

Electricity Network Innovation Competition Screening Submission Pro-forma

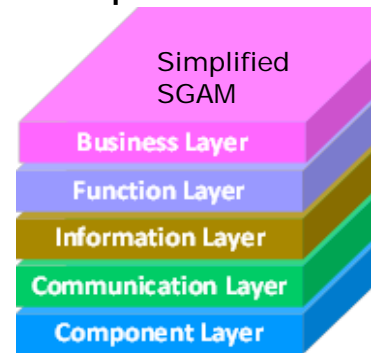
Notes on completion			
<p>Before completing this form, please refer to the Electricity Network Innovation Competition (NIC) Governance Document.</p> <p>Please use the default font (Verdana size 10) in your submission, the text entry areas are predetermined and should not be changed. The full-completed submission should not exceed 10 <u>pages</u> in total.</p> <p>Ofgem will publish all the information contained within the Screening Submission.</p>			
Funding Licensee			
SP Distribution			
Network Licence Project Partners			
To be confirmed during the preparation of the FSP			
Funding Licensee area			
SP Distribution and SP Manweb areas			
Project title			
INSPIRE			
Project Summary			
<i>The Licensee must provide an approximate Project start and end date.</i>			
<p>To achieve the transition to a Smart Grid by 2030, DNOs need a step-change in the way they manage network information.</p> <p>INSPIRE will demonstrate a network information model, which can be scaled to be applied to the whole system, to achieve a transition to the Smart Grid. This will integrate distribution network data to create intelligence as an enabler for a flexible energy system.</p> <p>The project will show how a step-change to the business as usual processes can be achieved through the integration of existing segregated information to create a managed master data model and applications that support dynamic business requirements.</p> <p>Use of the Method will be demonstrated through example applications to address use-cases informed by an industry stakeholder group. It will provide the ability to understand and manage increasingly complex system interactions in the distribution network.</p> <p>A key objective will be to ensure that knowledge generated is transferrable to other Network Licensees. The IEC 61968– Common Information Model (CIM), the Smart Grid Architecture Model and other international standards will be applied where appropriate, to help ensure that the eventual solutions are open and interoperable.</p> <p>The project start date is April 2017 and the completion date is March 2021.</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	£7.9m	NIC funding requested	£7.11m
Cross Sector Projects only: requested funding from Gas NIC, NIA or second tier LCN Fund?	<i>If yes, please specify</i>		
	N/A		

Problem

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

To achieve the transition to a Smart Grid by 2030, DNOs need a step-change in the way they manage network information. A whole system approach is required to manage future networks. The National Infrastructure Commission report 'Smart Power' states: **-“For the smart power revolution to realise its full potential we must ensure that our networks and systems keep up. This requires more active management of our local electricity networks...”**

Referring to the Smart Grid Architecture Model (SGAM) we believe that DNO **development of the Information layer has not kept pace** with the Component and Communication layers. Further development of the Information layer is critical to enable progress in the Function and Business Layers.



To achieve the transition to fully Smart Grids, the following barriers need to be addressed: -

1. DNO data has evolved in a number of independent data sets and does not provide a real time holistic view, and thus the capability to optimally manage the emerging flexible networks with their controllable generation and load (power, energy, voltage, frequency). New platforms are required.
2. The GB System Operator is currently updated with a snapshot of distribution network intelligence once per year. This is not fit for purpose going forward. Approaching 50% of generation is now connected to the distribution network. Visibility of distribution network status, including embedded generation is required much closer to real time.
3. The benefits to network availability and asset management from data analytics are not being fully leveraged to benefit customers.
4. The information system supporting designers is inadequate in this more complex and dynamic network landscape, potentially compromising future network design.

Method(s)

The Licensee must describe the Method(s) which 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.

A key first step in addressing these challenges is to enable information exchange across traditional DNO business function boundaries. Bringing this information together and creating a whole system network model provides a platform for the Problem to be addressed. Applications targeting specific use-cases in the Problem area will be built on the platform. We will consult other DNOs during development of the Full Submission to ensure that use-cases of significant relevance to the industry are selected.

Building on our NIA Project 'Data Intelligence for Network Operation' (DINO) which demonstrated a viable approach, INSPIRE shall develop a whole system network model comprising **network connectivity, asset hierarchy, and communications network status**. Creating near real-time visibility, this framework presents a powerful platform by referencing network status, alarms, events, and time series measurement data. A fundamental requirement will be the use of international standards where they apply to help ensure that the eventual **solutions are open and interoperable**.

Method(s) continued

This approach will **bring together existing business information** to realise meaningful improvements in network visibility and availability of information.

To develop the applications that deliver business insights we will firstly define the technical requirements for the solutions, building where possible on the learning from previous LCNF projects and current NIC/NIA projects. We will determine the most effective and cost efficient means to deliver the required solutions, whether this be a new application or modification of an existing application.

The applications will address use-cases in the 4 Problem areas identified: -

1. Help co-ordinate the application of smart grid techniques.
2. Improved network visibility for third parties – e.g. System Operator and customers.
3. Improved network availability and asset management through the use of data analytics – e.g. Using multiple data sources for pre-fault detection.
4. Improved network understanding for designers, including visualisations.

The objective is to develop a **plug & play approach**; promoting interoperability by creating a platform that leverages international standards and applications that interface with the platform. DNO's adopting this architecture would be able to integrate applications from multiple vendors in a more efficient manner than is currently possible.

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.

Phase 1 – Iterative design & implementation - An 'Agile' iterative process has been selected for this innovation work. This will maximise useful outputs whilst reducing delivery risks by using short development phases that allow solutions to be delivered, evaluated and refined incrementally, releasing benefits early and enabling validation of results and fine-tuning throughout the process. This phase comprises:

WP1 – Develop a whole system network model (132kV/33kV to secondary substation level) for two trial areas with high penetration of smart grid techniques £1.1m

WP2 – Development of a **secure** data management architecture £2.1m

WP3 – Development of applications £1.5m

Sub total: £4.7m

Phase 2 - Trial of the solutions in identified areas, appraising their performance and supporting their operation during the trial period. The required changes to business processes and company standards will be designed during this phase in order to develop the solutions ready for introduction into business as usual operation: **£1.9m**

Knowledge dissemination and project management: £1.3m

Specific Requirements (please tick which of the specific requirements this project fulfils)

A specific piece of new (ie unproven in GB) equipment (including control and/or communications systems and/or software)	✓
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A specific novel arrangement or application of existing electricity distribution equipment (including control and communications systems software)	✓
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A specific novel operational practice directly related to the operation of the electricity distribution system	✓
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A specific novel commercial arrangement	
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Accelerates the development of a low carbon energy sector & has 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.

The Carbon Plan highlights electricity as a critical component in facilitating the decarbonisation of both heat and transport networks, suggesting that peak demand for electrical energy could more than double by 2050. The UK's Carbon Plan directives indicate "Reform of the Electricity Grid" should be achieved by "**paving the way towards a 'smarter' electricity grid in the UK**".

We believe that the enhancements in network management that will be developed and trialled under INSPIRE are amongst the essential next steps in achieving the Carbon Plan. This is evidenced by The National Infrastructure Commission report 'Smart Power,' which highlights research that predicts **benefits to the consumer of between £2.9bn and £8.1bn per year by 2030 by creating a more flexible system.**

This project will develop a range of techniques that help to facilitate the Carbon Plan:

1. The method **facilitates a fundamental shift towards creating a fully smart grid** by providing an integrated and flexible data platform which will facilitate continuing improvements in network planning and operation in a rapidly changing environment.
2. The project will facilitate **incremental growth in the connection of renewable generation** and energy storage and demand side response services. This will support the UK's long term commitment to reducing the emission of greenhouse gas, satisfy the Carbon Plan and meet the EU 2020 renewables directive. These benefits, together with cost savings, will be achieved, by optimising the design, operation and constraint of these connections / services.
3. By providing **improved visibility of the whole system**, design services will be improved, enhancing customer ability to connect low carbon technologies. The overall customer cost of the connections process will be reduced through a shorter process and more accurate quotes.
4. Focussing interventions at a distribution system level will **minimise conventional reinforcement requirements** and system losses, resulting in reduced costs to customers. Better customer performance will arise as network availability increases through operational improvements.
5. Creating a platform that **facilitates sharing of accurate and secure information** with third parties, including the system operator to understand balancing requirements, will enable a more open and competitive market that delivers benefits for the customer. Future integration of smart meter data will permit the realisation of further benefits.

Delivers value for money for electricity customers

The Licensee must demonstrate that the Method(s) being trialled can derive benefits and resulting learning that can be attributed to or are applicable to the electricity transmission system.

- i. The project will directly impact issues that affect the GB System Operator and all Network Licensees. The solutions developed will be appropriate for deployment within all DNOs and also benefit the GB System Operator. This project will demonstrate techniques which are, we believe, essential enablers for a fully smart grid. Key learning from this project would address this by demonstrating how the integration of data collected from various systems can be achieved in an open, transferable and interoperable manner. The learning will be useful to DNOs/TOs and can be shared amongst appropriate parties. With this in mind, our proposal ensures that the method can be replicated in other parts of the GB network.
- ii. The scope of this project is appropriate in relation to the learning that is expected to be captured. The total project costs are c.£7.9m, and the NIC funding request is around £7.11m. The project will deliver techniques that are essential enablers for a fully Smart Grid with estimated benefits of up to £8.1bn per year as stated above.
- iii. Procurement of services under the project will be carried out in accordance with our Iberdrola Group procurement model and within licence obligations. Where applicable competitive tendering will be used to maximise customer value.
- iv. We expect that the proportion of benefits that accrue to the electricity distribution system will be at least 80%. Up to 20% will accrue to other parts of the electricity supply chain, primarily renewable generators and providers of other services.

Demonstrates the Project generates knowledge that can be shared amongst all Network Licensees

The Licensee must explain the learning which it expects the Method(s) it is trialling to deliver. The Licensee must demonstrate that it has a robust methodology in place to capture the learning from the Trial(s).

- i. One of the fundamental objectives of this project is to develop a method that embodies the principles of open standards and interoperability to ensure that the learning is transferrable to all Network Licensees and the GB System Operator. The proposed methodology, and the resulting implementations such as communication protocol, software structure and state estimation will be relevant to any network of a similar nature. An industrial collaborative working group will be set up at project inception to ensure the proposed methodology is replicable to other parts of the GB distribution network. A project partner with in-depth knowledge of the relevant international standards will verify that the approach used in developing the solutions is in accordance with those standards where appropriate. They will have a further role in providing feedback to the standards committees on any issues identified and suggestions for further development of the standards.
- ii. By working closely with the onshore network licensees (including the GB System Operator) in both the development and deployment of this project, significant opportunities for knowledge sharing will be realised throughout the project lifecycle. The methodology to capture the project learning will be formally documented, including project meetings with project partners and dissemination of analysis reports and findings. Our academic partner will summarise and review the learning on a regular basis. The captured knowledge will be provided at a dedicated on-line portal and appropriate national conferences.

Please tick if the project conforms to the default IPR arrangements set out in the NIC Governance Document?	✓
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If the Licensee wishes to deviate from the default requirement for IPR then it must demonstrate how the learning will be disseminated to other 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.

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.

How is the project innovative and with an unproven business case where the innovation risk warrants a limited Development or Demonstration Project to demonstrate its effectiveness?

Demonstrate why the Licensee has not previously used this Solution (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 trial as part of its normal course of business and why the Solution is not Research.

Whilst there are examples of innovation projects that tried to address some aspects of this Method, no project has systematically reviewed, trialled and informed the industry. The key innovation for INSPIRE is that it will combine multiple disparate data sources to enable a range of benefits to optimise network planning and operation, delivering: -

- A dynamic whole system model and applications to deliver previously unavailable insights and functionality
- Increasingly necessary user-friendly **interfaces** with system operator and customers
- Progress towards **plug & play applications** to address network problems efficiently
- A step-change in the utilisation, and benefits from **Data Analytics**
- Support for improved **business processes** that benefit customers

This solution has not been used before for a combination of reasons: -

- Learning from relevant flagship LCNF projects has only become available recently
- The industry is now at the point where it is clear the solution is required
- Technology has now reached the level of maturity that can facilitate this solution. (e.g. Common Information Model, IEC-61850)
- The availability and volume of data arising from smart solutions is increasing rapidly

The Method would not currently be adopted as the business as usual solution. The traditionally perceived lower risk and lower initial cost approach is to put in bespoke point-to-point integrations to solve individual business problems as they arise. However we believe that the flexible approach trialled under INSPIRE will provide longer term benefits and overall cost savings.

The commercial and technical risks warrant the application of NIC funding.

The solution is not research. It uniquely and innovatively brings together commercial software, standards, previous project learning, techniques and frameworks.

Project Partners and external resourcing/funding

The Licensee must provide evidence of how Project Partners have been identified and selected, including details of the process that has been followed and the rationale for selecting participants and ideas for the project.

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.

In developing this ISP we have obtained technical input from CGI and University of Strathclyde. Business workshops were held to develop the initial Problem statements.

It is envisaged that the project will be delivered with the participation of primary project partners and the involvement of other parties to ensure high quality deliverables on programme and budget. Interfaces with National Grid and other DNOs will be particularly valuable in ensuring relevance and transferability.

Primary Technical Partner role - Specification support, Systems Integrator, Project Management support

SP Energy Networks has been actively engaged in innovation in the data integration area through our existing DINO NIA project. In developing DINO we competitively tendered for the primary technical partner and appraised 10 potential partners with significant expertise in this area, ultimately selecting a partner based on their expertise and relevant previous experience together with the value for money of their offer. We will draw on this knowledge to appoint a partner for INSPIRE.

Primary Advisory Partner role – Technical guidance, Independent review

Expertise in the areas of data standards and distribution networks will be sought to provide informed inputs and overview. It is important to bring detailed knowledge, including recent developments, in these specific areas to the project to capture all relevant learning. The Advisory Partner role is most likely to be provided by an academic institution/s that will be selected through evaluation of the relevant skills and ability to resource the requirements.

In assessing a number of ideas for NIC projects, INSPIRE was selected by our R&D Strategy Board as it:

1. Addresses a **theme of concern** for a number of network licensees identified from presentations at previous LCNI conferences;
2. Is **supported by the findings** of; and will further the recommendations of; recent reports from DECC, the National Infrastructure Commission, and Work Stream 7;
3. Demonstrated **clear benefit** areas following three internal stakeholder workshops;
4. Can deliver learning to **inform business as usual** implementation;
5. Informal consultation at the Utility Week Future Networks Conference in March 2016 also showed a **significant level of support** for the proposal.

Derogations or exemptions

The Licensee should outline if it considers that the Project will require any derogations, exemptions or changes to the regulatory arrangements.

No derogations or exemptions identified.

Customer impact

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).

No direct interaction with customers is required.

Details of cross sector aspects

The Licensee should complete this box only if this Project forms part of a larger cross sector Project that is seeking funding from multiple competitions (Electricity NIC, Gas NIC or LCN Fund). The Licensee must explain about the Project it will be collaborating with, how it all fits together, and must also add a justification for the funding split.

N/A

