals for a number of case studies are presented.
- Capital costs are outlined for each design and this feeds into CBA in respect to DNOs and their customers.
- Benefits of making temporary connections over existing methods of connection or on site generation are presented.
- Outline of how solutions will fit within WPD policy and PSD practices is documented.
- A conclusion is given on whether a trial is suitable for temporary connection solutions.

Technology Readiness Level at Start	Technology Readiness Level at Completion
2	4

Project Partners and External Funding

The project partners are Connected Kerb and GHD.

Potential for New Learning

This feasibility study will provide learning on how increasing demand for EV charging at temporary events can be met without the need for significant network reinforcement costs or the use of fossil fueled generation. The case studies presented will demonstrate a range of scenarios and designs which will be applicable across all DNO license areas and represent a range of event types and scales. Learning will also include the cost benefits to the DNO and its customers of using temporary charging solutions when compared to making traditional connections. If the result of this learning demonstrates value in the solutions developed this may lead on to a trial project.

Scale of Project

This project is a 10 month feasibility study with the aim to find use cases for event EV charging before creating and assessing temporary charging solutions to determine whether a demonstration project is appropriate. This is an appropriate scale at this stage as the value of charging solutions needs to be proven before trials are carried out.

Geographical Area

Areas in which large temporary events without existing means of connection to the network take place will be the areas studied within this work. Large events happen across all four WPD license areas with examples for consideration including Glastonbury in the South West and Download Festival in the East Midlands, exact geographical areas will be identified during this feasibility study project.

Revenue Allowed for in the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

£106,130.99 of NIA funding will be used in the project.

Project Eligibility Assessment

Specific Requirements 1

1a. A 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 systems and 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	☐

Specific Requirements 2

2a. Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees ☒

Please answer one of the following:

i) Please explain how the learning that will be generated could be used by relevant Network Licenses.

This project will produce learning on EV charging solutions for temporary events including cost saving for DNOs and customers and high level design solutions. As temporary events take place across the whole of the UK these findings will be applicable for all distribution network licensees. The cost saving would be valid for all DNOs who would experience the same existing high connection cost and the designs agreed with WPD policy and PSD will be suitable for use on other networks. Any policy or standard techniques developed will be shared with other DNOs.

ii) Please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the Project.

N/A

Is the default IPR position being applied?

Yes	☒
No	☐

If no, please answer i, ii, iii before continuing:

i) Demonstrate how the learning from the Project can be successfully disseminated to Network Licensees and other interested parties

N/A

ii) Describe how any potential constraints or costs caused, or resulting from, the imposed IPR arrangements

N/A

iii) Justify why the proposed IPR arrangements provide value for money for customers

N/A

2b. Has the Potential to Deliver Net Financial Benefits to Customers ☒

Please provide an estimate of the saving if the Problem is solved.

Financial savings can be seen by all DNO customers where a reduced cost temporary connection solution is found. As this is a research project financial benefits are an estimate. The financial benefit for each temporary connection is estimated at £0.66m, where a solution is expected to cost £0.3m after the trial stage instead of an estimated £0.96m substation and connection cost. CBA will be completed in the project and more detailed costs will become part of the project learning.

Please provide a calculation of the expected financial benefits of a Development or Demonstration Project (not required for Research Projects). (Base Cost – Method Cost, Against Agreed Baseline).

This project is a research project during which the financial benefits will be outlined during work package 2.

Please provide an estimate of how replicable the Method is across GB in terms of the number of sites, the sort of site the Method could be applied to, or the percentage of the Network Licensees system where it could be rolled-out.

This method will be replicable across GB at events which are not permeant fixtures and therefore do not have permanent network connections. As an example over 500 music festivals happen annually and there will soon be the need for charging at all events. This can also be applied in other areas where a temporary increase in charging demand can be seen including tourist hot spots and city centres. This method could therefore be rolled out across the majority of the network licensees.

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

The cost of rolling this method out across GB will be demonstrated following the project.

2c. Does Not Lead to Unnecessary Duplication ☒

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

There are currently no NIA projects looking into the charging of electric vehicles at scale at temporary events.

If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

SSE are carrying out the LEVEL project looking at temporary EV chargers but the Temporary Event Charging project is significantly different. Each project is looking to solve a different problem. Temporary Event Charging will focus on providing mass EV charging points on a temporary basis to meet the challenges of specific scenarios and needs at events outlined as case studies. LEVEL is looking at providing individual temporary charging points in cases where there was not an expected need.

Additional Governance Requirements

Please identify that the project is innovative (i.e. not business as usual) and has an unproven business case where the risk warrants a limited Research, Development or Demonstration Project to demonstrate its effectiveness ☒

i) Please identify why the project is innovative and has not been tried before

This project will integrate electric vehicle charging points (EVCP) with the network via means of a new temporary connection methodology to avoid limited charging capacity and the need for diesel generation when charging EVs at temporary events. Temporary connections have never before been used for charging solutions.

ii) Please identify why the Network Licensee will not fund such a Project as part of its business as usual activities

The technology is a low TRL level and there is currently little information available without carrying out a feasibility study.

iii) 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

As the demand for EV charging at events increases DNOs will need to understand methods for providing connections on a temporary basis without the need for the high costs associated with making connections to the network. There is currently no suitable method available for charging solutions and there is therefore a low TRL applied to the project, therefore NIA is a suitable means of carrying out this feasibility study.

Additional Registration Questions

These are required for summary section of registration; some areas can be copied from sections above.

Technologies (select all that apply)

☐ Active Network Management	☐ Environmental	☐ Network Monitoring
☐ Asset Management	☐ Fault Current	☐ Overhead Lines
☒ Carbon emission Reduction Technologies	☐ Fault Level	☐ Photovoltaics
☐ Commercial	☐ Fault Management	☐ Protection
☐ Condition Monitoring	☐ Harmonics	☐ Resilience
☐ Community Schemes	☐ Health & Safety	☐ Stakeholder Engagement
☐ Comms & IT	☐ Heat Pumps	☐ Substation Monitoring
☐ Conductors	☐ High Voltage Technology	☐ Substations
☐ Control Systems	☐ HVDC	☐ System security
☐ Cyber Security	☐ Low Carbon Generation	☐ Transformers
☐ Demand Response	☐ LV & 11Kv Networks	☐ Voltage Control
☐ Demand Side Management	☐ Maintenance & Inspection	☐ Gas Distribution
☐ Distributed Generation	☐ Measurement	☐ Gas Transmission
☒ Electric Vehicles	☐ Meshed Networks	☒ Electricity Distribution
☒ Energy Storage	☐ Networks Automation	☐ Electricity Transmission

Project Short Name

Temporary Event Charging

Project Introduction

Temporary events, including festivals and sporting events, attract a large number of attendees each year, with a large proportion of these attendees needing to travel by car due to the limited travel infrastructure available in rural areas. As the number of electric vehicles (EVs) increases in line with government targets to decarbonise transport there will be a need for significant charging capacity at these events. Currently events provide limited charging points and existing charging methods include utilisation of diesel generation or making permanent network connections which is not economically viable for a short period of use.

This project will be a feasibility study consisting of designing solutions for charging EVs used to travel to events, and assessing their feasibility for further trial and development. The study will consist of two work packages. The first of which will involve carrying out background research before defining case studies for development. The second will design and develop solutions to each case study and could include temporary network connections and battery storage. Cost benefit analysis (CBA) will be carried out to demonstrate the benefit of these solutions in comparison to traditional connection methods. The findings will be reported with recommendations made for a potential future trial.

The project will be primarily carried out by Connected Kerb. GHD will act as a technical advisor and WPD will provide input to ensure solutions are suitable for use on the distribution network.

Project Benefits

- Accommodates charging of EVs without the use of fossil fuel generation reducing carbon emissions.
- Solutions can be applied to a range of events and other high charging demand areas e.g. tourist hot spots.
- Estimated £66,000 saving per event when compared to traditional network connection cost.
- Builds confidence in using EVs as a means of transport.

PEA Version	**2**		
	Name and Title	**Signature**	**Date**
Prepared by	Ryan Huxtable Graduate Trainee Engineer		23/11/2020
Approved by			