



Low Carbon Networks Fund Screening Submission Pro-forma

Notes on completion			
<p>Before completing this form, please refer to the LCN Fund Governance Document. Please use the default font (Verdana size 10) in your submission, 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 <u>9 pages</u> in total.</p> <p>Ofgem will publish all the information contained within the Screening submission.</p>			
DNO Group			
Electricity North West Limited (ENWL)			
Participant DNOs			
DNO area			
North West England			
Project title			
C ₂ C : Capacity to Customers			
Project summary			
<p>Situation The UK electricity distribution network is built to the Engineering Recommendation P2/6. This means that all networks contain redundancy and spare capacity to ensure security of supply; however actual usage of the spare capacity is extremely low.</p> <p>Problem As the UK moves towards a low carbon economy, the decarbonisation of transportation, heat and electricity production will result in increased demands on electricity networks. Traditional capital intensive approaches to meeting these increased demands are likely to be slow and expensive, hampering the achievement of the UK's emissions targets.</p> <p>Question To address the decarbonisation challenge, how can network operators quickly and economically enable customers to have access to the UK networks' inherent spare capacity?</p> <p>Method ENWL proposes to demonstrate a low risk transferable solution which releases the network's spare capacity through adaptive network automation and real time demand and/or generation side management. The proposed Method will reduce the need for traditional reinforcement, significantly cutting the cost and time required to provide new connections whilst also enhancing quality of supply for customers.</p>			
Estimated Project funding			
<i>Please provide an approximate figure of the total cost of the project and the LCN funding you are applying for.</i>			
Total cost of Project	£11.3m	LCN funding requested	£10.1m

Problem

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

As the UK fulfils its decarbonisation obligations, the demand on electricity networks will dramatically increase. Overall electricity demand and generation could plausibly grow by 1.2% per annum to 600TWh/year by 2050, an approximate 100% increase from current levels (1)(2).

Network demand will be driven by the decarbonisation of heat, transportation and electricity production. These new sources of demand will initially appear randomly across the network, predominantly at low voltage, and be aggregated and observable on the high voltage (HV) and extra high voltage (EHV) networks. Previous LCNF projects have in the main focused on the LV network with very few looking at the impact on the HV and EHV networks.

Economic Considerations

Meeting this demand using traditional capital intensive reinforcement techniques would require significant investment. A 2009 Ofgem consultation document estimated that required investment in the GB transmission and distribution network could be as much as £53.4bn between 2009 and 2025. Current reinforcement standards, mandated by licence condition, require that for every extra 10MW of firm capacity required at HV, 20MW of infrastructure is needed.

The costs of traditional reinforcement approaches can negate the business case for renewable generation. In some circumstances, the cost of network connections can be in the region of £165/kW eg £500,000 for a 3MW 11kV connection, jeopardising the commercial viability of such projects (3). If these costs are not mitigated customers will face substantially higher electricity prices via connection charges or tariffs.

Constraining the Low Carbon Future

Using traditional techniques to meet the volume and scale of new low carbon demand and generation connections will potentially hamper UK's efforts to move towards a low carbon future.

(1) Elders et al. (2006) "Electricity Network Scenarios for Great Britain in 2050"

Cambridge Working Papers in Economics.

(2) HM Government (2011) "2050 Pathways Analysis - Response to Call for Evidence".

(3) Inenco (2010) "Report calls for renewable grid connection standards".

Method(s)

Please describe the Method(s) which are being trialled. Please outline how the Method(s) could solve the Problem. The type of Method should be identified where possible e.g. technical or commercial.

Method

ENWL is proposing to release network capacity inherent in HV and EHV networks, reducing the need for traditional reinforcement. This will be achieved by applying adaptive network reconfiguration techniques (already developed for a different application under the Innovation Funding Incentive) in conjunction with new innovative customer commercial arrangements. This Method constitutes a shift in the distribution network operating paradigm from passive to active network management.

Method(s) continued
Trial

ENWL is proposing to demonstrate this Method on several hundred representative HV and EHV circuits across its network, serving approximately 360 000 customers, close to 15% of its customer base.

Through the demonstration ENWL aims to test a number of hypotheses and the associated benefits these can bring to customers. The hypotheses include:

1. The Method will release spare network capacity whilst maintaining security of supply
2. This Method will reduce network losses
3. The Method will reduce connection costs for new and existing customers
4. The Method will prove customers accept new forms of demand/generation response solutions.

ENWL believes there will be additional benefits resulting from the Method, including improved power quality and increased network utilisation. Other potential benefits will be explored further during the demonstration.

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 C₂C Project is forecast to run for 2.5 years and has been split into four cost elements. The cost estimates have been developed internally in collaboration with third party project management and technology partners.

Phase 1. Mobilisation	£460 000
Field Installation	£5 300 000
NMS Configuration	£2 780 000
Phase 2. Data Analysis & Customer Engagement	£1 260 000
Phase 3. Dissemination	£300 000
Total:	£11 270 000

ENWL is currently looking at project partners to potentially provide additional funding to the project. A contingency element has been incorporated into the total.

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

A specific piece of new (i.e. unproven in GB) equipment (including control and communications systems and software) that has a Direct Impact on the Distribution System)	<input checked="" type="checkbox"/>
A novel arrangement or application of existing Distribution System equipment (including control and communications systems software)	<input checked="" type="checkbox"/>
A novel operational practice directly related to the operation of the Distribution System	<input checked="" type="checkbox"/>
A novel commercial arrangement	<input checked="" type="checkbox"/>

Accelerates the development of a low carbon energy sector

The DNO must demonstrate that the Solution makes a contribution to the Low Carbon Transition Plan.

By releasing spare network capacity this project contributes to two aspects of the Government's five point Low Carbon Transition Plan (LCTP):

Building a low carbon UK

The LCTP indicates that customers will increasingly switch to electricity to decarbonise their transport and heating. It also points out that network users will be connecting low-carbon exporting electricity generation such as wind farms. These changes will increase power flows on networks, triggering reinforcement works such as circuit upgrades under the most efficient existing approach. By cost effectively and quickly releasing significant amounts of existing capacity the Method will allow GB customers to switch to low carbon solutions. Traditional reinforcement is a high emissions activity, involving disruption and carbon intensive assets; avoiding this will render quick and substantial carbon savings.

Supporting individuals, communities and businesses to play their part

The most significant impact of ENWL's approach is that customers' low-carbon activities are enabled and accelerated, because the Method is fast, low risk and cost-effective. The Method positively engages customers in a new form of demand side response, facilitating faster penetration of low carbon technology amongst communities, businesses and individuals. In addition introducing customers to less intrusive demand side response will facilitate the development and maturation of the wider market.

The Method can be easily implemented by all DNOs through cost effective adaptation of their existing systems.

Deliver net financial benefits to existing and/or future customers

The DNO must demonstrate that the Method(s) they are trialling has the potential to deliver the Solution at a lower cost than alternative methods.

The C₂C Project will deliver value to both existing and future customers through the minimisation of reinforcement requirements. Specifically through:

Cheaper Connections

Currently any new or existing customer who wishes to connect to the network will have to pay a significant amount for any reinforcement of the local HV circuit, which must be reinforced in line with ER P2/6. By reducing the need for reinforcement the Method has the potential to release an additional ≈ 300 MW of HV and EHV capacity across the demonstration network which would otherwise cost over £100M to provide using traditional techniques. This is expected to reduce the reinforcement element of connection charges by up to 80% allowing customers to connect to the network in a more cost effective manner and enabling them to progress projects at their preferred time scales.

Lower Use-of-System Charges

Reduced reinforcement expenditure relative to traditional techniques will flow through into lower use-of-system charges. For example, the release of spare network capacity via technical changes and new commercial relationships could be expected to reduce load-related HV network reinforcement spend in RIIO-ED1 by theoretically up to 80%.

Has a Direct Impact on the operation of the distribution network
<p><i>A Second Tier Project must demonstrate that the Method(s) being trialled will have a Direct Impact (as defined in v.4 of the Governance Document) on the operation of a DNO's Distribution System.</i></p> <p>Impacts The Method accommodates connection of demand and generation up to 2030 with significantly reduced reinforcement needs. It will provide a new approach to the planning and operating of the distribution network, allowing customers to engage in demand/generation response arrangements.</p> <p>The Method provides the opportunity to learn how to combine innovative commercial and technical solutions in the operation of the distribution network, preparing for a future role as a distribution system operator.</p> <p>Assessment The demonstration will measure connection costs, network utilisation, losses, power quality and customer engagement on the trial circuits relative to the remainder of the network, providing data on how these changes actually alter network state and performance.</p>

Generate knowledge that can be shared amongst all network operators
<p><i>The DNO must explain the learning which it expects the Method(s) it is trialling to deliver. The DNO must demonstrate that it has a robust methodology in place to capture the learning from the Trial(s).</i></p> <p>Capture and Communication Learning will be captured throughout the project and communicated to the UK customers and DNO community. The project will ensure the technology Solution can be easily implemented by all DNOs through cost effective adaptation of their existing systems. ENWL and Partners will set up a website and disseminate learning through a series of papers, seminars and conferences.</p> <p>Key Learning The C₂C project knowledge creation and dissemination approach sits at the centre of the project design and delivery. Specifically it will:</p> <ol style="list-style-type: none"> 1. Generate new network design and operating procedures which may be utilised as the change proposal for updating ER P2/6 and/or developing a DNO operating standard 2. Create an enhanced and transferable control and automation system for adaptive network management 3. Generate data and knowledge of the impact of the Method on losses, power quality, network utilisation and standards of performance by operating the network in this manner 4. Develop new commercial offerings and understanding of willingness of customers to engage in demand side response contracts and test different channels for customer engagement for the provision of demand side response.

Please tick if the project conforms to the default IPR arrangements set out in the LCN Fund Governance Document?

If the DNO wishes to deviate from the default requirement for IPR then it must demonstrate how the learning will be disseminated to other DNOs.

Focus on Methods that are at the trialling stage

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.

Technology Maturity

Releasing network capacity previously required enhancement of system protection assets and the installation of significant infrastructure. ENWL and its Partners have already made significant investments in adaptive automation technology. These technologies have matured sufficiently to enable them to be applied to deliver capacity release with an acceptable level of risk in a managed environment.

Incentive for Change

This Method constitutes a shift in the distribution network operating paradigm from passive to adaptive network management; the current regulatory incentive structure does not encourage DNOs to consider such changes. The Solution may also require derogations, which may be more forthcoming under an innovation project.

Demand Side Response

Demand side response is at an emerging stage, with aggregators now able to participate substantially in transmission system balancing markets. ENWL has struck a number of traditional load-shifting demand side contracts to avoid network reinforcement. These commercial arrangements displace demand at peak periods; however it is clear from initial research that such techniques will be insufficient to meet the UK carbon reduction targets unless combined with significant reinforcement. To develop the Method ENWL has developed new types of demand side response which have not been discussed or applied before in the UK context. These commercial contracts will be demonstrated extensively in the project.

Project Partners and external resourcing/funding

The DNO 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 DNO has not identified any specific Project Partners, it should provide details of the type of Project Partners it wishes to attract to the Project.

ENWL has sought to build a strong group of project partners, bringing expertise in technology, data analysis, customer engagement and project management.

General Electric: GE has been brought in to provide expert technology development and provision. They have extensive experience in the energy sector and specific knowledge and assets that can be applied to network operations.

PB Power: PB Power will provide both project management support and ensure the technology and techniques developed in the project are transferable to other DNOs.

Accenture: Accenture is working collaboratively with ENWL on providing bid development, governance and dissemination expertise.

University of Manchester: UoM will provide data analysis and be a key dissemination partner. ENWL is also seeking to partner with another academic institution.

Demand Side Response: Energy supply chain companies including RWE Npower, EnerNOC and Flexitricity will engage customers to test their appetite for demand side response solutions.

Others: ENWL is also considering partners with relevant expertise in a number of areas eg carbon impact assessment.

Derogations or exemptions

The DNO should outline if they consider that the Project will require any derogations, exemptions or changes to the regulatory arrangements.

Required Derogations

In implementing the Method, ENWL is likely to seek a derogation from Engineering Recommendation P2/6. ENWL might seek an exemption from Interruption Incentive Scheme for customers involved in the demonstration.

Future Derogations

In the future the information and learning that will come out of the project may lead ENWL to propose specific changes to the regulatory regime and industry standards and codes.

It should also be noted that it is unlikely that a derogation would be sought from the common connection charging methodology and the common distribution charging methodology.

Customer impact

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

Customer Relationships

Throughout the project there will be a series of planned engagements with customers. These will mainly be in the commercial space through the provision of connection offers to new customers and the purchase of demand side response capability from existing customers. ENWL will publicise this project as part of its wider carbon agenda.

Customer Impact

Some customers may experience planned supply interruptions for the installation of monitoring equipment. There is also potential for some customers to see an increase in short duration interruptions without adversely affecting Customer Interruptions/ Customer Minutes Lost, as defined by Ofgem. However, the majority of these customers will see an improvement of restoration times due to the increased deployment of system automation and remote control.

Customer Engagement Plan

Customer interactions will be managed through a detailed customer engagement plan which will be submitted as part of the full Second Tier bid.

Please use the following section to add any further detail you feel may support your submission.

ENWL is currently seeking the support of the customers within the Corridor Manchester with whom ENWL engaged last year on its previous LCNF submissions.

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