Low Carbon Networks Fund: Screening Submission Pro-forma

Notes on completion
Before completing this form, please refer to the LCN Fund Governance Document. **The typeface, font size and colour for the text entry areas are predetermined and should not be changed. Please ensure all content is contained within the boundaries of the text areas. The full-completed submission should not exceed 6 pages in total.** **Ofgem will publish all the information contained within section 1.1 following the ISP deadline and we will publish the information contained within section 1, 2 and 3 following the Full Submission decision.**

Section 1: Project outline

1.1. Project summary

Project title
Manchester Northern Gateway Smart Grid Project
Project purpose
Provide a narrative that explains the problem the Project, is seeking to address and the solution it is using to solve the problem. Detail how the project meets one or more of the specific requirements set out in paragraph 2.8 of the Initial Screening Process chapter of the LCN Fund Governance Document
The Northern Gateway development incorporates the transformation of buildings, land and local infrastructure across a 20 acre site in central Manchester. The first phase of this brownfield development includes: the creation of the Co-operative Group's 400,000 ft^2 Head Office building which is designed to achieve BREEMA Outstanding status that will set the standard for sustainable design across the remainder of the development; and the deployment of a 17MW biomass Distributed Generation plant within the local distribution network. The Northern Gateway, as an area of major urban investment and redevelopment, will introduce significant increases in fault levels, demand and considerable changes in usage and power flow across the distribution network. Historic planning data demand profiles and current planning tools are likely to need redefinition as a result of these changing requirements. The development is brownfield, but the majority of the infrastructure is new build, providing excellent opportunities to install new equipment unhindered by retrofit considerations. The Project will define the optimal technical, operational and commercial structures required to deliver an urban distribution network capable of both supporting and actively facilitating the utilisation of Distributed Generation and other Distributed Energy resources. The consortium will explore the potential for inner city areas to become carbon neutral and energy "self sufficient", as part of an intelligent, automated and re-configurable distribution network, delivering a localised demand management and network balancing capability. The integration of a range of communication networks and remote monitoring and control applications will include a core Cyber Security solution designed to ensure the integrity of all distribution network equipment, operational and data systems. We will investigate the commercial arrangements to support the wide scale deployment of localised Distributed Generation and Distributed Energy resources and explore the commercial interactions with the provision of heat.
Estimated Project funding
Please provide an approximate figure of the total cost of the project and the LCN funding you are applying for

Total cost of Project	£7.3 million	LCN funding requested	£6.3 million

1.2. Additional Project details

Funding commentary

Provide a commentary on the accuracy of your funding estimate. If the Project has phases, please identify the approximate cost of each phase

The three year Project is broken down into the following discrete phases:

Phase	Description	Cost	Indicative timing
Phase 1	Detailed specification and preparation	£985,000	(Jan 2011 to Apr 2011)
Phase 2	Initial deployment and testing	£2,444,000	(May 2011 to Apr 2012)
Phase 3	Full deployment	£2,949,000	(May 2012 to Dec 2012)
Phase 4	Operation, assessment, reporting and dissemination	£922,000	(Jan 2013 to Dec 2013)

Indicative Project Total Cost £7,300,000

The figures above reflect preliminary discussions with vendors and partners regarding cost assessments of the proposed solutions and activities. We believe these initial projections are accurate to within a 25% tolerance. These figures are subject to further detailed contractual negotiations as part of the subsequent project planning process and several vendors have indicated they will fund themselves, at least, 10% of their expected costs to the Project.

Objectives and deliverables will be identified for each phase of the project. The learning from each discrete phase will be captured and disseminated via a closedown report for each phase.

As the Northern Gateway development expands it is likely further collaborative opportunities will be identified and so ENW expects to seek Low Carbon Network funding to deliver further Project(s) and/ phases.

Project solution

Provide specific details of the solution which you are trialling, including details of specific network conditions where the trial is taking place

The Co-operative Group will deploy a range of Distributed Generation within the Northern Gateway development. The Head Office building will operate a small scale biomass generation plant with back-up generation (run by bio fuels) and the large scale 17MW biomass generation plant will be connected to the local distribution network.

ENW will lead an extensive trial of distributed energy services across the local consumer base. The Project will deploy a Distributed Energy Management System (DEMS) to provide a real-time view of available energy resources, committed resources, current state, alarm status, historic load and predicted load. This will deliver integrated Distributed Generation management and active demand shaping across the local distribution network. The integration of distribution network assets, small and large scale Distributed Generation, Storage and Building Management System solutions into ENW's Distribution System Management Control (DSMC) centre will provide remote control and management of consumer metering and demand management technologies. We will trial a range of access communications systems in order to evaluate their economic and operational effectiveness within a given context. A core Cyber Security solution will be deployed to ensure and maintain the integrity of all connected network assets and data systems.

Additional integrated distribution network intelligence will be deployed to provide a remotely configurable distribution network that is able to meet the operational issues arising from a more dynamic and diverse distribution and demand profile. These will include a Super Conducting Fault Current Limiter, HV automation equipment, HV network monitoring equipment, and distribution transformer monitoring.

It is anticipated that local Distributed Generation will deliver both heat and power and the consortium, will consider the commercial interactions between the provisions of these energy forms in the delivery of a low carbon economy.

Section 2: Eligibility criteria

In the space provided below, please demonstrate below how your project meets <u>all</u> of the following eligibility criteria:

Accelerates the development of a low carbon energy sector

Demonstrate how the Project makes a contribution to the UK's Low Carbon Transition Plan, as set out by DECC. Outline carbon benefits which the Solution you are trialling delivers and explain why the solution accelerates the realisation of these benefits over and above conventional solutions. These benefits can be explained in a qualitative manner for the purpose of screening

Intelligent Distribution Networks – The introduction, for the first time, of extensive network intelligence and management capabilities across the HV and LV networks, will deliver significant carbon reductions by allowing existing assets to support the changing needs and profile of distribution networks. This will reduce the need for network reinforcement and accelerate the adoption and integration of renewable Distributed Generation.

Distributed Generation Enablement – The Co-operative Group proposes to build a large scale biomass generation plant as part of the Master plan for their Northern Gateway development, which aligns with the low carbon directives and aspirations for carbon reduction within Greater Manchester and the UK. The Project will introduce and test new and existing technologies to enable the effective and efficient integration of small and large scale generation plant, which will include assessment of the effects and impacts on 33kV, HV and LV networks and identification of the optimal network operational practices to support wide scale renewable Distributed Energy sources.

Distribution Energy Management System - The integration and real-time control of these distribution networks will enable active management of the connected Distribution Generation and energy resources and the local demand. By effectively integrating the increasing deployment of renewable Distributed Generation with active demand management we will facilitate the local production and local use of lower carbon electricity.

Building Management Systems (BMS) – The new Co-operative Group's Head Office building, will include a state of the art BMS which will be integrated into the distribution network operations. The Project will integrate and manage access to this BMS and other similar systems through ENW's DSMC centre. This will facilitate operational control and matching of local demand and distributed energy assets, through innovative and new commercial arrangements with supply chain project partners.

Has a direct impact on the operation of the distribution network

Set out the Solution you are trialling and make a clear case as to how the Solution described in Section 1 directly impacts on the operation of your network

The Project will deliver a fully integrated DEMS system by providing remote control of small, medium and large scale Distributed Generation to match with local demand in an area of major urban redevelopment. This will affect the operation of the distribution network by:

- Reducing peak demand across urban networks that exhibit increasing, fluctuating load / demand;
- Defining the optimal process for management of Distributed Energy sources within the local distribution network, to reduce the need for high carbon content electricity generated nationally;
- Maintaining service and power quality levels as Distributed Generation and demand within a specific distribution network becomes more diverse and dynamic; and
- Minimising major capital investment in network reinforcement.

The main DEMS system components include: **Distributed Generation Integration** – Centralised management system to provide real time monitoring and control of the various Distributed Generation and Distributed Energy resources, including commercial and residential Building Energy Management Systems; **Cyber Security** - Design and testing of cyber security systems to provide extensive secure coverage ensuring critical protection of all distribution network assets, systems and data; **Demand Management Automation** – Real-time demand monitoring and management across distribution networks; **Communications Infrastructure** – Comprehensive, reliable and cost effective communications solution required to deliver real-time operation capability; **Network Automation and Control** – HV and LV distribution asset monitoring systems to assess system configuration and integration options**; Super Conducting Fault Current Limiter** – Assess capability to manage fault current issues arising from increasing levels of Distributed Generation.

Focuses on a network solution which is at the trialling stage and which requires Second Tier funding

Demonstrate why you have not previously used this Solution (including where the Solution involves commercial arrangements) and why LCN funding is required to undertake it. This must include why you would not run the trial as part of your normal course of business and why the Solution is not R&D

ENW's operational systems are meeting the present distribution network requirements within the Northern Gateway area. The LCNF offers the opportunity to investigate how significant expansion of network automation and control might meet increasing future demand and dramatically changing demand profiles. The fund allows ENW to support a level of investment in deploying such trial solutions that could not be sustained as part of business as usual.

ENW intends to utilise learning from previously funded initiatives, such as IFI projects, to further facilitate the learning from deployment of the various technologies as part of an integrated approach and within a fully operational environment. ENW, and its partners, intend to implement technologies at reasonable scale to assess how to effectively maintain quality of supply and service within a Smart Grid environment.

A number of individual technologies intended for deployment within the Project have previously been tested within a limited environment. Our approach is to implement these technologies as part of an integrated solution to explore how the considerable data which will become available can be most effectively employed to ensure the changing dynamics within distribution networks can be fully supported.

By example; with the implementation of The Co-operative Group's large scale urban biomass generator, this could introduce constraints on the network which would require significant capital network reinforcement. By exploiting alternative technology solutions as part of an intelligent distribution network, we believe we can both support the implementation of the new generation plant and significantly reduce the potential carbon footprint for such a project.

Utilising the capabilities that these integrated systems will deliver ENW and the Project partners will develop supporting commercial arrangements that would facilitate their wider scale exploitation.

Has the potential to deliver net benefits to existing and /or future customers

Demonstrate that the Solution you are trialling has the potential to deliver net carbon and financial benefits to existing and /or future GB energy customers

This Project assists the Co-operative Group, the UK's largest investor in green technologies, in its drive towards a self sustaining low carbon enterprise and is in line with the HM Government's Low Carbon Transition Plan to facilitate the contribution of individuals, communities and businesses. The Project will deliver understanding of how to enable businesses (and communities) to support the transition to a low carbon economy through adoption of renewable Distributed Generation within the local distribution network.

A key element of the Project is the network integration and management of small and large scale renewable Distributed Generation. This element contributes to the objective of reducing reliance on energy imports and addressing the issues of intermittency and voltage management arising from large scale adoption of renewable generation. The resulting learning's will deliver optimised operational and network design practices to facilitate the accelerated adoption of a UK generation mix based upon a sustainable low carbon supply. The introduction of a DEMS system will demonstrate how the management of renewable energy is delivered to provide a range of benefits to customers. The carbon reduction arises from an intelligent distribution network that delivers balancing of distributed generation and demand which will be realised across the energy supply chain. The objective of reducing peak demand together with demand side management schemes will explore potential reductions in operational costs and may result in minimising prices across the supply chain.

To further support HM Government's commitment to security of supply this project will assess the security of each component in the network to understand any physical and/or technical vulnerability. Where vulnerabilities are found solutions will be developed to deliver improvements and therefore maintain security and quality of the supply for consumers. Knowledge gained through this project will enable us to develop our distribution assets policy, procedures and practices and so that we can support wider renewable Distributed Generation initiatives, such as micro-generation and feed-in-tariffs.

Creates new knowledge that can be shared amongst DNOs
Explain the learning which you expect the Solution you are trialling to deliver. Describe the methodology you will use to capture the learning from the trial
ENW will learn how to: design and build a new distribution network incorporating Smart Grid technologies and integrate into existing operational and data systems; integrate and manage small, medium and large scale Distributed Generation and distributed energy sources, including integration of BMS systems with a DEMS system; evaluate the different communication systems; develop and test cyber security solutions for the energy network environment; develop advanced operational modelling techniques for connection and operation of Distributed Generation; develop and test innovative pricing and commercial arrangements between the supply chain partners. The Joule Centre is an acknowledged authority in the field of sustainable energy R&D and provides a facilitating role in leading collaboration between academic and industrial initiatives. The Joule Centre will facilitate direct involvement from a number of local academic institutions, including the proposed Smart Grid Development Centre at the University of Manchester, to provide the data capture, analysis, reporting and dissemination of outputs and learning from this Project. As learning is captured throughout Project life it will be documented in a series of Project briefing documents and engineering papers, which will be regularly published and presented at relevant industry conferences and working groups. We will develop our website to further disseminate Project information and will also look at setting up discussion fora for stakeholders to participate in dialogue to broaden participation.

Does the project conform to the default IPR arrangements set out in the LCN Fund Governance Document? (Y/N)	Y
If no, then please describe the IPR arrangements and demonstrate how the learning from the Project can be disseminated to other DNOs taking into account any potential constraints or costs caused or resulting from, the proposed IPR arrangements	
The Project currently conforms to the default IPR arrangements set out in the LCN Fund governance document.	

Section 3: Additional information

Please use the following section to add any further detail you feel may support your submission
This Project is strongly supported by stakeholders within the City, Greater Manchester and across the North West region as it facilitates the transition to a low carbon society. Manchester City Council, the Association of Greater Manchester Authorities and the Northwest Development Agency all support this Project as it delivers actions across a number of change programmes and city region pilots: **Manchester: A Certain Future** which is Manchester's Climate Change Action Plan; the pilots including Greater Manchester Energy Group's **Sustainable Energy Action Plan** and **Low Carbon Economic Area (for the Built Environment)** Plan; and the region's **Low Carbon and Environmental Goods and Services Strategy** which aims to support and grow the Smart Grid industry in the region; and the regional **Climate Change Action Plan** which sets out the region's priorities for a low carbon future including developing a Smart Grid infrastructure.

Section 4: External Collaborators

External Collaborators' details
Please use the space below to provide the name and business type of any External Collaborators who have contributed funds and /or resources to a Project, or describe the type of External Collaborators you may be seeking to attract
The following are the names of the organisations and their particular area of expertise make up the External Collaborators for the Project: **Partner:** • The Co-operative Group **Technology Partners:** • Distributed Energy Management System Provider • Communications Infrastructure Provider • PLC Solutions Provider • System Integration and Cyber Security Solution Provider • Specific Network Equipment Providers: Super Fault Current Limiter provider; Distribution Network Storage solutions provider, and assorted proprietary network intelligence providers. **Project Management Partner:** • Project Management Provider **Learning and Dissemination Partners:** • North West Universities through the Joule Centre • Proposed Smart Grid Development Centre at University of Manchester • Proposed Northern Gateway Demonstration Educational Facility **Energy Supply Chain Partner:** • Energy Retailer The list of vendors has been carefully selected to work with the proposal as External Collaborators. Each has been chosen for their expertise in one or more of the areas that will be covered by the trial.

Section 5: DNO details

Company
Electricity North West Limited
Contact name
Simon M Brooke
Contact Address
304 Bridgewater Place, Birchwood Park, Warrington, Cheshire, WA3 6XG.
E-mail
simon.brooke@enwltd.co.uk
Direct telephone line
01925 846858
Position
Low Carbon Projects Manager