

Electricity/Gas Network Innovation Competition

Screening Submission Pro forma

Notes on completion			
<p>Before completing this form, please refer to the relevant Network Innovation Competition (NIC) Governance Document(s).</p> <p>Please use the default font (Verdana size 10) in your submission. We will only accept the text visible in the text entry areas. The text entry areas are predetermined and should not be changed. The full-completed submission should not exceed 10 pages in total.</p> <p>Ofgem will publish all the information contained within this Screening Submission.</p>			
Is the application for the Gas or Electricity NIC?	Gas NIC <input type="checkbox"/>	Electricity NIC <input checked="" type="checkbox"/>	
Cross Industry Project	YES <input type="checkbox"/> <i>If yes, please fill out Cross Industry Projects section</i>	NO <input checked="" type="checkbox"/>	
Funding Licensee(s)			
SP Manweb plc.			
Network Licensee Project Partners			
EA Technology, Smarter Grid Solutions			
Funding Licensee area(s)			
SP Manweb plc.			
Project Title			
Refuelling Tomorrow: Enabling Electrified Transport			
Project Summary			
<i>The Licensee(s) must provide an approximate Project start and end date.</i>			
<p>Refuelling Tomorrow aims to accelerate the connection of charging infrastructure at lowest possible cost to GB electricity customers by developing and deploying innovative approaches to managing the uptake of Electric Vehicles (EVs) across a geographical area. The project will engage a wide range of stakeholders and combine transport planning, network planning and a number of innovative live network trials to co-create an interactive Future Transport Master Plan for the SP Manweb (SPM) licence area. The project will run for 4 years and begin in January 2019 and be completed by December 2022.</p> <p>The electrification of transport will require careful management, particularly for the energy sector, with a clear and transparent DNO lead strategy essential to help facilitate this transition at the lowest overall cost for customers. Crucially, this strategy needs to tie together the needs of a range of stakeholders with the capacity on the electricity networks to develop a system that is safe, resilient, and cost-effective for electrified transport. Our stakeholders are telling us they want to be able to connect to our network in the most efficient and timely manner, this project will go some way towards developing and trialling new innovative connections solutions, greatly improving the visibility of network capacity and accelerating the electrification of transport across the region.</p>			
Estimated Project funding			
<i>The Licensee must provide an approximate figure of the total cost of the project and the NIC funding it is applying for.</i>			
Total Cost of Project	£7.2m	NIC funding requested	£6.48m
Is the TRL of the Project at start date between 4 and 8?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	
What is the Problem?			

The Licensee must provide a narrative that explains the Problem(s) that the Project is seeking to address.

Within the UK there is a clear policy drive from Government towards encouraging the uptake of Ultra-Low Emission Vehicles, which is driving sales of EVs. This increasing demand will exert additional strain on electricity networks across multiple voltage levels. Specific issues are:

- Stakeholders are not currently in a position to understand network capacity requirements to fulfil their transport strategies. A deeper understanding is required and this is likely to be different for the different organisation types (e.g. Local Authorities, Local Enterprise Partnerships, etc, versus tactical customers such as petrol forecourt operators, car park operators etc.). Essential to this is developing improved visibility of network availability for our stakeholders and a streamlined connections process to facilitate timely connections at the lowest cost for customers.
- The pace of planning, consenting and building electrical capacity is slower than the speed customers can change vehicle types – there is a risk that DNOs become a constraining factor in the shift to electrified transport.
- Currently, a piecemeal and incremental approach to the roll-out of EV charging equipment has been used, as was the case for renewable generation connections. This piecemeal approach can result in a roll-out model which is fragmented, slow and ultimately more expensive to customers.
- Different end users (e.g. buses, fleets, taxis etc) will have differing impacts on the network requiring a range of solutions. In particular the clustering or wide scale adoption of fast and rapid chargers in certain areas may result in delays to the connection, as networks upgrades may be required, resulting in poor availability and increase cost for customers.
- Vehicle technology is evolving rapidly (faster charging rates, vehicle ranges and, in the future, autonomous driving) which impact when, where, and how much network capacity is needed. For this reason, UK DNO's must ensure that we understand the direction in which the EV industry is travelling and take a long term view on the charging requirements for different users, otherwise there is the risk that inaccurate assumptions may lead to poor investment decisions and create stranded network assets

It is therefore essential that DNO's help facilitate this transition, becoming the enablers of EV adoption and helping to facilitate Government climate change targets. For this reason, it is crucial that DNOs take a more active role in this discussion, enabling the timely and optimised connection of future EV charging infrastructure to avoid delays and developing clear guidance and connection standards to expedite the uptake of EVs.

What Method(s) will be used?

The Licensee must describe the Method(s) that are being demonstrated or developed. It must also outline how the Method(s) could solve the Problem. The type of Method should be identified where possible eg technical, commercial etc.

Refuelling Tomorrow will create a Future Transport Master Plan for the SPM licence area with a clear methodology which is replicable by all other GB licence areas. To do this SP Energy Networks (SPEN) will continue to work in partnership with a range of key stakeholders, such as local authorities and transport agencies, to carry out a detailed review of the transport routes that are used throughout the area, considering the capacity available within the existing distribution network alongside the societal need for EV charging connections. This will lead to an informed view on the necessary network reinforcement measures required, from innovative technologies to conventional reinforcement solutions, and provide a detailed view to inform stakeholders on the most strategic and affordable locations of charging equipment.

The Future Transport Master Plan will be informed by targeted innovative network trials of smart connections for a range of charging solution, such as the clustering of fast or rapid chargers in areas with limited access to off street parking. The network trials will also investigate the ability of smart controls, storage and Active Network Management (ANM) systems to provide lower connection and operational costs to customers. The Future Transport Master Plan will build upon the learnings from the network trials and network evaluation to understand the cost to enable an EV future within SPM by investigating several innovative commercial arrangements that best enable the connection of different types of EV charging infrastructure whilst ensuring that costs are fair and equitable for all.

Method(s) continued

The project will be delivered within 4 main Work Packages (WP).

- WP 1 will carry out Future Scenario Planning & Network Assessment (~9 months) within SPM. To do so the project will work in partnership with key stakeholders to create a detailed EV Roadmap which includes future EV technology scenarios at different points in time (2020, 30, 40 & 50). This roadmap will provide an evolving picture of the EV industry as the technology evolves and provide DNOs with an informed view on the likely impact on the electricity network. The future EV scenarios will also consider the impact of future charging solutions and how different customer types will interact as, for example, EV battery capacity and range improves.
- WP 2 will carry out targeted trials of innovative EV Charging solutions and last for approximately 24 months. The network trials will be split into two key EV enabling areas. The first will investigate Smart Options for the connection of clustered fast and rapid chargers for different customer types (i.e. commercial fleets, destination charging etc.). This will help to determine the most effective methods available for connecting EV charging infrastructure without the need for wider network reinforcement. This may include for example, the use of storage and ANM to manage network capacity in constrained areas. The second set of network trials will focus on alternative commercial and technical charging solutions for domestic customers who live within urban areas without access to off street parking. To do this SPM will work closely with local authorities and other key stakeholders to identify potential solutions to encourage the uptake of EV ownership in areas with limited access to chargers. This will include the development of innovative commercial arrangements and connections solutions to improve the availability of chargers in these areas. We will liaise with other DNOs individually and through the ENA to facilitate wide adoption of innovative connection options (e.g. development of draft Engineering Recommendations).
- Next WP 3 will build upon the learnings acquired from WP 1 & 2 to develop a Future Transport Master Plan Tool for SPM, providing more detailed understanding on the spare capacity on the network and the potential connections solutions which could be adopted. This will include the development of an interactive heat map designed for stakeholders, to guide the optimal location of charging infrastructure in line with current and future network capacity, aligned with the new connection standards for charging points of different types. This will include providing information on existing network capacity and planned network expansion/capacity increases. A critical part of this work package is to bring the learnings from WP 2 and align low carbon transport with the Distribution System Operator (DSO) model to demonstrate how the two can complement each other and facilitate the smart, flexible networks of the future.
- Finally WP 4 will carry out comprehensive stakeholder engagement and knowledge dissemination throughout the duration of the project. This will ensure the project meets stakeholder expectations and deliver real benefits for customers. In addition, the project will develop a close relationship and share learnings with the EV industry and DNO community throughout. This will ensure that GB DNO requirements are understood by the EV industry and DNOs have an informed view on EV technology and understand the wider impact on electricity networks. Learnings will also be disseminated through the SPEN website and relevant electricity industry conferences, such as CIRED and LCNI, alongside a number of targeted transport related events.

Funding Commentary

The Licensee must provide a commentary on the accuracy of its funding estimate. If the Project has phases, the Licensee must identify the approximate cost of each phase. OFTOs should indicate potential bid costs expenses

We have identified the challenges and effort required to deliver this project in partnership with a number of potential project partners. Our estimation of the project cost and breakdown of the funding required at this stage is based on this initial engagement, SPEN's unit costs and our experience in delivering innovation projects. Nonetheless, project cost will be refined and shown in detail within the Full Proposal (FSP). Currently, the project is planned within four main work packages (WP) as broken down below:

WP 1 - Future EV Scenario Planning & Network Assessment (6 months): £1.0m

WP 2 – Live Network Trials of Targeted Smart Charging Solutions (24 months): £3.1m

WP 3 – Future Transport Master Plan and Tool(s), based on SPM (18 months): £2.5m

WP 4 – Stakeholder Engagement and Knowledge Dissemination (throughout project duration): £0.6m

Which Specific Requirements do the Project fulfil?(Please tick which of the Specific Requirements this Project fulfils)

	Electricity	Gas
A specific piece of new (ie unproven in GB) equipment (including control and/or communications systems and/or software)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
A specific novel arrangement or application of existing electricity/gas transmission and/or distribution equipment (including control and communications systems software)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
A specific novel operational practice directly related to the operation of the electricity/gas transmission and/or distribution systems	<input checked="" type="checkbox"/>	<input type="checkbox"/>
A specific novel commercial arrangement	<input checked="" type="checkbox"/>	<input type="checkbox"/>

How does the Project accelerate the development of a low carbon energy sector & have the potential to deliver net financial benefits to existing and/or future customers?

The Licensee must demonstrate that the Solution has the potential to accelerate the development of the low carbon energy sector in GB and/or deliver wider environmental benefits to GB customers. The Licensee must demonstrate the potential to deliver net financial benefits to existing and/or future customers.

Refuelling Tomorrow aims to provide network companies and stakeholders with the tools and visibility needed to enable the uptake of EVs in a cost efficient and timely manner. It also aims to facilitate the uptake of both domestic and commercial EVs fleets by demonstrating a number of innovative technical and commercial charging solutions for customers without off street parking. Providing a commercially viable solution for customers who are currently unable to install their own charger could act as a major enabler of EVs in urban locations and result in a notable improvement in air quality in these areas.

The transition from fossil fuelled vehicles to low carbon transport is widely accepted to be a critical factor in reducing both greenhouse gas emissions and improving air quality in densely populated areas. Both are understood to have a negative impact of the health of both people and the environment. Within the UK, transport accounts for approximately 25% of greenhouse gas emission. Furthermore, air pollution has been linked to an incredible 40,000 early deaths each year with 37 out of 43 areas within the UK exceeding EU limits of key pollutants such as nitrogen dioxide.

Providing innovative connections solutions for a range of EV charger technologies and speeds will lead to a streamlined connections process and to a reduction in the network reinforcement that would normally be required when connecting such equipment. Active Network Management (ANM) has been successfully deployed to increase the installed capacity of renewable generation within the constraints of the existing network to obtain an overall lower cost to the customer. It is now necessary to develop a similar management approach for the connection of EV chargers. This approach will deliver savings to GB electricity customers both through reduced network reinforcement and accelerated connections. In addition utilising smarter solutions such as (customer owned) battery storage and ANM as a solution will improve network flexibility enabling the transport sector to be aligned with the future DSO; facilitating the deeper participation of this sector in future balancing services.

The methodology used to create and maintain the SPM Master Plan will be designed to inform the network investment plans required by each DNO during future price control periods. This detailed roll out plan will give confidence that investment plans provide the lowest cost solutions and justification for the just-in-time investment decisions required to accommodate EVs. An informed long term view on load related reinforcement across the distribution network will also ensure that capacity is made available for EV charging as soon as possible removing any delays that may hamper the uptake of low carbon transport.

A clear strategy and Future Transport Master Plan across the licenced area, which is coordinated across all stakeholders, would bring the DNO to the heart of the transition to a low carbon transport sector and ensure access to charging for EVs is made available to customers at lowest possible cost. As demonstrated by the uptake of Photovoltaics a disjointed and fragmented approach often does not represent value for money and leads to a slower and more costly uptake for customers.

How will the Project deliver value for money for electricity/gas customers?		
<i>The Licensee must demonstrate that the Method(s) being used can derive benefits and resulting learning that can be attributed to or are applicable to the electricity/gas transmission and/or distribution systems.</i>		
<p>i) The learnings from this project can improve GB DNOs network planning and operational approach by considering smart and controllable connection solutions. This can reduce network investments across the distribution system and provide better utilisation of assets, which results in lower network charges paid by customers.</p> <p>ii) The total cost estimate of the project is constructed based on our initial stakeholder engagement and potential number of trial sites considered. We believe the methods developed within this project, if proven successful, would enable the large scale roll out of critical charging infrastructure, which is applicable within each GB licenced area.</p> <p>iii) It is planned to carry out a competitive procurement to identify project partners which are capable of providing both equipment and monetary contribution towards the live network trials. We also plan to collaborate with other parties to build upon the learning provided by relevant projects; such as FUSION and the ENA Open Networks projects.</p> <p>iv) This project intends to enhance the operation and planning of distribution networks to better facilitate electric transport. However, the project also benefits the transmission network by enabling electric transport to be aligned with the DSO and potentially offer aggregated services to the Transmission System Operator (TSO) reducing transmission network losses and constraints.</p>		
How will the Project generate knowledge that can be shared amongst all relevant Network Licensees?		
<i>The Licensee must explain the learning that it expects the Method(s) to deliver, and how it will be shared. The Licensee must demonstrate that it has a robust methodology in place to capture the learning and how the learning is disseminated.</i>		
<p>This project will build upon the learnings generated by multiple Ofgem funded innovation projects (New Thames Valley Vision, Electric Nation, My Electric Avenue, Smart EV, Black Cab Green) to understand the impact of EVs on the distribution network and the smart solutions which are currently available. The project also intends to demonstrate how Electric Vehicles can be aligned with the DSO and will consequently work closely with DSO aligned projects such as FUSION, Transition, EFFS and the ENA Open Networks.</p> <p>The project will generate a blueprint to show how a distribution licensed area can prepare a detailed roll out plan which takes both a short and long term view of the likely reinforcement required to facilitate EVs of all types. Key to this is understanding the charging behaviour of different users and the current connectivity and capacity available across the network to facilitate these. It will also demonstrate a number of innovative smart methods to connect charging equipment of a variety of sizes and produce new connection standards for the benefit of customers.</p> <p>The results of the project will be captured and shared through our internal and external dissemination activities. A dissemination strategy will be submitted within the full submission. It will include webinars, industry workshops, and continuous engagement via industry working groups, academic, and summary reports to capture the project findings.</p>		
Does the Project conform to the default IPR arrangements set out in	YES	NO

the NIC Governance Document?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<p><i>By selecting NO, the Licensee wishes to deviate from the default requirements for IPR. If this is the case, it must demonstrate how the learning will be disseminated to other relevant Licensees and how value for money will be ensured. The Licensee must also outline the proposed alternative arrangements and justify why the arrangements are more suitable than the default arrangements.</i></p>		
<p>The work undertaken as a part of this NIC project will adhere to default IPR arrangements. Project partners and suppliers will comply with the default IPR arrangements as a part of the selection criteria. Any deviations, if identified, during the proposal development will be highlighted in the full submission.</p>		
<p>How does the project demonstrate it is innovative (ie not business as usual) and has an unproven business case, that the innovation risk warrants a limited Development or Demonstration Project to demonstrate its effectiveness?</p>		
<p><i>Demonstrate why the Licensee has not previously used this Method (including where the Solution involves commercial arrangements) and why NIC funding is required to undertake it. This must include why the Licensee would not run the Project as part of its business as usual and why the Solution is not Research.</i></p>		
<p>We believe this project will deliver innovative solutions which have not been demonstrated before within GB. In addition, given the recent push towards low carbon transport we also believe the timing of the project is right and will deliver new tools & systems which will be critical enablers of a low carbon transport future.</p> <p>There is a strong need for innovative solutions for the connection of high power EV chargers. Utilities must understand how these can be managed both efficiently and economically and develop control systems and connection standards to manage these high intensity and potentially bi-directional resources intelligently. Furthermore, there is also a strong need to develop new technical and commercial charging solutions for customers without access to slow/fast domestic chargers. Previous innovation projects have explored the impacts of EV integration at a domestic scale. However, none have investigated the impact of EV integration across multiple customer groups nor developed a Future Transport Master Plan and Tool(s) for a licenced area to prepare a low carbon transport future. There is also little understanding of how the transport sector can be integrated with the future DSO which has huge potential to be a key DSO enabler. Each of these requires innovative solutions and none currently have the proven business case which is required.</p> <p>Finally, modelling and demonstration of such infrastructure comes with an inherent risk while the demand for such capability does not yet exist and EV penetration is low. Access to a wide range of EV charging facilities is a clear enabler of EV uptake and without a clear DNO strategy the EV market is unlikely to grow at the rate required to hit carbon reduction targets. The market requires innovative control solutions, and the relevant demonstrators to prove and enable the deployment of such infrastructure. Until these risks are mitigated through innovation work, the business case for commercial deployment, and the technical ability to do so while safe guarding the network will remain unknown.</p>		
<p>How were project Partners, external resourcing/funding identified, and what are</p>		

<p>their roles?</p>
<p><i>The Licensee must provide evidence of how Project Partners were identified and selected, including details of the process that has been followed, and the rationale for selecting partners and ideas for the Project.</i></p> <p><i>The Licensee should provide details of any Project Partners who will be actively involved in the Project and are prepared to devote time, resources and/or funding to the Project. If the Licensee has not identified any specific Project Partners, it should provide details of the type of Project Partners it wishes to attract to the Project.</i></p>
<p>Each year SPEN releases an Innovation Challenge which is open to all. The purpose of the innovation challenge is to work in partnership with both Industry and Academia to identify innovative solutions to the biggest challenges that we face across the Transmission and Distribution Networks. This is complemented with our Innovation Strategy which sets out our priority areas for innovation with the biggest potential benefits for GB electricity customers.</p> <p>In response to the 2018 Innovation Challenge we were pleased to receive a total of 46 innovative ideas which we assessed against the NIC funding criteria and our own priority areas for innovation. We believe there is a significant need for innovation within the area of low carbon transport so that DNOs are equipped with the knowledge and smart tools necessary to enable the uptake of Electric Vehicles. For this reason we were pleased to see several strong proposals for Transport projects.</p> <p>EA Technology and Smarter Grid Solutions amongst others were identified as best placed to help deliver this project. The exact role of each project partner is still under development and will be refined when developing the Full Proposal (FSP). We believe this is the best approach to ensuring the project identifies project partners who represent best value for money for UK electricity customers and ensuring the project is a success.</p> <p>We have also engaged extensively with several community partners and local councils who will help deliver Refuelling Tomorrow. This includes Energy Local, Anglesey Community Energy, Welsh Government, North Wales Trunk Agency, Cheshire Energy Hub and Liverpool City Council. Engagement with communities and local government will be critical in realising an EV enabled future.</p>
<p>Will the Project require any derogations or exemptions?</p>
<p><i>The Licensee should outline if it considers that the Project will require any derogations, exemptions, or changes to the regulatory arrangements.</i></p>
<p>The project is not expected to require derogations or exemptions at this time. This will be reviewed again when developing the Full Proposal (FSP).</p>
<p>How will the Project activities impact customers?</p>

The Licensee should outline any planned interaction with customers or customers' premises as part of the Project, and any other direct customer impact (such as amended contractual or charging arrangements, or supply interruptions).

We do not anticipate any negative impact to customers at this time. This will be reviewed when developing the Full Proposal (FSP) to ensure the network trials have limited impact on customers.

What funding is being requested from each NIC? (Cross Industry Projects only)

The Licensee must outline funding that is being requested from the Electricity and the Gas NICs and include a justification for the funding split.

This project is not a cross industry project and 100% of the funding request is attributed to the electricity NIC.

Are there any further details the Licensee feel may support its submission?

SP strongly believe that a Future Transport Master Plan is required for the licenced area to facilitate the quicker uptake of EVs in such a way that avoids fragmented investment, seeks least regret solutions and avoids stranded assets. To do this SPM has carried out extensive engagement with EV stakeholders in the licence area and built strong relationships which we intend to build upon if this project is awarded funding. A small selection of these are listed below.

- We are working closely with the Welsh Government and other groups, acting as a key facilitator in many community projects across North Wales with various partners – Corwen Community Energy, Energy Savings Trust, Local Partnerships, Menter Mon, National Trust and Community Energy Wales. These projects are critical to help local communities benefit from the natural resources available in their area and we are encouraging these communities to take advantage of the fuel cost savings associated with EV that are crucial in rural areas where petrol and diesel costs are significantly higher than in urban areas. Many of these areas also have large proportion of customers in fuel poverty so it is important to try and make savings on transport fuel costs.
- North Wales Trunk Road Agency (NWTRA) is responsible for connecting charging points along the A55 in North Wales. We have been engaging closely with NWTRA to determine the most suitable areas for our network for them to allocate charging points and connections.
- Cheshire Energy Hub – collaboration with Warrington & Cheshire LEP, Warrington Borough Council, Cheshire West and Chester Council, EA Technology, University of Chester, all local utilities and major industrial partners in the area to promote a complete energy system. This will include the electrification of both heat and transport and alignment of locally available generation and demand within the Energy Innovation District that includes domestic, commercial and industrial customers.
- Liverpool City Council – We are working closely with Liverpool City Council to determine where to locate over 200 charging points throughout the city. To date the plan is to connect the chargers in a range of locations across the city with limited off street parking opportunity to encourage the uptake of EVs.

SPEN will continue to engage closely with these stakeholders and others to ensure that the Future Transport Master Plan delivered through this project will deliver significant benefits for all customers.

Contact Name

Nicol Gray

Contact Address

6th Floor
Scottish Power House
320 St Vincent Street
Glasgow
G2 5AD

E-mail

nicol.gray@spenergynetworks.co.uk

Direct Telephone Line

0141 614 1263

Job Title

Senior Engineer, Commercial & Innovation