Innovation in networks – Ofgem's Low Carbon Networks Fund

Decision on the fourth year competition

Publication date: 29/11/2013

Contact: Arun Pontin or Sam Cope

Team: Smarter Grids and Governance

Tel: 020 7901 3869 / 020 7901 7239
Email: networks.innovation@ofgem.gov.uk

Overview:

We run the annual Low Carbon Networks (LCN) Fund competition to help stimulate innovation in electricity distribution networks. Through the LCN Fund, electricity Distribution Network Operators (DNOs) can apply for up to £64m to fund innovative low carbon projects that could deliver benefits to customers. This document explains which projects have been selected for funding this year.

There were seven applications this year. From these, we have selected four projects for funding. This decision is consistent with the recommendations of our independent expert panel, who assisted with the evaluation of the project proposals. We propose to award £26.58m of the available £64m to these projects. In addition, the DNOs and a range of partners will invest £8.11m of additional funding and in kind contributions in the projects.

The winning projects trial innovative operations, commercial arrangements and the use of new technologies. These will help DNOs understand how they can best respond to meet the changing requirements of customers and generators as Great Britain moves towards a low carbon economy. The learning will be relevant and available to all DNOs and consequently all customers in Great Britain will have the potential to benefit from the projects.

Context

Electricity distribution networks are entering a period of significant change. The challenges presented by the transition to a low carbon economy and the development of new technology will directly affect distribution networks and the way in which DNOs interact with their customers.

As part of the last electricity distribution price control (DPCR5), we established the £500m LCN Fund. The aim of this fund is to stimulate innovation and to provide DNOs with the opportunity to obtain funding to trial innovative solutions to the challenges that they face. These trials are needed so that DNOs can understand how they can meet the changing needs of consumers and generators as we move towards a low carbon economy, and ultimately could result in lower costs for consumers.

The learning gained from these trials will be disseminated to all DNOs and will be widely available to other interested parties to help them make the changes required in a timely and cost effective way. Learning from the trials will help to feed into the Smart Grid Forum, which is jointly chaired by us and the Department of Energy and Climate Change (DECC).

This document provides details of the projects which the DNOs submitted to compete for funding and explains our decision on funding for projects in this year's competition.

Associated documents

LCN Fund Governance Document v6

DPCR5 Final Proposals - Incentives and Obligations (145/09)

Contents

Executive Summary

Our LCN Fund is designed to stimulate innovation. It provides up to £500m of funding over five years to encourage DNOs to undertake trials to help address the challenges they face in facilitating the transition to a low carbon economy. Trials financed through the LCN Fund will generate learning for all network operators and will be made available to all interested parties. The learning brings potential benefits and cost savings for current and future consumers.

The LCN Fund is an annual competition which provides funding to a small number of large scale innovation projects. DNOs compete against each other for an allocation of up to £64 million of available funding. The competition was run for the fourth time this year. This document announces our decisions.

The seven submissions we received requested total funding of £54.19m. From these, we have selected four projects for funding. We will approve £26.58m, of the available £64m of funding, for these four projects. The project proposals were assessed against published criteria which we have summarised in the introduction.

Successful projects

In reaching the decision to select four projects for funding, we were advised by our independent expert panel, which reviews the project submissions and recommends which projects should be awarded funding. Following consideration, we have accepted the expert panel's recommendations. We summarise the successful projects in the table below.

Project (location)	**Funding requested**
Eta: Creating Efficient Distribution Networks (Manchester, Wigan and Wigton) A project trialling interconnection and voltage management on Low Voltage (LV) networks. *Submitted by Electricity North West Limited*	£8.44m
Flexible Urban Network – Low Voltage (London and Brighton) A project trialling interconnection of LV networks, to share network capacity, using three connection methods. *Submitted by London Power Networks plc and South Eastern Power Networks plc*	£6.53m
Solent Achieving Value from Efficiency (Solent) A project aiming to trial targeted energy efficiency measures with domestic customers to alleviate network constraints. *Submitted by Southern Electric Power Distribution*	£8.29m
Vulnerable Customers and Energy Efficiency (London) A project aiming to trial energy efficiency and demand-side response (DSR) with fuel poor and vulnerable customers. *Submitted by London Power Networks plc*	£3.32m

These projects complement the fifteen projects previously funded under the Second Tier Funding Mechanism.[1] Those projects are currently being implemented and learning is already emerging.

Unsuccessful projects

We received applications for three projects which were unsuccessful in this year's competition and will not be awarded funding. While these were all innovative, they did not demonstrate that they had performed sufficiently strongly against one or more of the evaluation criteria.

Northern Powergrid's (NPg) **Activating Customer Engagement** has the potential to develop important new learning on how to engage with customers by employing 'non-tariff' methods, which would encourage them to provide demand-side response (DSR) to DNOs. However, NPg did not demonstrate a sufficiently robust methodology or sufficient value for money to customers for the project to be accepted for funding. While we do not plan to fund the project this year, we consider that learning in this area could be very useful. We encourage NPg to develop this project further.

Scottish Power Manweb's **Anglesey Community Energy** is a potentially useful project that would have explored a community focused approach to energy efficiency and DSR. While this project could have developed learning on this approach, and on the role DNOs could play as Distribution System Operators (DSO), we do not plan to fund this project. We were concerned that the methodology does not robustly test the solution and that the specific network problems on Anglesey have not been properly defined in the project submission. A clear case of the financial benefits was also not made. There was uncertainty that the project will deliver new learning that is applicable across Great Britain. As such, and considering the high cost of the project, we were uncertain that this project represented value for money to customers.

Western Power Distribution's **Clean Energy Balance – Circumventing Electricity Network Constraints** aimed to maximise the use of renewable generation output through a variety of methods. Some of these methods involved the use of an electrolyser that would use renewable electricity, to produce hydrogen. The hydrogen would be stored and either used to generate electricity at a later time or injected into the gas network. While this is an innovative project, insufficient justification has been provided that the project satisfies a number of the evaluation criteria. Based on the evidence provided, we and the expert panel were unclear about when the solution would be a more economic alternative to other connection arrangements. This undermines the claimed benefits and provides uncertainty of the potential for future replication. This, coupled with the high cost of the project, makes the value for money to distribution customers uncertain.

[1] Information on these projects is available on our website.

1. Introduction

Chapter Summary

This chapter describes the background and structure of the LCN Fund, how we and the expert panel have evaluated projects, and the process we followed during this year's Second Tier competition.

Purpose

1.1. The purpose of this document is to explain our decisions on the applications that were made to the fourth LCN Fund competition. We evaluated the projects against the evaluation criteria set out in the LCN Fund Governance Document.[2]

1.2. We have published a number of other documents alongside this decision. These are -

- The full submission for each project, which includes the information on each project that we used to evaluate the project against the evaluation criteria.
- The independent expert panel's recommendation on which projects should receive funding.
- Reports by our consultant, BPI International, on each project. These scrutinise the information provided by the DNOs and provide the consultant's detailed assessment of each project to aid the expert panel's recommendation and our decision.
- The DNOs' answers to questions that BPI International, the expert panel and Ofgem raised on aspects of each project.

1.3. This decision document constitutes both notice of and reasons for our decision as required under section 49A of the Electricity Act (1989).

The LCN Fund

1.4. Network companies need to consider how they can play a full role in tackling climate change while maintaining security of supply and value for money to customers. Significant investment in the energy market in Great Britain is needed to ensure security of supply.[3] Of this, around £32 billion will need to be spent on networks.

1.5. To encourage DNOs to innovate to meet these challenges we created the £500m LCN Fund as part of the fifth Electricity Distribution Price Control Review

[2] LCN Fund Governance Document v.6
[3] Project Discovery - Energy Market Scenarios

(DPCR5). It is designed to enable DNOs to trial new technologies, operating practices and commercial arrangements which are required to meet the challenges associated with the transition to a low carbon economy. The LCN Fund is intended to help the DNOs understand what role they should play in the overall supply chain in a low carbon energy sector and how they can enable the transition. The learning from the selected projects is important not just for DNOs but for the energy industry and its stakeholders as a whole. A key feature of the LCN Fund is the requirement that learning gained from projects must be widely disseminated, so that customers across Great Britain gain significant return on their funding through the roll-out of successful solutions and the subsequent network cost savings and/or carbon benefits.

Structure

1.6. The LCN Fund incentivises DNOs to innovate in the way they design, build and operate their networks. It consists of two tiers and a discretionary reward mechanism. The First Tier provides funding to DNOs for small scale projects and to put in place the people, resources and processes to progress innovative projects. There is £80m of First Tier funding available until 2015. To date, projects worth £21.6m have been registered through the First Tier.

1.7. Under the Second Tier of the LCN Fund, we hold an annual competition to provide funding to a small number of large scale innovation projects. DNOs compete against each other for an allocation of up to £64 million of funding available each year. This document explains our decision on the projects we have selected for Second Tier Funding in this fourth year of the LCN Fund.

Second Tier Process

1.8. The Governance Document prescribes the governance and administration of the LCN Fund.

1.9. The annual competition starts with DNOs submitting outline project proposals in the Initial Screening Process (ISP). During the ISP we consider whether these proposals are eligible for funding. Only eligible projects are allowed to progress to the full submission stage.

1.10. The successful DNOs are invited to develop the eligible projects into full project proposals (full submissions). While the decision on which projects are funded rests with us, we are advised by an independent panel of experts - the expert panel.[4] The expert panel consists of individuals recruited to bring knowledge and expertise covering energy networks, environmental policy, technical and engineering issues, economics and finance, and consumer issues. The expert panel assesses each project against a set of evaluation criteria.

[4] Biographies of the expert panel members.

1.11. Table 1.1 summarises the current full submission evaluation criteria. The full detail of the evaluation criteria is contained in the Governance Document.

Table 1.1: Summary of evaluation criteria

Degree to which the solution being trialled -	**Degree to which the project-**
• Accelerates the development of a low carbon energy sector & has the potential to deliver net financial benefits to future and/or existing customers. • Impacts on the operation of the distribution network. • Provides value for money to distribution customers. • Generates new knowledge that can be shared amongst all network operators.	• Demonstrates a robust methodology and readiness of the project. • Is being delivered cost effectively. • Involves other partners and external funding. • Is relevant and timely.

The 2013 Competition

1.12. This year's competition began with the ISP in April 2013. We received eight submissions and were satisfied that they all met the ISP eligibility requirements. Subsequently, DNOs were able to develop these project ideas into full submissions. DNOs submitted full submissions for seven projects by the deadline of 9 August 2013. Seven bids were received and a brief summary of each project is in Chapter 2 and all the ISPs and full submissions are available on our website.[5]

1.13. This year, the combined funding requested was £54.19m, of the annual total of £64m. Each DNO submitted at least one bid to this year's competition.

1.14. The expert panel conducted a thorough evaluation. It was assisted in its review by our external consultants, BPI International, who assessed the feasibility of the projects, validated the information supplied and presented this information on a comparative basis. BPI International's reports are published on our website.[6] The expert panel reviewed the DNOs' submissions and BPI International's reports and met all the DNOs and project partners twice. It then evaluated the projects against the criteria set out in the LCN Fund Governance document v.6.

1.15. We, BPI International and the expert panel asked questions of the companies throughout the process. The expert panel also highlighted aspects of the submissions where it had concerns. DNOs were able to respond to these comments by amending their submissions. All DNOs chose to make amendments. Both the original submissions and the final submissions are available on our website. BPI International

[5] Full submissions can be found here.
[6] The consultants' reports and questions and answers are available as sub documents to each project submission.

has also provided addenda to its reports that reflect these amendments. The expert panel made its recommendations based on the final submissions.

1.16. The expert panel's recommendations are in its report, which it submitted to us in October 2013.[7] We reviewed the expert panel's recommendations and took them into consideration when making our decision. We also made our own assessment to decide which projects should receive funding based on their performance against the evaluation criteria. This is included in Appendix 1.

[7] The expert panel recommendations report can be found as a subsidiary document to this decision.

2. Decision

Chapter Summary

This chapter explains which projects will receive Second Tier funding and provides an overview of the reasons behind our decision.

Overview of full submissions

2.1. All DNOs submitted projects this year. These projects build on learning from projects funded through the First and Second Tiers of the LCN Fund and the Innovation Funding Incentive (IFI).[8] We were pleased that some projects proposed using assets and learning from existing LCN Fund projects to minimise the cost of the new projects. We were also encouraged by the number of projects that involved community energy schemes. While we were impressed by the range of innovative technical, commercial and operational ideas in this year's submissions, we note that the expert panel expressed concern at the lack of granularity provided in some project submissions.

2.2. This was the first time that the gas and electricity Network Innovation Competitions (NICs) were run in parallel with the LCN Fund competition. When developing the NICs we were keen to ensure that there were no barriers to cross industry ventures seeking funding from multiple competitions. We note that a cross industry venture involving separate bids to the gas NIC and LCN Fund was submitted this year. These two projects were evaluated individually against the evaluation criteria for their respective competitions. Only the LCN Fund portion of the overall cross industry venture is considered in this document.

2.3. When developing the sixth version of the LCN Fund Governance Document, and following consultation, we removed perceived barriers to LCN Fund projects trialling energy efficiency measures. We were pleased to see that, as a result of these changes, a number of projects this year have proposed trialling targeted energy efficiency measures as a means of solving network issues.

2.4. We had some concerns with this year's submissions. It was not always clear that, where possible, services and project partners were competitively selected. While partners cannot always be selected in a competitive manner, we are keen that DNOs undertake competitive processes where possible, to ensure value for money and allow new entrants to this sector. Where a competitive process has not been undertaken, we expect to see the reasons outlined in the full submission. We were also concerned that not all submissions had identified the process for selecting project ideas. We are keen that DNOs are open to as wide a range of ideas as possible.

[8] The IFI was introduced in DPCR4 to incentivise network companies to conduct innovate.

2.5. Table 2.1 provides a summary of the seven full submissions. Further descriptions of these projects can be found in Appendix 1.

Table 2.1: Summary of project submissions

Project (location)	Funding requested
Activating Customer Engagement (Durham) A project aiming to trial approaches to encouraging DSR from customers, without the use of tariffs. *Submitted by Northern Powergrid*	£5.62m
Anglesey Community Energy (Anglesey) A project aiming to trial a new community focused approach to engaging with customers to provide DSR, with the aim of alleviating network constraints and avoiding network reinforcement. *Submitted by Scottish Power Manweb*	£9.24m
Clean Energy Balance - Circumventing Electricity Network Constraints (Wadebridge, Cornwall) A project aiming to trial methods of maximising the output of renewable generation in the presence of network constraints. *Submitted by Western Power Distribution*	£12.75m
Eta: Creating Efficient Distribution Networks (Manchester, Wigan and Wigton) A project trialling interconnection and voltage management on LV networks. *Submitted by Electricity North West Limited*	£8.44m
Flexible Urban Network – Low Voltage (London and Brighton) A project trialling interconnection of LV networks, to share network capacity, using three connection methods. *Submitted by London Power Networks plc and South Eastern Power Networks plc*	£6.53m
Solent Achieving Value from Efficiency (Solent) A project aiming to trial targeted energy efficiency measures with domestic customers to alleviate network constraints. *Submitted by Southern Electric Power Distribution*	£8.29m
Vulnerable Customers and Energy Efficiency (London) A project aiming to trial energy efficiency and DSR with fuel poor and vulnerable customers. *Submitted by London Power Networks plc*	£3.32m

Our decision

2.6. Following consideration of the project submissions, the expert panel's recommendations and consultants' reports, we have -

- Selected four projects that can be funded as they were submitted (listed in Table 2.2).
- Decided that three projects will not be selected for funding (listed in Table 2.3).

Table 2.2: Projects selected for funding as submitted

Project (location)	DNO	Funding requested
Eta: Creating Efficient Distribution Networks (Manchester, Wigan and Wigton)	ENWL	£8.44m
Flexible Urban Network – Low Voltage (London and Brighton)	LPN and SPN	£6.53m
Solent Achieving Value from Efficiency (Solent)	SEPD	£8.29m
Vulnerable Customers and Energy Efficiency (London)	LPN	£3.32m

Table 2.3: Projects not selected for funding

Project (location)	DNO	Funding requested
Activating Customer Engagement (Durham)	NPg	£5.62m
Anglesey Community Energy (Anglesey)	SPM	£9.24m
Clean Energy Balance - Circumventing Electricity Network Constraints (Wadebridge, Cornwall)	WPD	£12.75m

Reasons for our decision

2.7. We reviewed each project submission against each of the evaluation criteria in the Governance Document and against the entire portfolio of first, second and third year projects. These detailed assessments are in Appendix 1 of this decision. Below we provide a summary of the reasons for our decision.

2.8. The total funding we intend to approve this year is under the £64m annual funding limit and it would have been possible for us to fund more than the four projects that have been selected. However, funding can only be provided to those projects that we consider have performed strongly against the evaluation criteria. We consider that all of the projects not selected for funding involve innovative ideas. However, we do not consider their proponents demonstrated sufficiently that they performed strongly against all of the evaluation criteria. We do not consider that funding them at this stage would be in the best interests of distribution customers.

Projects selected for funding as submitted

Eta: Creating Efficient Distribution Networks (ENWL)

Overview

2.9. This project aims to use innovative techniques to control and optimise the voltage on the High Voltage (HV) and Low Voltage (LV) networks in real time. The project would use new equipment to interconnect, monitor and control LV networks.

The project would also seek to develop existing network management software to coordinate and control these interventions automatically.

Summary of assessment

2.10. This project uses innovative technology, is replicable and could be a useful tool for managing the impact of the roll out of low carbon technologies across Great Britain. The method could release existing capacity on the LV networks quicker and cheaper than traditional reinforcement. This could give DNOs the time to assess the most efficient response to managing the strain on high use of parts of the network. It could also allow cheaper and faster connections for low carbon technologies (LCTs).

2.11. In its final submission, ENWL removed costs associated with customer surveys, noting that the customer perception of changes in voltage would be recorded by the CLASS project.[9] This improved the value for money of the project and demonstrated good use of synergies with a project already funded by customers.

2.12. Eta performed particularly well across all of the evaluation criteria and we plan to fund this project.

Flexible Urban Networks – Low Voltage (FUN-LV) (LPN and SPN)

Overview

2.13. This project aims to interconnect LV networks to share thermal capacity between neighbouring substations. Two of the methods to be trialled will involve the use of Power Electronic (PE) devices. These devices will allow controlled sharing of thermal capacity between two or three substations.

Summary of assessment

2.14. This project will use innovative technology, and is likely to be a replicable and relevant tool for all DNOs to manage LV networks.

2.15. The method could release existing capacity on the LV networks more quickly and cheaply than traditional reinforcement. This could allow for faster and cheaper connections for LCTs. The devices will also allow a degree of control over power quality, minimising some of the impact of LCTs.

2.16. The expert panel were initially concerned that suppliers of PE devices would be reluctant to share information on the performance of their devices. In its

[9] The CLASS project, funded in the 2012 LCN Fund competition will involve voltage control on EHV and HV networks.

resubmission, UKPN committed to provide this information as part of the project learning and included this within its Successful Delivery Reward Criteria (SDRC).[10]

2.17. We considered that FUN-LV performed well across all of the evaluation criteria and we plan to fund this project.

Solent Achieving Value from Efficiency (SAVE) (SEPD)

Overview

2.18. This project will trial a range of targeted energy efficiency measures with domestic customers to alleviate network constraints and reduce the risk of 'stranded assets'. The project will also seek to develop a network planning tool that incorporates learning from this project and other similar trials.

Summary of assessment

2.19. Capacity released on the networks could be used to provide cheaper and faster connections for LCTs. We consider the learning developed by this project could be applicable to all DNOs.

2.20. We and the expert panel were initially concerned that aspects of the project did not represent value for money, as they were being explored by other LCN Fund projects. In its resubmission, SEPD removed an element of the project which involved price signals from suppliers to customers. This resulted in a sizeable reduction in costs and the project now represents better value for money to customers.

2.21. Overall, and on the basis of the project resubmission, SAVE performed well across all of the evaluation criteria and we plan to fund this project.

Vulnerable Customers and Energy Efficiency (VCEE) (LPN)

Overview

2.22. This project will attempt to engage fuel poor and vulnerable customers to reduce their energy demand and provide a DSR service to the DNO. The project will develop learning on the best engagement approaches and issues that must be overcome to encourage this response.

[10] Successful delivery reward criteria are project specific objectives. The DNO will be eligible to claim a successful delivery reward, equal to their compulsory contribution, if all SDRCs are met.

Summary of assessment

2.23. Engagement with this specific segment of customers has received limited attention in previous trials and this project could develop learning that would be applicable to all DNOs. These customers are often clustered geographically. The project could develop learning that could allow DNOs to work with these clusters to release capacity on the network, avoiding or deferring network reinforcement.

2.24. The quantified potential net financial benefits are small. However, the overall cost of the project is relatively low when considering the potential benefits. These include reducing barriers to rollout of DSR or Time-of-Use (ToU) tariffs to all customers and making sure vulnerable customers can benefit from such a rollout. We were also pleased to note the level of external contribution provided to the project and UKPN's decision to not seek discretionary reward[11] funding for delivery of this project.

2.25. We noted that UKPN conducted an open process to recruit its energy supplier partner and this partner is providing a substantial contribution to the project. We considered these arrangements appropriate. The expert panel was concerned that valuable learning might not be readily shared by some project partners with their competitors. In its resubmission, UKPN committed to sharing this learning and also included its provision as part of the revised SDRCs.

2.26. Overall, VCEE performed well across all of the evaluation criteria and we plan to fund this project.

Projects not selected for funding

The remaining three projects involve innovative ideas. However, their proponents were not able to demonstrate sufficiently strong performance against all of the evaluation criteria. Therefore we will not fund them at this stage. We did not consider that we could resolve the issues associated with these projects by placing additional conditions on funding.

Activating Customer Engagement (NPg)

Overview

2.27. This project intended to trial non-tariff approaches to encouraging customers to provide DSR. The project would have used this learning and learning from other DSR trials to create a DSR planning tool for network operators.

[11] The LCN Fund discretionary reward is available to DNOs who deliver Second Tier projects deemed to be exceptional.

Summary of assessment

2.28. We considered that this was an innovative idea in an area which has had few trials. We were also very pleased to note that the project would use learning from other trials to inform the network planning tool. However, we and the expert panel had a number of concerns about the strength of this project against some of the criteria. These concerns were highlighted by the expert panel prior to resubmission. These concerns were insufficiently addressed in the final submission by NPg and consequently they failed to demonstrate a sufficiently strong performance against the evaluation criteria.

2.29. The expert panel were concerned that the overall costs of the project appeared high, for the work being undertaken, and involved using significant resources from the parties involved. We noted that in the resubmission the costs associated with some parties, particularly the number of person days allocated to NPg, were reduced. We and the expert panel were also concerned by the costs associated with the Gen Game. [12] We noted that these costs included development costs, which are fixed. As such, reducing the trial sample size would not have reduced the overall costs of the trial.

2.30. We and the expert panel were also concerned about the readiness of the Gen Game, and whether it could facilitate sustained engagement. We noted that to date the Gen Game had been tested on 20 households over a period of two months. Given this limited testing, we considered that the overall project risk was too high. Therefore, we were concerned about the project's performance against criterion (f) – "Demonstration of a robust methodology and that the project is ready to implement".

2.31. We were concerned about the ability of the project to sustain the benefits claimed, as these are dependent on encouraging and sustaining the interest of customers. The readiness of the Gen Game contributed to this concern, as its ability to generate and sustain interest and engagement was relatively unproven. We and the expert panel were also concerned about the lack of clarity on trial structure, engagement approaches and how the various approaches would be compared. This coupled with our concerns over the cost of the project, meant that we were not satisfied that the project would provide value for money to distribution customers.

2.32. We had concerns with the evidence provided against some of the criteria. We did not consider it in the interests of electricity distribution customers to fund the project with the current methodology. However, this is an innovative project that could provide valuable learning on the potential for non-tariff DSR.[13] We encourage NPg to develop this project further, taking account of our concerns. We consider that further development work on the approaches to customer engagement, the Gen Game and the DSR tool could have alleviated some of our concerns. Such work could be funded through the First Tier or the IFI.

[12] The Gen Game is an internet based engagement tool, which awards points to users based on the frequency and size of the DSR they provide.
[13] Many of the approaches to encouraging domestic customers to participate in DSR involve the use of ToU tariffs that provide time dependant price signals to customers. Non-tariff DSR would involve approaches other than price signals.

Anglesey Community Energy (SPM)

Overview

2.33. This project intended to trial a community focused approach to engaging customers to provide a network service. It also would have explored the role that a DNO could play as a DSO, balancing local generation and demand.

Summary of assessment

2.34. While we consider that this project could provide valuable learning, we and the expert panel had a number of concerns about the strength of this project against some of the criteria. These concerns were highlighted by the expert panel prior to resubmission. However the final submission from SPM did not sufficiently address these concerns.

2.35. The proponent did not provide sufficient justification of the net financial benefits of the solution. The net financial benefits appeared small in comparison with the overall cost of the project and were reliant on a number of assumptions. These included the use of reinforcement on Anglesey as the base case, particularly this reinforcement being deferred by nine years. We considered that there was uncertainty at present that the benefits claimed will be realised on Anglesey or elsewhere in Great Britain.

2.36. We and the expert panel were also concerned about rollout of the solution, which would require a viable business model involving a community aggregator.[14] The business model, in this proposal, involves narrow margins for this entity and its long term viability is questionable. As such, we considered there was significant uncertainty about whether this project could lead to net financial benefits to distribution customers.

2.37. We and the expert panel were concerned that the project did not perform sufficiently well under criterion (f) – "demonstration of a robust methodology and that the project is ready to implement". The project aimed to test a business model for the solution. The business model proposed by SPM relied on customers paying an annual £99 membership fee. However, the project would not require customers to pay this membership fee initially and the fee may be phased in once the project was underway. We were concerned that this approach may not reflect the actual business practice in the event of rollout. Given their involvement would be decided by their social landlord, it was unclear what learning would be gained about social housing tenants' willingness to participate. These two factors combined resulted in limited testing of the business model. A key part of the project learning is on the new business model, but as we note above, we did not have sufficient confidence that this would be robustly tested. We considered this reduced the probability of rollout of the method.

[14] The community aggregator, Menter Mon in this case, would organise and collate the DSR provided by the community into a useful service for the DNO.

2.38. While this project could have developed useful learning, it did not demonstrate sufficiently the potential net benefits to distribution customers. We were also concerned that the methodology was insufficiently robust and the overall lack of clarity on aspects of this project. Due to this lack of justification against a number of the criteria, we are not funding this project.

Clean Energy Balance - Circumventing Electricity Network Constraints (WPD)

Overview

2.39. This project intended to maximise the output of renewable generation through a variety of trials. These included the use of an electrolyser to produce hydrogen which would have been stored and either used to generate electricity at a later time or injected into the gas network. The trials would also have involved a constraint scheme and the use of CHP units to reduce electricity demand.

Summary of assessment

2.40. While this project was innovative, it did not sufficiently satisfy a number of the evaluation criteria and as such, we do not consider that this project should be awarded funding.

2.41. We and the expert panel were concerned about the economic viability of the proposed solution. We noted that the benefits are reliant on a number of assumptions which are difficult to justify. These include the assumptions that the developers would not size or locate renewable generation in an economic manner and that electricity would be available for the electrolyser free of charge. We also note the submission highlighted the possibility that the solution would be used by renewable generation developers rather than DNOs.

2.42. We did not consider that the project sufficiently satisfied criteria (a) – "Accelerates the development of a low carbon energy sector & has the potential to provide net financial benefits to future and/or existing customers" and (c) – "Generates knowledge that can be shared amongst all DNOs" to be eligible for funding.

2.43. We were concerned that this project might not provide value for money to distribution customers. The overall costs of the project were high, considering the uncertainty about potential net financial benefits and generation of new knowledge. The extent to which partners and services have been competitively acquired was also not clear.

2.44. While this project involved a number of innovative ideas, for the reasons outlined above we are not funding this project.

Customer issues

2.45. Several of the projects selected for funding this year could have an impact on customers. We consider that these projects have put in place appropriate arrangements to mitigate the risk of adverse customer effects.

2.46. Eta will involve interconnection of LV networks and voltage management and is a logical progression of last year's CLASS project. The voltage management will seek to optimise the voltage on the network and minimise the impact from LCTs connection. As Eta will be trialled on the same substations as CLASS, customer perception of any changes would be recorded through customer surveys funded as part of that project (although we note the need to delineate the impact between the two projects). If customers perceive degradation in supply quality that cannot be alleviated, the trial would be stopped at that location until the concern is addressed. The project will maintain voltages within the statutory limits, contained in the Electricity Safety, Quality and Continuity Regulations.

2.47. ENWL has indicated that installation of network equipment may require some planned interruptions of customer supplies. ENWL would try to avoid these where possible and has stated that these interruptions will be unlikely. When interruption is unavoidable, customers will be notified in advance in line with ENWL's standard procedures. ENWL has also stated that, as a result of the networks being interconnected, more customers may experience unplanned interruptions. This is the result of interconnection leading to a higher number of customers being connected to the same feeders. However, ENWL has estimated that, due to the new operating regime and equipment, it will be able to restore supply to customers in a shorter time compared to normal operation in most circumstances. It has estimated that customers involved in the trial will, on average, experience fewer minutes lost than customers not on the trial feeders.

2.48. In a similar way to Eta, FUN-LV will involve interconnection of LV networks. While there are no planned interruptions to supply and no increased risk of unplanned interruptions, a fault could affect a larger number of customers in this project. If a fault did occur, the circuits would automatically revert to their pre-trial configuration (alleviating the fault). UKPN would deal with circuits which experience faults in line with its normal fault procedures.

2.49. SAVE will involve the recruitment of roughly 4000 customers. These customers are to be split into four groups with each group receiving a different intervention. These interventions are; the installation of light emitting diode (LED) bulbs, in home energy displays, price signals from the DNO combined with in home energy displays and community coaching. SEPD has stated that there will be no increased risk of unplanned interruptions to supply.

2.50. VCEE will seek to engage fuel poor and vulnerable customers to participate in energy efficiency and DSR activities. The trials will involve providing these customers with advice on energy efficiency, devices which promote energy efficiency, smart meters and a ToU tariff. UKPN has undertaken preparatory work on engaging with

these customers, including a communication strategy and literature review. The approach to customer engagement builds upon existing best practice. Extra steps to protect these potentially vulnerable customers have been identified. These include incentive payments for participation in the project and support for customers struggling to pay bills. In order to ensure customer protection, the trial will involve the charity National Energy Action and two housing associations in the area. UKPN also has a specific partner to handle customer engagement, CAG Consultants. In order to protect customers who receive a ToU tariff, UKPN has committed to monitoring the temperature in participants' homes. If the temperature is recorded as below an acceptable level the project team will intervene, potentially removing the ToU tariff, to protect the customer.

2.51. All projects which involve engagement with Relevant Customers[15] are required to develop a strategy for communication. We evaluate these strategies and they must meet the requirements of paragraphs 3.91 - 3.95, section two, of the Governance Document. These requirements are in place to protect customers and ensure that inconvenience is minimised. It is important that projects communicate properly to customers the reasons for the interruptions and why the potential benefits from the projects justify the inconvenience.

2.52. We feel the approaches above are reasonable when considering the potential benefits that could be delivered and that adequate customer protection will be provided.

[15] Relevant Customers are customers with a profile class of 1,2,3 or 4 as defined in Part 2 of Schedule 16 of the Distribution Connection and Use of System Agreement. Profile class 1-4 include customers who have the following demand tariffs; domestic unrestricted, domestic two rate, domestic off-peak, small non-domestic unrestricted, small non-domestic two rate and small non-domestic off-peak.

3. Next Steps

Chapter Summary

This chapter explains the next steps for those projects that have been successful and provides details of next year's competitions.

Funding selected projects

3.1. Before a project is funded, we will issue a direction ('the Project Direction') setting out the project specific terms that the DNO has to abide by as a condition of the funding.[16] We are currently preparing project directions for the successful projects and we will issue draft versions of these to DNOs shortly.

3.2. Following the acceptance of the project directions by the relevant DNOs, we will issue a separate direction (the 'Funding Direction'). This will specify the amount of money which each DNO will be allowed to recover from its customers over the course of the next regulatory year.[17] The Funding Direction will also require funds to be transferred to the relevant DNOs in order to fund the selected projects. We will issue the Funding Direction in time for the DNOs to prepare their indicative use of system tariffs at the end of December. The Funding Direction will take account of any funding to be returned to customers, including revenues generated by LCN Fund royalties.

3.3. Although funding will not be raised from customers until the next regulatory year, starting 1 April 2014, we expect the DNOs to commence their projects as quickly as possible, according to the terms set out in their project direction and the Governance Document.

3.4. We will monitor projects to ensure they are being implemented in line with the full submissions. Each DNO implementing a project will be required to provide a detailed report, at least every six months, to allow us to evaluate the project's progress. We will publish these on our website to make project learning available to all interested parties. Each of the implementing DNOs should also be sharing what it is learning from its project according to the plan set out in its project submission. In addition, DNOs are required to hold an annual conference, open to all interested parties, where DNOs will be able to present the learning from their projects.[18] Finally, the ENA has developed a portal which holds smart grids data, including LCN Fund learning.[19]

[16] The requirement for a Project Direction is set out in charge restriction condition (CRC) 13 of the electricity distribution licence. Further details are set out in the LCN Fund Governance Document.
[17] The requirement for a Funding Direction is set out in charge restriction condition (CRC) 13 of the electricity distribution licence, and further details are provided in the Governance Document.
[18] The third annual conference was held in Brighton on 13 and 14 November 2013.
[19] Please see ENA portal here: http://www.ena-eng.org/smarter-networks/index.aspx

3.5. DNOs are incentivised to deliver the projects to a high standard. They will be eligible to apply for a delivery reward (called the Second Tier Successful Delivery Reward) if they meet the delivery criteria set out in the project direction.

Future competition

3.6. As explained in Chapter 2, we had some concerns about the processes undertaken to identify project ideas and recruit project partners. DNOs should note criterion (d) – "Involvement of other partners and external funding". This criterion requires DNOs to explain the process used to identify potential project partners and the steps they have taken to actively seek ideas for projects. This criterion also requires that if parties other than distribution customers are benefitting from a project, they should provide funding commensurate with that benefit.

3.7. It is also important that the carbon benefits (ie the quantity and speed in which network capacity is released) and financial benefits are quantified by the proposed methods. This quantification should be at a trial scale and also at the Great Britain scale. The assumptions and base cases that these estimates are made on should be identified. These details could be provided in the full submission appendices. It is also important, as a number of LCN Fund and IFI projects begin to deliver learning, that the base case is the most effective existing intervention. In many cases, smart solutions may offer a better alternative than reinforcement and where their use is proven, they should form the base case.

3.8. The expert panel has also provided its views in section 4.4 of this year's recommendation report. We ask potential bidders in next year's LCN Fund competition and the NICs to take these points into account when developing their submissions for next year.

3.9. We may also change the Governance Document to incorporate lessons learnt from this year's process and to make a number of housekeeping changes. The LCN Fund Governance Document (v7) will govern the fifth year of the LCN Fund. This will be in place prior to the ISP deadline in 2014. We will confirm the ISP and full submission deadlines in early 2014. We expect that they will be similar to the deadlines in 2013.

3.10. The LCN Fund includes a Discretionary Funding Mechanism, which allows for up to £100m to be awarded to Distribution Network Operators (DNOs). This funding is available to provide discretionary rewards to certain projects that bring particular value to the challenge of preparing networks for the low carbon economy. The award was implemented to provide a strong incentive to DNOs to develop well-designed and successful projects. This total sum of £100m can be awarded across three distinct rewards: the Second Tier Successful Delivery Reward, the First Tier Portfolio Reward and the Second Tier Reward. We plan to consult on aspects of the Discretionary Funding Mechanism in the New Year.

Appendices

Index

Appendix 1 – Project Evaluations

This appendix contains our detailed evaluation of each project against the LCN Fund evaluation criteria. The Governance Document explains the evaluation criteria and our evaluation process in full, but we have summarised the process in the introduction and the criteria in the table below.

Degree to which the solution being trialled:	**Degree to which the Project:**
• Accelerates the development of a low carbon energy sector & has the potential to deliver net financial benefits to future and/or existing customers. • Impacts on the operation of the distribution network. • Provides value for money to distribution customers. • Generates new knowledge that can be shared amongst all network operators.	• Demonstrates a robust methodology and readiness of the project. • Is being delivered cost effectively. • Involves other partners and external funding. • Is relevant and timely.

The detailed evaluation criteria in the Governance Document use the defined terms 'project', 'method' and 'solution'. A project is the specific trial being proposed or undertaken. A solution is the outcome which the project is seeking to establish, prove or demonstrate. A method is the proposed way of reaching the outcome. We use the same terminology in this appendix.

Activating Customer Engagement (Northern Powergrid)

Project overview

This project intended to trial approaches to encouraging DSR from customers, without the use of a supplier, or true use of system charges. The goal would have been to use the DSR service to alleviate distribution network constraints to avoid or defer reinforcement and provide network capacity for LCTs.

The output from the project would have been a best practice guide on how to incentivise this response from customers. Additionally, the project would have attempted to create a DSR planning tool. This tool would have allowed DNOs to plan networks with DSR as one of the available interventions to resolve constraints. We were pleased to see that the tool would have drawn on data from other DSR trials, in addition to those resulting from this trial.

The project would have involved three different approaches to engaging customers. The first approach would have been a school programme involving between 10 and 25 schools, with information being provided to the community through the school children. The method would have sought to recruit 500 households. This approach would have attempted to encourage habitual load shifting from the evening peak to periods of low load or high generation. Household response would have been monitored with performance used in inter and intra school competitions with prizes available.

The second approach would have trialled an internet based tool, the Gen Game,[20] to engage with 1,950 households in three groups. The Gen Game involves smart plugs which provide direct control to the DNO of certain appliances. Customers would have opted in to allow control of these appliances. This intervention would have attempted to produce a dynamic response address peak loading and voltage issues. The Gen Game would have been used to award points based on the size and time of load available for control. The points system would have been used to populate a league table and award prizes. This intervention would have been used to gauge customers' willingness to be involved in DSR and how their energy usage changes over time.

The final approach would have involved 40 premises of the local authority, Durham County Council. Energy efficiency devices, pledges and competitions would be used to promote static profile balancing. The outcomes of the three approaches would have been used to populate the DSR planning tool.

The project would have involved a period of network monitoring to identify constraints and network usage and then record the effect of the trials on these. The trials would have run from summer 2015 until spring 2017. The project would have been be delivered by NPg.

[20] The Gen Game is an internet based engagement tool, which awards points to users based on the frequency and size of the DSR they provide.

(a) Accelerates the development of a low carbon energy sector & has the potential to provide net financial benefits to future and/or existing customers

We considered that this project could have facilitated the goal of the Carbon Plan to decarbonise electricity generation. The project could also have provided financial benefits to customers. However, there was some uncertainty that these benefits would be realised.

Carbon benefits

The project could have facilitated aspects of the Carbon Plan, particularly the goal to decarbonise electricity generation. Encouraging load to non-peak periods could have several carbon benefits. Firstly, the method could be used to match generation and demand, maximising the output of renewable generators. It could also reduce the need for high carbon peaking plant which is used to generate electricity at peak times. The headroom created on the networks could be used to accommodate LCTs providing cheaper and quicker connections for these devices. By promoting reductions in peak demand and demand shifting, network reinforcement could be avoided or deferred.

NPg estimated that the interventions could release 39,093kW of network capacity at the trial scale. It also estimated that this capacity could be released almost instantly compared to four months for a base case of reinforcement. NPg estimated that, between 2020 and 2040, the interventions could have been used on 10% of Great Britain substations a year. NPg has not estimated the total capacity released in Great Britain rollout of the methods.

NPg has estimated that the avoided reinforcement, load peak shifting, load reduction and reduced losses enabled by the interventions could have saved a total of 346,000tCO_2 across Great Britain by 2050. The financial value of this carbon was estimated as £52.3m.

Net financial benefits

The project could have delivered net financial benefits to customers. NPg has estimated that, at the trial scale, the net financial benefits would have been £3.6m. NPg has also estimated that, based on Great Britain rollout of the DSR planning tool, the net financial benefits of the project could have been between £28m and £201m per annum. NPg has stated that a figure in this range is most likely and that the overall financial benefit to distribution customers following Great Britain rollout could have been £3.4bn by 2050.

However, we were concerned that the project methodology did not provide sufficient clarity and confidence that customer engagement would be successful and the customers response sustainable. As such, we were uncertain that the project would be able to sustain the benefits claimed. Our concerns regarding the methodology are further discussed as part of our evaluation under criterion "(f) Demonstration of a robust methodology and that the project is ready to implement"

(b) Provides value for money to distribution Customers

We were concerned about the ability of the project to provide value for money to distribution customers. While the financial benefits claimed are large and mainly attributable to the distribution system, as noted above, there was some uncertainty that they would be realised.

We and the expert panel were concerned that the overall costs of the project appeared high and involved utilising significant resources from the parties involved. We note that in the resubmission NPg has reduced its own resource requirements from 10,037 person days to 7,511 person days. Overall the costs of the project reduced by £494k. We were also concerned about the high cost of using the Gen Game per household and noted that part of this cost was for further development of the Gen Game (a fixed cost).

We were pleased to see that NPg would have competitively procured software for the diagnostic tool, the network and household monitoring equipment, marketing consultants, the IT systems associated with the Gen Game and consultants to support load shifting by the Industrial and Commercial (I&C) customers.

We consider that, as the use of DSR without tariffs is untested, DNOs are unlikely to explore this method without innovation funding.

(c) Generates knowledge that can be shared amongst all DNOs

This project could have generated new learning for DNOs.

We consider that this project could have filled existing knowledge gaps and provided significant incremental new learning, particularly on the use of non-tariff DSR to provide a network service. NPg has stated that it would have attempted to recruit a representative mix of customers to the trials. We consider that the knowledge and tools developed by this project would have been applicable to all DNOs. We note that replication of the public sector interventions would initially rely on the presence of an enthusiastic local public sector organisation.

This project had robust plans for learning and dissemination, building on experience from NPg's existing LCN Fund project, Customer-Led Network Revolution. NPg had identified nine key learning outcomes. NPg also identified a range of interested parties that would be engaged as part of the project. The project would also have had a dedicated communications manager. The project would have used a range of channels for dissemination including a project website, two workshops per annum, webinars and reports on key deliverables. There would have been learning targeted at the other DNOs including the provision of the Gen Game to each, with the energy efficiency performance and rankings of the DNOs announced at the LCN Fund conference. We considered the plans and techniques for dissemination by NPg to be appropriate.

We note that NPg had designed the trials to ensure that the results are statistically significant. However, we share the expert panel's concern regarding the robustness of the project methodology. This concern specifically relates to the limited previous testing of the Gen Game to a two month trial with 20 participants. As such the level

of sustained engagement that can be achieved is unclear and the potential for rollout is uncertain.

We note that NPg has indicated that it would conform to the default Intellectual Property Rights (IPR) arrangements.

(d) Involvement of other partners and external funding

We considered that this project would have involved an appropriate group of partners that bring relevant expertise to the project.

NPg would have had four project partners and a collaborator. The partners would have been Durham County Council, Newcastle University, Exeter University and Durham University. Oswald Consultancy, the creator of the Gen Game, had been identified as a project collaborator. We note that Durham County Council was an enthusiastic and important partner in this project. NPg has identified the criteria used to select these parties. These criteria include technical capability, quality of contribution and overall cost. It is unclear the extent to which an open process was used to select partners.

We considered that these partners brought relevant expertise to the project. We were also pleased to note the contribution of £430k from Durham County Council. We considered that this funding was relatively secure as the council has demonstrated strong enthusiasm and commitment to the project. We also noted that the council would request a further £514k of funding from the EU which would have been used to extend the trials. We noted that Oswald Consultancy, the developer of the Gen Game, was providing a contribution of £50k.

NPg did not outline the process used to select ideas.

(e) Relevance and timing

We considered that this was a relevant and timely project.

A number of current LCN Fund trials are looking at the potential of tariff based DSR. This project would have expanded upon that learning by quantifying the role that non-tariff DSR could play in network management. Had it succeeded it could have contributed to the facilitation of the Carbon Plan's goal of decarbonising electricity generation. NPg has stated that the outcomes of the project (engagement methods and the planning tool) could be used by DNOs in the next 5-10 years. NPg has also stated that it believes the methods to be replicable across over 80 percent of Great Britain and as such the learning could be relevant to all DNOs.

(f) Demonstration of a robust methodology and that the project is ready to implement

We were uncertain that the project was ready to implement and were concerned with the robustness of the methodology.

NPg stated that due to the strength of the project partners, and its experience with delivering CLNR, the project would be able to begin in a timely manner. The project

has senior level buy in and pre-project authorisation has already been achieved. We considered that the project has sufficient resources in place.

We were concerned regarding the robustness of the project's methodology. We noted that the trials have been designed to produce statistically significant sample sizes. However, one of our main concerns related to the Gen Game. This engagement tool has only been trialled to a limited extent (on 20 households for two months) and we were concerned about whether it would perform as expected. We note the expert panel's concern regarding its untested ability to engage with different audiences, including children. Additionally, we were concerned that there was a lack of clarity regarding all of the approaches to customer engagement. These factors combined resulted in uncertainty that customers could be engaged successfully and a sustained response achieved.

The expert panel also noted that the development of the DSR tool was likely to be complex and there was not much detail on its planned development. We considered that this, combined with our concerns regarding customer engagement, lead to uncertainty that the methodology could be replicated and the financial benefits claimed achieved. We considered that further development work on the approaches to customer engagement, the Gen Game and the DSR tool could have alleviated this concern.

NPg has outlined the approach to calculating the costs and benefits of the project and ensuring accuracy of the data within the submission. While these are appropriate, we were concerned with some of the underlying assumptions made, including the sustainability of the benefits.

NPg has provided a detailed risk register with mitigations and contingencies identified. We note that the risk of the Gen Game not being fully developed is not identified as a project risk. Further development of the Gen Game could affect implementation of the project.

NPg has identified that low uptake of LCTs should not impact on the trial as there are existing clusters in Durham County Council's area that would be targeted.

NPg has provided a high level project plan. This lists the key tasks but does not identify sub tasks.

NPg has identified the project's governance structure, which includes an executive board made up of NPg directors and representatives from the partners. NPg has also provided considerable information on its approach to managing the project, including managing risks and emerging issues. The governance structure also identifies the responsibilities of each partner. Each stage of the project would have required board approval and it is at these check points that the project could be recommended to us for suspension.

The key customer impacts from this project would have been to those customers directly involved in the trials. Domestic customers who opt into the trials would have been provided with smart plugs and household monitoring devices. These may be used as part of the Gen Game. Customers would opt in to provide this service and can change their minds at any time. Customers would have been awarded prizes as a

reward for providing a DSR service. NPg has stated that customers may withdraw from the trial at any time and, due to the nature of the project, are not locked into any tariff. NPg has also stated that there is no increased risk of unplanned customer interruptions during the trial.

The Successful Delivery Reward Criteria (SDRCs) were SMART and linked to key outcomes of the project, including the delivery of the DSR planning tool.

Anglesey Community Energy (Scottish Power Manweb)

Project overview

This project would have trialled a new community focused approach to engaging with customers to provide a network service, with the aim of alleviating network constraints and avoiding network reinforcement. A third party local community engagement partner, Menter Mon, would act as a social aggregator, seeking to mobilise customers as a group rather than individuals. Menter Mon would have investigated the energy needs of the community, recruit customers and act as an agent engaging with the DNO on behalf of customers. The project would then have established a local energy 'market' with the aim of matching the needs of the network with customers' ability and willingness to provide DSR. Menter Mon would operate the market.

One of the key aims of the project was to explore whether customer energy needs and the network services required by DNOs can be reconciled to provide benefits to both parties. The project would seek to develop a financially viable business model. The project would also seek to explore the potential for a DNO to become more active, both in interacting with its customers and in its network management, and fulfilling a DSO role.

To enable customers to provide a DSR service to the DNO, and improve their energy efficiency, home automation equipment would have been installed in up to 2000 homes[21] and 25 I&C premises. Automation equipment and an active network management (ANM) system would have been installed on the distribution network. This equipment would have allowed Scottish Power Manweb (SPM) to coordinate its network needs with the services being offered by customers. The aim was for customer responses to reduce peak network load, allowing network reinforcement to be postponed.

The trials would have taken place on Anglesey. The full trial of active DNO participation in the energy market would have taken place from July 2016 until September 2017.

(a) Accelerates the development of a low carbon energy sector & has the potential to deliver net financial benefits to future and/or existing customers

This project aimed to accelerate the development of a low carbon energy sector through improving energy efficiency for customers, reducing the need for network reinforcement and avoiding curtailment of renewable generation (by making additional network capacity available). We were concerned that the degree to which the project could provide net financial benefits was uncertain.

[21] The minimum required is 1200.

Carbon benefits

This project could have facilitated several aspects of the Carbon Plan, particularly the decarbonisation of electricity generation. The local energy market would have sought to match local demand and generation. Part of this matching of generation and demand would be through the use of water storage heaters at times of peak solar PV output. This could have reduced the likelihood of network constraints and so maximise the delivered output of renewable generation (ie curtailment is avoided). This could result in greater utilisation of existing network assets and enable more LCTs to connect to the network. The project would also have promoted energy efficiency, potentially reducing energy demand.

SPM estimated that as a result of DSR and demand management, it could defer network reinforcement on the Anglesey network by up to nine years. SP has not provided an estimate of the Great Britain benefits but based on the forecast capacity released by the trial and the estimated roll out to 40 sites, it appears the method could release up to 25.9MW on a Great Britain scale if rolled out.

It also estimated that the capacity could have been released in three years compared to four years for traditional reinforcement. We note that some assumptions on the uptake of energy efficiency, including a 0.9% reduction in the total load on Anglesey, and demand response are necessary to realise these benefits.

Net financial benefits

We were concerned, and noting the expert panel's concern, that the financial benefits of this project were not well explained. We note that the base case costs in this instance was the cost of the reinforcement required in Anglesey, which may not be the same when replicated across Great Britain. SPM has estimated a saving of £158.4k a year for the duration of the avoided reinforcement. It is unclear how this figure has been derived. We also noted that the financial savings are relatively small considering the cost of the project. These benefits are reliant on the anticipated load reduction and load shifting being realised.

SPM also estimated that involvement in the project could have resulted in a net financial saving of £181[22] per year on each participating customer's energy bill. This saving would have been made through energy club payments (as suppliers are not involved in this project). We note that if the energy club is not able to recruit sufficient membership, then the viability of the business model is reduced and the ability of the solution to avoid reinforcement is curtailed. We also note that these figures are not definitive and one of the objectives of the project is to establish a detailed cost benefit model.

During the second bilateral, SPM estimated that the solution could be replicated at 40 sites across Great Britain. However, this replication would be dependent on the

[22] This figure is based on a total saving of £280 from energy efficiency savings, time of use savings and payments from the DNO for DSR services less a £99 membership fee.

success of the energy club. SPM estimated that the net financial benefits of this would be £426m.

(b) Provides value for money to distribution customers

As noted above the financial benefits of this project were uncertain. While we note that the benefits case would have been refined by the project, we consider there to be significant risk that these figures would not be realised. Consequently, we were concerned that this project has not demonstrated that it represents value for money for distribution customers, particularly considering the high level of funding requested and the uncertainty surrounding the benefits.

We were concerned that the total cost to the project for some partners appeared high, particularly for the universities. We note that in the resubmission, the number of person days allocated to Bangor University reduced and their cost to the project was revised from £1,291k to £896k. We also note that the overall cost of Durham University has increased and the cost of the other partners has remained the same in the resubmission.

The roles and responsibilities of these partners were not particularly well defined. We note that partners have been selected on the basis of specific criteria. It is unclear, however, the extent to which partners were selected through an open process. This may account for the high costs of some partners. In total, following the resubmission, the proposal involves roughly 60 person years of effort with associated cost of £4.82m, which appeared high.

We were pleased to note that Menter Mon would competitively tender for the home automation equipment. The cost of supplying and installing this equipment was estimated at £270k.

Part of the project would have been to investigate the network problems that need to be addressed. As such, SPM did not yet know what network equipment would have been required. It was therefore difficult to determine whether the funding requested for this equipment represented value for money.

We considered that, due to the innovative nature of this project and key role of not-for-profit groups, this solution is unlikely to be trialled without LCN Funding.

(c) Generates knowledge that can be shared amongst all DNOs

We considered that this project could have provided very useful learning on the role of social aggregators and third party community engagement. However, there was uncertainty regarding the wider applicability of that learning. This concern was shared by the expert panel who felt that the learning may not be taken up by other DNOs.

This project could have provided useful learning on the role a social aggregator could play in engaging communities to provide services to the DNO. This is an area that has not been extensively explored in previous trials. It would have developed learning on the potential for a market model, and equipment required to locally balance generation and demand. Additionally it could have developed learning on the ability of communities to play a more active role in energy management. The project could have also provided learning on the more active role DNOs could play when engaging with their customers and acting as a DSO.

There was, however, uncertainty over the applicability of new learning from this project. We also note the island nature of Anglesey's distribution network. While the network learning would be applicable to other networks, the degree to which it is applicable to more interconnected systems, that serve users with different social characteristics, is uncertain. There was also a lack of clarity over the specific network problems that this project would seek to address. We note that in the second bilateral, SPM estimated the number of areas for Great Britain rollout as 40.

The project had appropriate plans for capturing learning and we note that the project would have built on the dissemination techniques used in other SP projects (ie Flexible Networks for a Low Carbon Future and Accelerating Renewable Connections). The methodology identified dissemination tools such as internal and external workshops. SPM indicated that base lining and recording of trial results is a fundamental part of the knowledge capture. We note that network monitoring equipment would be used to record the network impacts.

SPM indicated that it would conform to the default IPR arrangements.

(d) Involvement of other partners and external funding

We consider that this project has an appropriate group of partners. The process taken to recruit partners was however unclear and we note that the partner contributions are roughly 5.4 percent of the total cost of the project.

We consider that the partners have appropriate expertise to deliver the project. The project involved an enthusiastic and trusted local entity, Menter Mon. As noted above, SPM has provided the criteria each partner was required to meet. It was unclear however if a competitive process was involved. SP has stated that the level of partner contribution is £722k, or 5.4 percent of the project. Therefore, the proportion of funding for this project requested from distribution customers is relatively high. This and the high costs of some partners have led to concerns, noted by the expert panel, that this project does not represent value for money. It appeared that the partner contributions were relatively secure with responsibilities for each partner already agreed.

SPM did not detail its approach to selecting what project ideas are put forward to the competition.

(e) Relevance and timing

Overall this was a timely project. Increasing numbers of community energy initiatives are likely as Great Britain transitions to a low carbon economy. As such, projects that seek to coordinate these developments with the local electricity network are timely. We note that the project is particularly timely on Anglesey, where significant network reinforcement is likely to be required in the near future. We note the expert panel's concern that the network problems are currently not properly defined.

SPM has stated that the learning from this project could be used to inform network designers of alternative methods of planning reinforcement. SPM has also identified its internal dissemination approach, including the incorporation into business practices.

(f) Demonstration of a robust methodology and that the project is ready to implement

We considered that parts of the project's methodology were not robust, as the business model was not going to be fully tested.

We were concerned that the project would not robustly prove the solution. This concern was in two parts. Firstly, some of the domestic customers (600) would not necessarily be opting into the trial. As social tenants, they would be participating as a result of the housing association choosing to participate. Additionally, the proposed business model hinges on customers paying a £99 annual fee. This would not have initially been charged to the participating customers. SPM stated that the business model would be refined during the project. However, we were concerned that the project would not adequately test the willingness of customers to participate in the business model which is vital to properly test it for future rollout. As such, it is uncertain that the project would deliver the financial benefits claimed.

We note that SPM has not requested any protection from cost over-runs.

It appears that the project would have been ready to begin in a timely manner. SPM identified a core team and additional staff would be available if the project is funded. We note that early community engagement had already begun. SPM has identified an appropriate governance structure with a steering board, which would have the power to recommend that the project be suspended in certain circumstances.

Customer impacts would have been limited to customers having home automation installed. Customers may have received a financial reward to compensate them in the event of the installations causing disruption. SPM estimated that there would have been no increased risk of unplanned interruptions to customer supply.

The project had a risk register that listed key risks, mitigations and contingency plans. The project also had a project plan, with details provided for each work stream. Each work stream had a party assigned who would have had responsibility for delivering the workstream.

The SDRCs were SMART and well defined.

Clean Energy Balance - Circumventing Electricity Network Constraints (Western Power Distribution)

Introductory note

Clean Energy Balance (CEB) was a cross industry venture, the funding for which was requested from a proposed LCN Fund project, a Gas NIC project and the Network Innovation Allowance (NIA). Each project was assessed separately against their respective Governance Documents. The assessment in this section relates to the submission made to the LCN Fund 'CEB – Circumventing Electricity Network Constraints'.

Where there is a local constraint on the electricity network, part of the LCN Fund project would have used an electrolyser to use excess electricity generated from a wind farm to produce hydrogen. The Gas NIC project would then test hydrogen storage and the injection of hydrogen into the gas distribution system (resulting in a 2% hydrogen 98% natural gas mix).

Project overview

This project would have attempted to maximise the output of renewable generation which would otherwise be curtailed due to network constraints. It would have used a variety of novel methods, most of which involve electrolysis to produce hydrogen. The electrolyser would have been sited next to a wind farm and would use electricity that would otherwise not have been produced due to curtailment of the wind farm at times of network constraints. The project would have explored the interaction between the electricity and gas systems - the hydrogen produced would either be used in an on-site gas engine to produce electricity (once the network is no longer constrained), or injected into the gas distribution network.

The project would have trialled seven methods.
1. a generation constraint scheme;
2. the use of the electrolyser to allow gas engine enabled peak shifting;
3. constraint circumvention by injecting hydrogen into the gas network;
4. a network arbitrage model which combines the previous methods;
5. the use of CHP units as a means of avoiding reinforcement by increasing load; and
6. two separate and distinct trials exploring the end to end value chain of all the previous methods.

As part of the trials Western Power Distribution (WPD) would have operated a demand zone and a generation zone. The demand zone would have included two commercial CHP units and 50 domestic micro-CHP units. These would have been controlled by a local control system to coordinate generation with demand. The generation zone would have included a 6MW wind farm (with a 1MW firm/5MW non-firm connection to the distribution network), a 1MW electrolyser, a hydrogen store, a gas injection module and a 1.4MW gas engine. A micro grid control system would have sought to control and maximise the efficiency of the equipment in the generation zone, with the ultimate aim of avoiding curtailing the wind farm generation. The system would have used data from weather forecasts, available

network capacity (gas and electricity), electrolyser operation, gas engine operation and available gas storage to achieve this.

The project involved strong engagement from the local community, with the planned wind farm in the generation zone being funded by a local energy cooperative.

The trials planned to run from April 2016 until September 2017.

This project would have been managed by Toshiba on behalf of WPD.

(a) Accelerates the development of a low carbon energy sector & has the potential to deliver net financial benefits to future and/or existing customers

This project could have facilitated the aim set out in DECC's Carbon Plan to decarbonise the generation of electricity. We agree with the expert panel that, based on the evidence provided, there was considerable uncertainty that this project would have provided net financial benefits to electricity distribution customers.

Carbon benefits

This project aimed to facilitate the decarbonisation of electricity, by increasing the generation capacity factor of renewable generation connected to constrained network. This would have been achieved through the use of electrolysis and constraint management to avoid curtailing renewable generation, in this instance a wind farm. The carbon benefits arise from maximising the renewable generation output and displacing other higher carbon sources of supply.

Additionally, the project would have supported the decarbonisation of heat by promoting the use of CHP units. The CHP units would have been used to match local electricity demand with the aim of avoiding the need for urban electricity network reinforcement. WPD proposed that a reduction in grid connection costs for generators through the methods trialled by the project could have lead to an increase in the number of renewable generation schemes.

WPD estimated that, combined, the methods trialled could release 56.6MW of capacity at the trial scale. Of this capacity, 50MW is released by the constraint scheme, 3MW by the electrolyser and 3.6MW by the use of CHP. WPD has also estimated that this capacity could be released in 7 to 12 months[23] compared to 24 months for traditional reinforcement. Additionally, WPD estimated that rollout of the combined methods could be applied to 92 sites by 2019. WPD did not quantity the benefits of this wider rollout.

[23] This is for a combination of all of the methods.

Net financial benefits

WPD estimated that, for the combined methods, there was a net financial benefit of £4.5m compared to the base case of reinforcement at the trial scale. The base case for the benefit is the 6MW £7.4m connection cost involving traditional network reinforcement. We noted that the case for future benefits relies on the connecting customer paying for the gas engine and the CHP units being funded entirely by the domestic or I&C customers. We also noted that the majority of the revenues to create the financial benefits rely on the generation of electricity by the gas engine and the use of the electrolyser to provide a demand response service.

We and the expert panel had concerns that it was unclear when these methods would be the most economic connection option and that the overall benefits case for the methods was unclear.

WPD has not estimated the potential net financial benefit were this method to be rolled out across Great Britain. It is unclear that this project would provide financial benefits in the near future as numerous uncertain assumptions would need to be realised. Particularly that a significant proportion of the wind farm's output would be provided to the electrolyser at a value of £0/MWh.

(b)Provides value for money to distribution customers

As noted above we consider there was uncertainty that the financial benefits of this project would be realised. Consequently, we were concerned that this project had not demonstrated that it represented value for money for distribution customers, particularly considering the high level of funding requested. We were also concerned by the lack of competitive processes to identify partners and the degree to which the costs for the project represented value for money.

WPD stated that the methods could have reduced connection costs for renewable generation and potentially been the basis of a business model that does not require DNO involvement. WPD also stated that the adoption of CHP enabled by this method could have resulted in a reduced need for urban network reinforcement. As discussed above, the potential for net financial benefits resulting from this project was uncertain. There was particular uncertainty around the number of sites where the method would be more economic for the generator than a full connection or a constrained flexible connection.

We noted that most of the project partners were not selected through a competitive process. We were therefore somewhat concerned at the value for money they provided to the project. We note that Toshiba had sub-contracted the trial management work to its Telecommunications Research Lab (TRL) and project management to Cornwall Development Company (CDC). We did, however, note that each partner would provide a contribution of 10% of the contract value. The supplier for a key component of the project, the IT systems were selected through a competitive process.

We considered that some aspects of this project are innovative and as such are unlikely to be undertaken by DNOs as part of their business as usual operations.

(c) Generates knowledge that can be shared amongst all DNOs

We considered that the project could have provided some new learning that could have been shared amongst all DNOs. However, we also considered that the usefulness of the new learning may be limited, given the uncertainty over the economic replicability of the solution.

We considered that the project could have provided commercial and technical knowledge about the use of controllable demand (eg electrolysers) for managing network constraints. These views were shared by the expert panel. We also considered that new learning could have been developed on the potential of hydrogen as an energy vector to circumvent electricity network constraints, both in time (via use of hydrogen storage and a gas engine) and location (via use of the gas network). It could have also provided learning needed to make the methods viable as a business model for other generators. As noted above, it was uncertain that this business model would be an economic alternative to traditional reinforcement or a constrained connection. We also noted that WPD has stated the business model would likely be deployed by the renewable developer, rather than the DNO. We were uncertain that community groups would possess the commercial tools to make this business model viable.

We considered that the project had appropriate learning dissemination plans and methodology to capture learning. WPD had identified the key interested parties and the particular aspects of the project that each party would be interested in. There is a clear plan for dissemination, involving range of events, learning reports on each stage of the project and other dissemination techniques. We noted that data related to the project would be available to interested parties through a web portal.

WPD indicated that it would conform to the default IPR arrangements.

(d) Involvement of other partners and external funding

We considered that this project involved some appropriate partners, but note the expert panel's concerns regarding the absence of key partners during the bilateral meetings and the lack of an experienced renewable developer in the project.

We consider that the project partners would have brought expertise to the project. However, the involvement of an experienced renewable developer could have been beneficial. We also noted that each partner was to provide a contribution of 10 percent of their contract value and that ITM power was providing its services at cost. Toshiba would have provided the energy management systems and managed the overall project. It would have been supported in managing the project by Cornwall Development Company (CDC). The project involved Wadebridge Renewable Energy Network (WREN), a community energy cooperative that is funding the wind farm.

We were concerned that most partners were not selected in a competitive manner. WPD has stated that it was approached by Toshiba with the idea for the project, and the proposal was then scrutinised, alongside other proposals. As noted above, each partner was to make a contribution worth 10 percent of their contract value. The partners were committed to the project and the external funding appeared secure. While this was appropriate for some partners, it appeared low for others, particularly when considering the potential commercial and first mover advantage that involvement in this project could have provided. Toshiba had sub contracted work to CDC and Telecommunications Research Laboratory. It was unclear what steps were taken to ensure each partner's involvement represented value for money.

We were also concerned that the proportion of total project cost being requested from the LCN Fund is high. We noted that if the sites continue to operate after the trial the main beneficiary would be WREN as it is able to continue operation of the wind farm. Its contribution to the project was £22k.

(e) Relevance and timing

We considered this to be a relevant project. The connection of renewable generation is relevant to all DNOs. The possibility of making use of capacity in the gas network, considering the potential reduction in gas demand due to the electrification of heat, is relevant. However, we note the expert panel's concern that the solution may not be relevant to other DNOs and would likely be undertaken by the generator.

DNOs are currently facing challenges caused by the impact of low carbon generation on their networks. We considered aspects of the project which are seeking to reduce these impacts on the network, while maximising low carbon generation, to be timely.

WPD did not identify how it would use the outcomes of this project to inform its future business planning.

(f) Demonstration of a robust methodology and that the project is ready to implement

The project had detailed plans, risk logs and mitigations identified, although we noted the uncertainty around the renewable generation planning permission.

CEB had a detailed project plan that identified phases, tasks and subtasks with responsibilities assigned to partners. WPD also identified the governance structure for the project. This included a project review board.

While the project had a detailed plan for delivery and learning capture, this is a complex project that would have required good coordination to overcome issues that arose. We note the expert panel's considerable concern regarding the complexity of the project. We also note that there was uncertainty that the proposed generation projects[24] would proceed. While WPD had identified mitigations, we considered that this risk could cause significant disruption to the project. We also noted that the wind farm would not commence a planning application process for another year. If the

[24] For the project, the renewable generation would be a wind farm (with a solar PV farm as contingency).

planning application were unsuccessful, considerable disruption could have been caused to the project which would already have expended funding. WPD has stated that if the uptake of LCTs is lower than expected, the project would still deliver learning on improving efficiency of network operations.

We noted the expert panel's concern regarding the CHP units. Their role in relation to the overall constraint management is unclear and adds complexity to the project. This increases the risks to project delivery.

WPD and the project partners have conducted extensive planning work and all partners were committed to mobilisation within five months. As such, it appeared the project could begin in a timely manner. The level of resource requested appeared sufficient to deliver the project. WPD identified that access to contingency funding would need to be approved by the project steering board. The contingency for the project was 10 percent of the total cost.

WPD identified how the costs and benefits have been estimated. As discussed above, we considered that there was considerable uncertainty in these estimates. WPD has provided details of the measures taken to ensure accuracy of the information contained in the bid. This included independent peer review.

The project would have involved some customer impact. This disruption would have been for customers who volunteered to have micro-CHP units installed in their properties. This disruption would have involved electrical wiring work, plumbing work, noise and disconnection of heating and electricity supply during installation. WPD recognised that customers would need to be aware of the impacts before they signed up. WPD also identified a small risk of additional unplanned interruptions to supply as a result of the project.

The SDRCs were SMART but very focused on learning outcomes of the project. It was of particular concern that successful commissioning of the methods was not a SDRC.

WPD identified the processes that are in place to decide when the project should have been recommended to us for suspension. This would have involved a delivery confidence assessment.

The project had a comprehensive risk register with detailed mitigations and mitigation action plans identified.

Eta: Creating Efficient Distribution Networks (Electricity North West)

Project overview

This project aims to use innovative techniques to control and optimise the voltage on the HV and LV networks in real time. With the transition to a low carbon economy, DNOs are likely to experience increasing numbers of clusters of LCTs connecting to these networks. This in turn could result in statutory voltage limits being breached. Where voltages breach these upper or lower limits, DNOs are usually required to conduct expensive network reinforcement. Voltage is not currently actively controlled on LV networks in Great Britain.

The project will use two types of switching and monitoring devices, the 'Weezap' and the 'Lynx' (both developed by project partner Kelvatek), to facilitate centralised control of LV networks. This equipment will be used to interconnect radial LV networks and remotely reconfigure the LV network to 'smooth' the voltage profile and improve power flows. Remotely controlled capacitors on the LV networks will then optimise the voltage. These will be coordinated with existing voltage control at the 33/11kV substations. The project will use network management software (provided by project partner Siemens) to seek to coordinate and control these interventions automatically. If this is successful, network reinforcement could be deferred or avoided.

The control of network voltage will also allow the project to explore 'Conservative Voltage Reduction' (CVR). This technique uses the relationship between voltage and demand to purposefully reduce the voltage on a LV network to reduce demand. This could result in customers consuming less energy, a reduction in network demand peaks and a reduction in network losses. The project will test whether these reductions could be achieved.

The project will consist of a two year field trial. The trial will be conducted using an on/off methodology. This means that for a defined period of time (eg 24 hours) the project will use the new voltage control techniques and for the next 24 hours, the new techniques will not be used. The project will then gather data on the performance of the network under the trial regime and normal operation.

The project will be trialled across five 33/11kV and 40 11kV/415V substations (10 HV circuits and 160 LV circuits) in Manchester, Wigan and Wigton.

(a) Accelerates the development of a low carbon energy sector & has the potential to deliver net financial benefits to future and/or existing customers

If successful, the method trialled in this project will have the potential to provide net financial benefits to existing and future customers and provide a strong contribution to the development of a low carbon economy.

Carbon benefits

This project will facilitate the aim set out in DECC's Carbon Plan to decarbonise the generation of electricity. The method will use voltage control and interconnection of LV circuits to maintain network voltages levels and increase capacity on these networks. This could reduce barriers to the connection of LCTs to the distribution network by potentially avoiding the need for reinforcement. ENWL has estimated that network capacity could be released four times faster and 40 percent cheaper than traditional network reinforcement.

Voltage control and a controlled reduction of customer voltage could reduce customer demand and energy consumption. The potential benefits of this are threefold. Reduction in energy demand could result in a lower requirement for carbon intensive peaking generation plant, customers could experience lower energy bills as a result of lower consumption and peak network demands could be reduced, avoiding the need for network reinforcement.

The Eta method of voltage control has the potential to become an alternative to network reinforcement. ENWL estimates that the method could provide up to 9.61MW of capacity at a trial level, 2,985MW of capacity at DNO level and up to 39,630MW of capacity at Great Britain level. ENWL has estimated that the solution can typically be implemented in 11 months, compared to 44 months for traditional reinforcement.

Net financial benefits

ENWL has identified that this method, at the trial scale, provides a net financial benefit of £732,688 compared to traditional reinforcement. It has also stated that, at Great Britain scale, the Eta method could save customers up to £8.6 billion. These potential savings will be realised by customers through reduced energy use and reduced distribution charges, as reinforcement is avoided. While these benefits are based on conditional assumptions, the potential benefits are substantial.

This method is highly replicable across Great Britain, (although we note the voltage demand relationship depends on the demand characteristics in a specific area). ENWL has estimated that this technique could be applicable at 6,656 sites across Great Britain.

(b) Provides value for money to distribution customers

Given the level of funding proposed in the re-submitted full submission, we consider that this project provides clear value for distribution customers. The approach could either defer the need for network reinforcement or remove it altogether. This will lead to a reduction in costs for customers. The learning is also clearly applicable to distribution networks in terms of active voltage control on the LV network, the voltage/demand relationship and the potential for reducing peak demand.

We note that all project partners, apart from Kelvatek, have been selected in an openly competitive manner. Kelvatek has been selected as it is the manufacturer of the key enabling technologies for the project (Lynx and Weezap). Kelvatek is providing a substantial financial contribution to the project, £1,516,300, which is 48 percent of its total cost. This contribution is mainly in the form of discounts on equipment. We consider this level of contribution is appropriate.

The expert panel were initially concerned that some aspects of the proposal did not represent value for money, particularly customer surveys. The panel noted that customer perception of changes in voltage was already being monitored in the CLASS project. The panel were also concerned by the level of contribution from Siemens who could potentially benefit from their involvement in the project. In the resubmission, ENWL removed customer surveys and associated costs noting that customer perception to changes in voltage will be recorded through surveys funded by the CLASS project (as these projects will coincide). The contribution from Siemens also increased. These factors combined resulted in the funding requested from the LCN Fund being reduced by £500k. We consider these arrangements appropriate.

ENWL has set out that it will competitively tender for the products and services not supplied by partners. These costs include procurement of the capacitors and the installation of equipment.

We are pleased to note that ENWL's labour costs have been benchmarked against the cost of external delivery.

We consider that the project is innovative and of a sufficient level of risk that it is unlikely to be undertaken in the absence of LCN Fund support. The majority of LV networks in Great Britain operate in a radial configuration. This project will seek to demonstrate that interconnecting these networks and using voltage control technology can provide network benefits. This is not something that has been trialled in Great Britain previously. In its submission, ENWL has stated that innovation funding is required to test this method in a trial setting, allowing technical and operational risks to be minimised. It also stated that the significant changes to systems and processes will not be contemplated without innovation funding. We also note that the use of capacitors on LV networks is unproven in Great Britain.

(c) Generates knowledge that can be shared amongst all DNOs

This project will generate significant new learning on the interconnection and automation of LV networks, the impact of voltage control on the LV network and the ability to control demand and connect additional LCTs, and the network management

systems required to coordinate these. We note that the use of capacitors on LV networks is particularly innovative. Additionally, useful new learning could be generated on network operation in terms of how voltage control impacts on power quality, losses and available network capacity. This is applicable to all DNOs. ENWL has estimated that the method is applicable to 72 percent of Great Britain LV circuits.

The trials will follow an on/off methodology. As such, the trials will operate for a defined period of time and then the network will operate normally for the next period. This allows the network operation during the trial to be compared directly to the same section of network operating under current conditions. This approach is appropriate to test the performance of the method. ENWL has identified the monitoring equipment that will record the performance of the network.

ENWL has put in place appropriate plans for knowledge dissemination with a separate, well thought out work stream and a specific budget for capturing results and disseminating learning. It has identified the key audiences, including customers, DNOs, academia and wider industry. It will use a range of dissemination tools, both externally and within ENWL, and has clearly defined tools for each audience.

We note that ENWL has confirmed that the project will conform to the default IPR conditions.

(d)Involvement of other partners and external funding

This project involves a relevant group of project partners. They provide appropriate expertise, including in academic and technical areas.

We also note that external funding is secure, with terms and conditions agreed, and that major project partners have made contributions to the project. We are pleased to see Kelvatek and Siemens' external funding contribution of £1,516,300 and £400,000 respectively, given that there will be benefits to these parties. As noted above, Siemens' contribution increased when the project was resubmitted. These contributions are partly in kind and partly financial. We consider these contributions appropriate.

Collaboration between DNOs and other parties in the energy supply chain is a central objective of the LCN Fund and we are pleased to note that most of the project partners, have been selected in an openly competitive manner. When developing the project, ENWL published an expression of interest on the Energy Networks Association's (ENA) LCN Fund Portal as well as Requests for Information for the supply of capacitors and optimisation software.

(e)Relevance and timing

This project could potentially facilitate the connection of DG and LCTs by releasing capacity on existing network assets in a timely manner. Clusters of LCTs are already beginning to impact on LV networks. As such, projects seeking to address this issue are highly relevant and could feed into business planning for the RIIO-ED2 period. ENWL has identified, as part of its SDRCs, that by the end of the project, the Eta method will be ready for use within its normal business practices for addressing clusters of LCTs.

This project is timely, and could provide valuable learning in this area.

(f) Demonstration of a robust methodology and that the project is ready to implement

Eta has a detailed project plan, clearly breaking down the project into eight phases. Each of the phases and their outcomes are described. The consortium is well structured and we are pleased to note that all partners have agreed to work schedules and terms and conditions or framework agreements. The roles and responsibilities of each project partner have been clearly defined. The project management structure, which builds on experiences of ENWL's Capacity to Customers and CLASS projects, is appropriate. This approach, combined with senior management support and detailed initial work means the project is ready to be implemented. We consider ENWL has put in place sufficient resources to deliver the project.

Eta will have a dedicated management accountant to manage costs and report in line with ENWL's standard policies and frameworks. ENWL has also proposed an appropriate level of contingency.

We consider that this project has a strong methodology. It is technically feasible as it builds on previous IFI and First Tier LCN Fund projects. The project's methodology also builds on international examples. ENWL has stated that statistical methods will be employed to select the LV circuits used in the trials. We also note that the trial locations have been selected to include dense urban, urban and rural networks.

There could be some customer impacts associated with the project. The installation of some equipment may result in planned interruptions to supply. ENWL will avoid these where possible but if necessary, these interruptions will be handled in line with ENWL's standard practice. This involves contacting all customers affected. The project will not impact customer appliances as voltages will be maintained within statutory limits, within which appliances are designed to operate. As noted above, customer perception to changes in voltage will be recorded by surveys funded by the CLASS project.

The Eta risk management process uses the standard ENWL process. A detailed risk register has highlighted a range of risks and appropriate mitigations and contingencies.

The SDRCs are SMART, well defined and linked to the outputs in the project plan.

Flexible Urban Networks – LV (UK Power Networks)

Project overview

The decarbonisation of heat and transport will put an increased strain on the LV network. It will become increasingly difficult to maintain power quality within the voltage limits and in many cases there may not be sufficient spare capacity on the existing circuits, requiring them to be replaced. In response to this challenge, the project will seek to optimise capacity on existing LV networks through interconnection with adjacent LV networks - so that capacity and power flows could be shared between them. This will make the network more flexible and resilient, allowing more capacity to be released. In this way, the project will aim to reduce connection time and cost on these networks.

The project will involve three methods. Method one will involve connecting two radial LV circuits via a link box switch. Method two will involve the use of a power electronic (PE) device to connect two radial LV circuits. Method three involves connecting three LV circuits with a PE device. The PE devices will allow control of the direction and magnitude of real and reactive power flow between substations. All methods will allow capacity to be shared between the substations connected. Each of the methods will be stand-alone and the project will seek to understand under what circumstances each of the methods is the best intervention.

The trials will involve 36 sites, 24 in London and 12 in Brighton. Each method will be tested on 12 sites. The trials will run from Q3 2015 to Q3 2016. The project will be delivered by UK Power Networks (UKPN).

(a) Accelerates the development of a low carbon energy sector & has the potential to deliver net financial benefits to future and/or existing customers

By releasing capacity on LV networks, this project could facilitate cheaper and faster connections for LCTs, such as solar PV, heat pumps and electric vehicles. We consider that this project could facilitate the Carbon Plan and deliver net financial benefits to customers.

Carbon benefits

Increasing load in urban and suburban areas is likely, particularly due to the emphasis on decarbonisation of heat and transport in the Carbon Plan. Much of this extra load will be connected to the LV network. As such, releasing capacity on this network quickly and cheaply could enable LCTs to connect more quickly, facilitating the Carbon Plan. The PE devices will also allow power quality to be controlled, mitigating the impacts of some LCTs on the network.

UKPN has estimated the average capacity released by each installation. It estimates that method one will release 200kW of capacity, method two will release 240kW of capacity and method three will release 400kW of capacity. UKPN has estimated that

method one and two could release this capacity in one month, compared to 18 months for traditional reinforcement. It has also estimated that method three could release capacity in three months, compared to 24 months for traditional reinforcement. UKPN has estimated that the solutions could release up to 162MW of capacity by 2027 if rolled out across Great Britain. This capacity could be used to provide cheaper and quicker connections for LCTs. The estimate is based on the methods being deployed on a total of 577 substations a year from 2017.

Net financial benefits

UKPN has estimated that the financial benefit of the methods at the trial scale is likely to be £1.8m–£3.6m. We note that while the methods release capacity quicker, they do not release as much capacity as is typically created by traditional reinforcement. The net financial benefit of the methods when releasing the same capacity as traditional reinforcement is £586k at the trial scale. While these benefits are subject to assumptions (including a modest cost reduction for PE devices) and network topology, we consider that, based on the evidence provided, they appear robust.

UKPN has estimated that the benefits, if the methods are rolled out across Great Britain, are likely to be £112.7m by 2027 based on a total deployment of 577 substations a year.

(b)Provides value for money to distribution customers

We consider that this project provides value for money to distribution customers.

The expert panel was initially concerned by the day rates of some project partners. Consequently, one partner reduced its day rate and another increased its contribution to the project in the resubmission. This has resulted in a reduction of the funding requested from the LCN Fund by £161.9k. We consider the revised number of person days and rates to be appropriate for the scale of the project.

UKPN has provided a detailed breakdown of costs and provided justification for each category. These costs appear reasonable and UKPN will undertake competitive procurement process for the PE devices. UKPN will also conduct a competitive tender process to identify a contractor for work stream four. This work stream is to develop the cost benefit analysis for the project.

As PE devices have not been used to interconnect LV networks before, we consider that this project is sufficiently innovative to warrant LCN Funding.

(c) Generates knowledge that can be shared amongst all DNOs

We consider that this project will generate new knowledge that can be shared amongst all DNOs.

The use of PE devices to interconnect radial LV networks has not previously been trialled on Great Britain's distribution networks. As such, this project could develop significant new knowledge in the devices application on Great Britain's networks and the ability to release capacity on existing networks. The potential of increased uptake of LCTs could increase load on LV networks across all DNO areas. As such, the devices and techniques for releasing capacity could be applicable to all DNOs.

UKPN has outlined its plans for knowledge dissemination and stated that these plans build on learning from its previous LCN Fund projects25. Knowledge capture and dissemination is one of the five project work streams. UKPN has identified areas of learning (ie technical learning on the PE devices and network performance), dissemination activities and key audiences. The project will also partner with the Institution of Engineering and Technology for dissemination. We consider these plans appropriate.

We note that the project has indicated that it will conform to the default IPR arrangements.

(d) Involvement of other partners and external funding

The project has an appropriate group of partners who provide relevant expertise to the project. Most of these partners have worked with UKPN on other projects. We note that project partners were not recruited in a competitive way and the expert panel's concern regarding some partner costs. We and the panel consider that the increased partner contributions in the resubmission have allayed this concern.

The level of external funding provided to the project is £518k. This funding appears to be relatively secure. We note that confidentiality and framework agreements are already in place with most partners. We are also pleased to note that UKPN is providing an extra contribution of £961.2k above its compulsory contribution.

UKPN has identified the process followed to identify and select project ideas. Seven ideas were originally considered and these were assessed by UKPN against perceived gaps in existing LCN Fund learning. This review resulted in the two projects identified[26] being submitted.

We were concerned that partners had not been selected in a competitive manner. However, UKPN has explained the rationale for selecting each partner, including the relevant expertise and funding they bring to the project.

[25] UKPN has three second tier projects; Low Carbon London, Flexible Plug and Play and Smarter Network Storage.
26 The other project submitted by UKPN being Vulnerable Customers and Energy Efficiency.

(e) Relevance and timing

This project is timely, and could provide valuable learning in the relevant area.

UKPN stated that during RIIO-ED1, DNOs will need to spend £500m reinforcing the LV network and it is expected that learning from this project can avoid some of this expenditure.

This project could potentially facilitate the connection of DG and LCTs by releasing capacity on existing network assets in a timely manner. Clusters of LCTs are already beginning to impact on LV networks and accelerating the need for reinforcement. UKPN has stated that, if proven, it expects this solution to form part of its normal business practices before the end of RIIO-ED1.[27]

UKPN has stated that PE devices are now at an appropriate level of readiness for them to be trialled safely on the distribution network, with the expectation that future costs of the devices will reduce due to increased demand and competition.

(f) Demonstration of a robust methodology and that the project is ready to implement

We consider that the project has a robust methodology and is ready to implement.

UKPN has provided a very detailed project plan, which breaks down the project into five work streams. There are detailed descriptions of the sub-work streams, identifying the key tasks, outputs, interdependencies and roles and responsibilities for each. We consider that UKPN has the necessary resources and expertise to deliver the project.

This project is ready to implement. A key part of (and potential risk to) the project is the procurement of PE devices for method two and method three. UKPN has already completed an open competitive process for these devices. Preferred suppliers have been identified and final specifications and prices are being agreed. We note UKPN received a strong response to its initial tender for PE devices. UKPN has also begun procurement for supporting equipment and IT systems. Additionally UKPN has identified a number of the trial sites already. These preparations are reasonable and sufficiently mitigate the risks of delay in procurement affecting the project. The project has a detailed risk register with mitigations and contingencies identified.

We and the expert panel was concerned that, given the innovative nature of the application of PE devices, suppliers may be reluctant to provide warranties for their products. In its presentation to the expert panel, UKPN confirmed that warranties will be obtained from any selected supplier.

The expert panel also noted that in order for the learning to represent value for money, it was important that information on the performance of these devices was widely shared, something the supplier might be reluctant to do. This could undermine the robustness of the learning from the project. In its resubmission, UKPN

[27] The ED1 period ends 31 March 2023.

has committed to report on the reliability and performance of the PE equipment (through the SDRCs).

We consider the project has a robust methodology. The trials will run on 36 sites with 12 sites per method. These sites cover a range of urban LV networks.

UKPN will manage costs through governance procedures and project management arrangements including a steering group, monthly reporting arrangements and risk reviews. It has also included an appropriate level of contingency. It was demonstrated through the bilaterals that the project has significant senior management 'buy in'.

UKPN has also identified the steps taken to ensure that costs and benefits have been estimated reasonably. We consider the steps taken to be appropriate. A benefit range has been identified for each method, based on different scenarios.

UKPN has indicated that there will be minimal customer impact from this project. There are no planned interruptions to supply and no increased risk of unplanned interruptions.

The revised SDRCs are SMART, linked to the project plan and relate to significant project milestones and important learning.

Solent Achieving Value from Efficiency (Southern Electric Power Distribution)

Project overview

This project will test a range of energy efficiency approaches and measures with domestic customers. The aim of these measures will be to reduce demand and so alleviate constraints on distribution networks and postpone or negate the requirement for network reinforcement. Their use could also be expected to lead to a reduction in customers' energy bills.

The project will trial four methods.[28] These are:
1. the installation of light-emitting diode (LED) bulbs;
2. a concentrated data informed engagement campaign, involving provision of individual energy usage information and local network capacity;
3. a series of DNO price signals direct to customers with data informed engagement; and
4. community coaching.

For methods one to three, the project will recruit 3000 customers as trial participants and another 1000 customers to act as a control group. The final method, community coaching, will be targeted at two small communities of around 1000 homes.

These trials will attempt to understand the effectiveness of approaches to encouraging electricity demand reduction or shifting demand. They will also attempt to quantify the effectiveness of the methods themselves, including the level of incentive required, to alleviate network constraints. The outcomes of the trials will be used to inform and develop a network planning model for use by distribution network planners. The tool will also incorporate learning from other related LCN Fund trials. The tool will highlight the circumstances when energy efficiency interventions are a viable alternative to traditional reinforcement for alleviating network constraints.

The first iteration of the trials will run from January 2016 to December 2016. A second iteration of the trials will run from January 2017 to December 2017 and will attempt to incorporate lessons learned in the first iteration. These trials will be preceded by a period of network monitoring to understand the constraints on the network and to aid quantification of the trials results. The project will be delivered by Southern Electric Power Distribution (SEPD).

(a) Accelerates the development of a low carbon energy sector & has the potential to provide net financial benefits to future and/or existing customers

We consider that this project could facilitate the goal of the Carbon Plan to improve

[28] The original project submission contained five measures, titled methods. During resubmission, SEPD removed the original method four which involved price signals to customers from suppliers. The Governance Document is clear that in resubmission, a project's Problem, Method or Solution cannot change. Method is defined as the proposed way of solving the problem. While SEPD has removed one measure, the overall project method of trialling energy efficiency to solve the problem remains unchanged.

energy efficiency while providing net financial benefits to distribution customers.

Carbon benefits

The project could facilitate aspects of the Carbon Plan, particularly the goal of improved energy efficiency. Reductions in energy demand could reduce carbon emissions, particularly when those reductions occur at peak times. Additionally, by promoting energy efficiency and reductions in peak demand, the need for network reinforcement could be avoided or delayed.

SEPD has estimated the average potential capacity released for each method on a LV feeder scale. These are 73kW of capacity released for method one, 76kW for method two, 102kW for method three and 102kW for method four. This equates to creating between seven and ten percent headroom on these feeders. SEPD has also indicated that this capacity can be released faster than traditional reinforcement. While the estimated reductions in energy consumption are based on conditional assumptions, we note the figures are similar to those achieved in other studies, such as the CLNR project. The network headroom created by these methods could be used to accommodate LCTs, resulting in cheaper and quicker connections for these technologies. SEPD estimates include between six and nine 3kW heat pumps or electric vehicles per LV circuit per method.

SEPD has not estimated the potential capacity released on Great Britain rollout.

Net financial benefits

This project has the potential to provide net financial benefits to customers. SEPD has estimated that these are £190k per feeder for method one, £202k for method two, £162k for method three and £117k for method four. These estimates vary depending on the level and nature of the reinforcement required under the counterfactual. SEPD has also stated that the application of this method could avoid 'stranded assets' – reinforcements being developed due to high peaks in the short term but subsequently not being required due to a natural decrease in load.
SEPD has not estimated the financial benefit of Great Britain rollout of the methods. It has quoted figures[29] estimating that a 5 percent reduction in Great Britain energy usage could result in a financial benefit of £219m per annum and a 5 percent reduction in peak energy usage, resulting in infrastructure savings of between £142m and £275m.

(b)Provides value for money to distribution Customers

We consider that the revised project provides value for money to distribution customers.

Targeted energy efficiency interventions could defer or avoid the need for network reinforcement. As this project will trial approaches and interventions available to DNOs and create a network planning tool, we consider that the key learning and benefits from this trial will accrue to distribution customers.

[29] These figures were obtained from the 'Demand Side Response: A Discussion Paper', Ref: 82/10, published 15 July 2010 (https://www.ofgem.gov.uk/ofgem-publications/57026/dsr-150710.pdf)

As noted above, learning from the project could also avoid 'stranded assets'. General uptake of energy efficiency could reduce peak loads over time. However, in the short term, network investment may be required to meet growing peak demand. As such, the learning from the project will allow DNOs to accelerate uptake of energy efficiency measures and avoid what will otherwise become redundant investment in the network.

The expert panel expressed concern that aspects of the original submission did not represent value for customers' money. This included a high level of resource from some partners and the fact that one of the measures proposed was being tested by other LCN Fund projects. As a result, in the resubmission SEPD removed the original method four (price signals to customers through suppliers) and committed to tender for a supplier of the network planning tool. As a result, the funding requested has reduced to £8.2m. We consider that with these changes the project represents better value for money to distribution customers.

The project will competitively tender for the provision and installation of LEDs, customer recruitment, survey activities, substation monitoring and the development of the network modelling tool.

As energy efficiency methods are unproven in their ability to address network constraints, we consider that this project is unlikely to proceed without LCN Funding.

(c) Generates knowledge that can be shared amongst all DNOs

We consider that this project could generate useful new learning for DNOs.

There are currently few trials investigating the ability of DNOs to use energy efficiency interventions with domestic customers as a means of avoiding network reinforcement. SEPD has identified perceived gaps in knowledge that this project will seek to address. The knowledge and tools developed by this project will be applicable to all DNOs.

As noted above, the expert panel was concerned that the original method four may not develop significant new learning. The panel noted that price signals to customers via suppliers were being trialled in a number of other LCN Fund projects (eg CLNR and Low Carbon London) and as such repeating these trials, even with a wider group of suppliers, may not generate new learning. Method four was consequently removed in SEPD's resubmission to alleviate this concern.

This project has robust plans for learning and dissemination, building on experience from existing LCN Fund projects. SEPD has identified the key interested parties and the particular aspects of the project that each will be interested in. There is a clear plan for dissemination, involving dedicated staff and a range of events and other dissemination techniques.

SEPD identified the process followed to identify project ideas. This includes scrutiny of internal and external ideas against LCN Fund requirements and review by an internal Innovation Strategy Board.

(d) Involvement of other partners and external funding

We consider that this project has an appropriate group of partners that bring relevant expertise to the project. We were concerned however that partners were not selected through a open competitive process. The revisions made during the resubmission mitigate these concerns.

The expert panel were initially concerned at the high costs for some partners, noting that partners were not selected in a competitive way, and the roles of some partners were unclear. SEPD made several changes to this project as part of its resubmission. These included the removal of the original method four removing one partner. It also removed another partner in favour of tendering for a developer of the network investment tool. Other partner costs were also revised. As noted above, these changes have resulted in the funding requested from the LCN Fund reducing from £9.96m to £8.2m. The level of funding provided by the project partners is £694k. We note that SEPD intends to sign contracts with these partners and secure this funding once the competition results are announced. While we are keen that partners are recruited in an open manner, we consider the changes in the resubmission have sufficiently addressed this concern.

SEPD has indicated that it will conform to the default IPR arrangements.

(e) Relevance and timing

We consider that this is a relevant and timely project. Energy efficiency is not a tool currently used by DNOs to manage their networks. Additionally Government schemes such as the Energy Company Obligations and the Green Deal are expected to increase the levels of energy efficiency in domestic properties. It is therefore timely that DNOs investigate the impact energy efficiency may have on networks and whether it can be harnessed as a tool to avoid or delay reinforcement. As noted above, SEPD has stated that while energy efficiency is likely to increase in the future the uptake may be slow and reductions in demand may not occur in time to avoid reinforcement. It is therefore timely to investigate whether energy efficiency can be used as a targeted tool by DNOs with the aim of avoiding network reinforcement and 'stranded assets'. Additionally, the tool will make use of learning that is currently emerging from existing LCN Fund trials.

SEPD has stated that the outcomes of the project have been designed with replication across the DNOs in mind. They will produce, amongst other things, manuals and training documents for staff of other DNOs. The project will also have a Knowledge Manager whose role will be to ensure that learning developed is incorporated into standard business practices.

(f) Demonstration of a robust methodology and that the project is ready to implement

This project has a robust methodology and is ready to implement.

We consider that the project has a robust methodology for delivery. SEPD has outlined the sample sizes required and has provided statistical justification for the samples. The trials are well structured with a period of preliminary network

monitoring and control groups identified. We consider that there is a low risk with regard to technical feasibility as the technologies used are 'off the shelf'.

We and the expert panel were concerned about the lack of detail regarding the delivery of the network investment tool. In its resubmission SEPD has provided further information on the tool including its inputs and outputs. SEPD has also committed to tender for a party to develop the tool. We consider these arrangements appropriate.

SEPD has identified how the costs and benefits of the project have been identified with project partner support. These have been provided for a range of types of reinforcement. There should be no impact on the project if the uptake of LCTs is lower than anticipated during the trial stage. The project is seeking to prove the headroom that can be created on networks using energy efficiency measures. The learning is still valid even if that headroom is not utilised during the trial.

SEPD has provided a high level project plan. Additionally SEPD has described each phase of the project with the activities, outputs and responsibilities identified. This project will be managed in line with SEPD's Large Capital Project Governance Framework Manual. Risks will be monitored by the project partner review board and stage gate reviews will be undertaken to identify further mitigations or whether the project should be suspended.

The project has a detailed risk register, by work package, and contingency plan. The biggest risk to the project is the recruitment of customers. SEPD has given some consideration to this risk, including increasing the time allowed for engagement and recruitment, to one year, ahead of trials beginning. Additionally, the project partner DNV Kema has been selected for its experience in this area.

Aside from participation in the trials, customer impacts from this project are likely to be small. SEPD has stated that there will be no planned customer interruptions and no increased risk of unplanned interruptions.

The revised SDRCs are SMART and linked to outcomes of the project, including the development of the network investment tool.

Vulnerable Customers and Energy Efficiency (UK Power Networks)

Project overview

This project will trial approaches to engaging fuel poor and vulnerable customers to provide DSR and a demand reduction service to alleviate network constraints.

The project will trial a range of interventions with the aim of encouraging a DSR service from these customers. It will also develop learning on what the most effective approaches are for achieving the desired response from this group of customers.

The first trial will investigate the use of smart meters, energy saving devices and peak saving devices. The second trial will use the results and approaches from the previous trial and also involve peak shifting devices and a ToU tariff. The trials will run sequentially for 12 months each.

The trials will involve 550 households in Tower Hamlets. The project will run from January 2014 to December 2017. The project will be undertaken by UK Power Networks (UKPN).

(a) Accelerates the development of a low carbon energy sector & has the potential to deliver net financial benefits to future and/or existing customers

We consider that this project could facilitate the goal of the Carbon Plan to improve energy efficiency. It is likely to lead to net financial benefits to distribution customers.

Carbon benefits

Increasing uptake of LCTs is one aspect of the Carbon Plan. It is likely that DNOs will need to alter the way they operate their networks to accommodate this. To facilitate this, the use of DSR and ToU tariffs may become widespread. It is likely that a key challenge to implementing these measures will be engaging with, and ensuring the protection of, vulnerable and fuel poor customers. The learning from this project could facilitate the future rollout of the methods with these groups of customers and therefore could provide a significant contribution to the Carbon Plan. The learning from the project could also ensure that fuel poor customers are able to fully participate and benefit in the event of DSR and ToU tariff rollout.

There are high proportions of fuel poor and vulnerable customers in some areas. Targeting these clusters with the methods trialled by this project could be useful tool in deferring network reinforcement. UKPN has estimated that the project could release 2,500kW network capacity at the trial scale. The benefits are estimated on the project enabling 10% of the total or 'technical' potential of these groups to provide demand reduction and demand response services. UKPN has estimated that

the method could reduce network peaks by between 2.5-5 MVA across its three licence areas. These reductions in demand and released capacity could defer or avoid the need for network reinforcement. We note that these figures are relatively small.

UKPN has estimated the carbon savings of the method on the trial scale and on the Great Britain scale. These are 93.51 tCO_2 at the trial scale by 2017. Scaling up this benefit to all fuel poor customers results in carbon savings of 153,017 tCO_2 across Great Britain.

Net financial benefits

UKPN has estimated that the net financial benefit of the methods, at the trial scale is likely to be £413k if the reinforcement is deferred for 10 years or £1.05m if the reinforcement is deferred indefinitely. These figures are the midpoint of the benefit range. We note that the overall benefits are low compared to other projects, particularly if the reinforcement is not deferred indefinitely. However, we consider the financial benefits of identifying and overcoming barriers to participation and rollout of DSR to these groups of customers could be more substantial. This is a result of the potential to facilitate the wider roll out of DSR to all customers.

(b) Provides value for money to distribution customers

We consider that this project provides value for money to distribution customers as this overall low cost project could result in significant learning.

We consider that the learning developed by this project could be substantial and of use to the Distribution System. The project could also develop learning for suppliers that aids the rollout of smart meters and ToU tariffs. As such, we are pleased to note the contribution of £1.121m made by British Gas (BG). Overall, considering the level of funding requested and the potential learning for the distribution system, this project provides good value for customers' money.

Providing a cheaper alternative to reinforcement could result in net financial benefits to customers. UKPN has also estimated that customers involved in the trials could receive an annual reduction of between £16 and £61 on their annual electricity bill.

UKPN has competitively recruited the customer engagement partners CAG Consultants. UKPN has not identified what other elements of the project will be competitively procured.

We consider that trialling DSR with these customer groups is sufficiently innovative to warrant LCN Funding.

(c) Generates knowledge that can be shared amongst all DNOs

We consider that this project will generate new knowledge that can be shared amongst all DNOs.

As noted above, we consider that this project could develop significant learning on the ability of fuel poor and vulnerable customers to provide DSR. The learning on how to engage and protect these customers could also be important in aiding future roll out of DSR, ToU tariffs and smart meters to all customers. This learning will be relevant to all DNOs.

The expert panel were concerned that certain partners, in particular British Gas, could develop significant learning and, because of competitive considerations, may be reluctant to share some of the learning. In its resubmission, UKPN emphasised that this learning will be shared and sharing this learning was incorporated in the revised SDRCs.

Due to the high proportion of customers with English as a second language, the expert panel questioned how transferable the engagement approaches used in the trial would be. UKPN explained that the trials will be structured so that customers are categorised, with one category being language, providing granularity to the results and mitigating this concern. UKPN also stated that the level of energy used by fuel poor, vulnerable and customers who are non-English speakers is similar to the average level of energy use.

UKPN has outlined its plans for knowledge dissemination and stated that these plans build on learning from its previous LCN Fund projects. UKPN has identified key areas of learning including stakeholder engagement, technical knowledge, network knowledge and customer protection knowledge. UKPN has identified the target audience for the learning, dissemination products such as strategies and reports and dissemination channels such as conferences, workshops and newsletters. Sharing of the learning will be supported by the project partners and forms part of the Memorandum of Understanding (MoU) agreed with each. We consider these plans appropriate.

We consider the project has a robust methodology to capture the learning from the trials. The trials have been designed, by project partner University College London (UCL), to provide results that are statistically significant. The trials will use two groups of customers. One group will receive the interventions in the first trial which involve the energy saving devices. The other group will be used as a control group to establish a baseline. In the second trial, both groups will receive smart meters and ToU tariffs, the second group will also receive the energy saving devices. The project will monitor the local distribution network to record the effects of these trials.
We note that UKPN has indicated that it will conform to the default IPR arrangements.

(d) Involvement of other partners and external funding

We consider that this project has an appropriate group of partners.

UKPN has selected partners, such as the local council, on the basis of their expertise and local knowledge. We consider that the partners provide the appropriate range of expertise for engaging with these groups of customers and conducting the trials. These include the local council, the social landlord and the charity National Energy Action.

We note that the customer engagement partner CAG Consultants was recruited through a competitive process. We are also pleased to note that UKPN approached a number of suppliers for involvement in the project and issued an 'invitation to response' for involvement in the trials. This process resulted in UKPN selecting BG as a partner. We are pleased to note the level of contribution provided by BG, which is £1.121m. The other partners are providing £142k to the project and UKPN is providing an extra contribution, above the 10% compulsory contribution, of £431k. We consider that this funding is relatively secure and note that contracts are in place with most partners.

UKPN has identified the process followed to identify and select ideas for projects. Seven ideas were originally considered and these were assessed by UKPN against perceived gaps in existing LCN Fund learning. This review resulted in the two projects identified being submitted to the competition.

We also note that UKPN has stated that it will not claim a discretionary reward for delivery of this project.

(e) Relevance and timing

We consider that this project is timely and could provide valuable learning.

Increasing uptake of LCTs is a key part of the Carbon Plan and, by 2020, every home in Great Britain will have a smart meter. As there are an estimated 4.5m customers in fuel poverty, it is relevant to explore and attempt to overcome the potential barriers to their involvement in the transition to a low carbon economy. We consider that this project is therefore relevant and timely and could produce valuable learning in this area.

(f) Demonstration of a robust methodology and that the project is ready to implement

We consider that the project has a robust methodology and is ready to implement.

UKPN has provided a very detailed project plan, which breaks down the project into five work streams. These are detailed descriptions of the sub-work streams, identifying the key tasks, outputs, interdependencies, and roles and responsibilities for each. We consider that UKPN has the necessary resources and partner expertise to deliver the project.

UKPN has undertaken considerable preparatory work. Some of this work includes a customer engagement strategy and a literature review of relevant learning. The key risk to this project is the recruitment of fuel poor and vulnerable customers. UKPN has identified appropriate mitigations for this risk. Significant preparatory work has been completed including a strategy for this sensitive engagement and a literature review. The project also involves customer engagement specialists, the local council, housing associations and charities. UKPN has provided a detailed risk register that includes a range of risks and contingencies.

As noted previously, we consider the project has a robust methodology to capture the learning. The project will involve sample sizes large enough to produce statistically significant results, control groups and monitoring of the local network.

The key customer impacts will be restricted to customers participating in the trials. These customers will receive energy savings devices, a smart meter and be placed on a ToU tariff. UKPN has stated that its approach to customer engagement will involve explanations of the benefits of each aspect of the trial. UKPN has estimated that customers will lower their energy bill as a result of their involvement. To mitigate any customer impacts, UKPN has committed to provide customers with financial incentives for participation and protection from any increase in bills related to the project. UKPN will also monitor the temperature in participants' homes. If temperatures are recorded below a minimum level, UKPN will intervene to protect that customer. UKPN has also committed, in its resubmission, to provide focused learning on protecting customers as part of these trials.

UKPN will manage costs through governance procedures and project management arrangements including a steering group, monthly reporting arrangements and risk reviews. It has also included an appropriate level of contingency. The project has senior management buy in.

UKPN has identified the steps taken to ensure that the costs and benefits have been estimated reasonably. The benefits range has been identified, based on different scenarios. We consider the steps taken to be appropriate.

The revised SDRCs are SMART, linked to the project plan and relate to significant project milestones and important learning.

Appendix 2 - Glossary

A

Active Network Management (ANM)

Authority

The Gas and Electricity Markets Authority is the governing body for Ofgem, consisting of non-executive and executive members.

C

Combined heat and power (CHP)

D

Demand side response (DSR)

Demand side response is any mechanism that allows a customer's demand to be intelligently controlled in response to events on the power system. Such events would include lack of network capacity or insufficient generation.

Department of Energy and Climate Change (DECC)

UK Government department responsible for setting energy and climate change policy.

Distributed Generation (DG)

Any generation which is connected directly into the local distribution network, as opposed to the transmissions network, as well as combined heat and power schemes of any scale. The electricity generated by such schemes is typically used in the local system rather than being transported for use across the UK.

Distribution Network Operator (DNO)

Distribution Network Operators operate the electricity distribution networks in Great Britain. The term covers six companies operating 14 licence areas.

Distribution Price Control Review 5 (DPCR5)

This price control is expected to run from 1 April 2010 until 31 March 2015.

Distribution Use of System Charges (DUoS)

The charges levied for using the distribution assets to transport electricity from the transmission system through to the end customer who uses the electricity.

E

Electric Vehicles (EVs)

Energy Networks Association (ENA)

ENA is the industry body funded by UK gas and electricity transmission and distribution licence holders. It lobbies on common issues in the operating environment, both at domestic and European levels, and provides technical services for the benefit of members.

G

Great Britain

Grid Supply Point (GSP)

H

High Voltage (HV) Network

I

Initial Screening Process (ISP)

The Initial Screening Process is a pass/fail evaluation of second tier LCN Fund bids that takes place before the full submission process. The purpose of the ISP is to prevent DNOs spending money to fund project bids which do not meet the LCN Fund criteria.

Innovation Funding Incentive (IFI)

Scheme established under SLC 46 and CRC10 of the licence. The IFI is intended to encourage DNOs to invest in appropriate research and development activities that are designed to enhance the technical development of distribution networks (up to and including 132 kV) and to deliver value (i. financial, supply quality, environmental, safety) to end consumers.

Intellectual Property Rights (IPR)

Comprises copyright, designs, patents, confidential information and trademarks.

L

Low Carbon Networks (LCN) Fund

Funding to encourage the DNOs to innovate to deliver the networks we will need for a low carbon economy.

Low Voltage (LV)

M

Memorandum of Understanding (MoU)

N

National Electricity Transmission System Operator (NETSO)

National Electricity Transmission System Operator has responsibility for making sure that electricity supply and demand stay in balance and the system remains within safe technical and operating limits. In Great Britain this role is undertaken by National Grid.

Net present value (NPV)

Net present value is the discounted sum of future cash flows, whether positive or negative, minus any initial investment.

Network Innovation Competition (NIC)

The Network Innovation Competition will apply the LCN Fund concept to electricity and gas transmission and gas distribution network companies. The competition will also be open to independent network operators.

R

RIIO

Revenue=Incentives+Innovation+Outputs. New framework for network regulation which was developed as part of the RPI-X@20 review.

S

Short term operating reserve (STOR)

Specific, measurable, attainable, relevant and time-bound (SMART)

Successful delivery reward criteria (SDRC)

Successful delivery reward criteria are project specific objectives. The DNO will be eligible to claim a successful delivery reward, equal to their compulsory contribution, if all SDRCs are met.

T

Technology readiness level (TRL)

Technology readiness level is a measure used to assess the maturity of evolving technologies. It is graded on a scale from 1 to 9. TRL 1 occurs when scientific

research begins to be translated into applied R&D with TRL 9 describing a proven technology.