Low Carbon Networks Fund

Report and Recommendations 2013

Prepared for

The Gas & Electricity Markets Authority

By

The Low Carbon Networks Fund Expert Panel

November 2013

1 Introduction

1.1 This report prepared by the Low Carbon Networks (LCN) Fund Expert Panel (the Panel) sets out the Panel's recommendations to the Gas and Electricity Markets Authority on the portfolio of projects to be funded in the 2013 Second Tier funding round. Members of the Expert Panel are as follows:

- Dr Robin Bidwell (Chair)
- Sharon Darcy
- Prof. Nicholas Jenkins
- Prof. David Newbery
- Sean Sutcliffe

1.2 We received seven submissions – the total funding requested from the Low Carbon Network (LCN) Fund was £54.2m. Full details of each submission will be available on the Ofgem website. The names of the companies, titles of the submissions and the total cost and the amount requested from the LCN Fund are as follows (the values in brackets indicate the total cost of the projects).

- **Anglesey Community Energy (ACE) - Scottish Power Manweb**
  Total cost: £11.125m Cost to LCNF: £9.242m
- **Solent Achieving Value from Efficiency (SAVE) - Southern Electric Power Distribution (SEPD)**
  Total cost: £9.975m Cost to LCNF: £8.293m
- **Activating Customer Engagement (ACE) - Northern Powergrid**
  Total cost: £6.115m Cost to LCNF: £5.621m
- **Eta - creating efficient distribution networks - Electricity North West (ENWL)**
  Total cost: £8.933m Cost to LCNF: £8.438m
- **Clean Energy Balance (CEB) – circumventing electricity network constraints - Western Power Distribution**

Total cost: £13.012m Cost to LCNF: £12.75m

- **Vulnerable Customers and Energy Efficiency (VCEE) - London Power Networks (LPN)**
  Total cost: £3.852m Cost to LCNF: £ 3.322m
- **Flexible Urban Networks – Low Voltage (FUN-LV) - UK Power Networks (UKPN)**
  Total cost: £ 8.867m Cost to LCNF: £ 6.528m

1.3 The Expert Panel followed the evaluation process set out in the LCN Fund Governance Document v 6 (April 2013). Initial submissions were received by Ofgem and were screened by Ofgem staff for compliance with the requirements set out for the Initial Screening Process. Consultants were appointed by Ofgem to review the submissions (the consultants' reports will be published in full). The Panel met the DNOs early in the evaluation process to allow the project teams to present their submissions. During the period up to the completion of the consultants' reports and prior to the second DNO meeting, the consultants and the Panel sent each of the DNOs a number of questions with the purpose of clarifying the submissions and highlighting areas of concern. A further bilateral meeting was then held with the DNOs.

Following these meetings, the Panel met to review each of the submissions in the context of the criteria set out in the Governance Document. In evaluating the submissions, the Panel took into account all of the documents that had been made available: the submissions, their appendices, the material made available at the presentations, the consultants' reports as well as any additional information that had been submitted via Ofgem or the consultants from the DNOs. The Panel also took account of information from meetings that were held with the DNOs and any material provided during those meetings. Based on this evaluation, the Panel reviewed the projects against the criteria. This report sets out the Panel's recommendations to the Authority.

1.4 This report should be read together with the consultants' reports, the DNO's submissions and the other information that is published concurrently with it on the Ofgem website. This report sets out the results of the Panel's deliberations and its recommendations for the Authority. As such it is primarily concerned with the assessments, conclusions and recommendations of the Panel; all the details of the projects and the technical evaluations undertaken by the consultants are contained in the other published documents.

2 Evaluation Criteria

2.1 The criteria that the Panel are required to take into account in the evaluation process are set out in the LCN Fund Governance Document under the Tier 2 evaluation process. In this section, we list the evaluation criteria and briefly discuss a number of points that arose during the evaluation process. A full description of the criteria is set out in the Governance Document.

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

Carbon benefits. The Governance Document states that the DNO must demonstrate how the solution makes a contribution to the Carbon Plan (DECC December 2011 updated April 2013). The Governance Document specifically states that a solution may facilitate the use of low carbon electricity.

As the Panel has noted in previous years, the primary role of the DNOs in delivering the Carbon Plan is to ensure that the network has sufficient capacity to allow Low Carbon Technologies (LCTs) such as heat pumps, electric vehicles, domestic solar PVs and large scale renewable generation to connect to the network.

The traditional solution to lack of capacity is to physically strengthen the system. This is expensive and, in the case of LV circuits, can be seriously disruptive (involving new cables, link boxes and street furniture in crowded urban areas) and can in some cases prove extremely problematic because of insufficient space to house the additional equipment or wires.

Demand Reduction (DR) and Demand Side Response (DSR). The majority of the submissions were focused on the role of the end customer (domestic households, offices and other Industrial and Commercial customers) and the extent to which they can be incentivised or persuaded to use less electricity overall through energy efficiency and other means or to use less electricity at peak times (peak shifting). The Panel found it difficult to estimate the extent of the carbon savings – in some projects the calculations relied mainly on generic estimates provided by DECC and Ofgem on the potential gains from energy efficiency and peak shifting. The trials should help to clarify these savings.

Active management. Two of the submissions examined ways in which the LV system may be actively managed; in each case, the method relies on linking together the circuits and installing technology to distribute the power flows, thereby increasing the available capacity overall. One submission looked at reducing average voltage: this will provide additional carbon savings.

Integrated scheme. One submission addressed the problems of constraints caused by wind and potentially solar farms. This was an ambitious and complex project where wind, otherwise constrained off the system, would be used to create hydrogen.

Overall the Panel considered that all the schemes offered ways of avoiding costly and difficult reinforcement of the networks and therefore facilitated the Carbon Plan. The extent of the carbon savings were difficult to judge and the Panel suspected that where these were quantified, they were possibly overstated. The Panel will make

recommendations to Ofgem to, once again, look at how the carbon benefits can be presented.

Financial benefits. Estimating the financial benefits was similarly problematic: there was a range of benefits claimed for similar schemes – depending on the underlying assumptions around the amount of energy reduction on average and at peak and on the price that the DNO believed could be obtained from the STOR market for the aggregated DSR services. Assumed revenues ranged from £2.00 per kW to £47.00 per kW. Some of the benefits also depended on whether or not the different types of DSR could be seen as additive – in other words whether a customer using low energy appliances would also save more energy through behaviour change and then how much more such a customer would save by shifting their peak demand. Clearly the trials will clarify some of these issues.

The financial benefits will not just accrue to the DNO. DSR will also save money for customers, e.g. through reducing electricity use. Currently the LCNF financial benefit assessment criterion does not specifically allow these benefits to be included when calculating the financial savings in relation to the costs.

As with the carbon benefits, the Panel did not find the financial benefit calculations particularly robust and in Section 4 recommendations are made to Ofgem for how this can be improved for next year's submissions.

2.3 (b) Provides value for money to distribution customers.

This criterion requires the Panel to take account of the size of the benefits and resulting learning in relation to the costs of the project to the LCNF. It is important to note that it is the DNO system and the DNO customers that must benefit in order that the criterion is satisfied. The criterion recognises that there may be wider benefits to third parties and these are taken into account by the Panel – but it is essential that the project clears a hurdle of providing good value for money for distribution customers.

It is important that project costs should represent good value. The Panel recognises that this is an innovation fund and managing the risks for a first time project will require some element of higher resource than subsequent roll out. But the costs must be justifiable in relation to the role of each of the partners and sub-contractors incurring the cost. The Panel would where possible like to see evidence of a process to ensure the inputs of each party are priced competitively – there remain concerns that the time inputs and the day rates of some of the universities are higher than the Panel considered justifiable and in some cases there was little evidence of a clear process having been run to select that input. In addition the Panel felt that in relation to the university support, there was in more than one submission insufficient clarity as to the precise role and deliverables, even though the cost to the project of their involvement was high.

The Panel was pleased to see that day rates were, by and large, in the acceptable range this year – but in more than one case, the overall days allocated to the work appeared out of proportion to the tasks to be undertaken.

Value for money is an important criterion. The Panel lays particular stress on whether, given the goals, the cost of delivering the project was reasonable and whether the learning to be achieved will provide real benefits for DNO customers. This criterion explicitly requires the panel to consider cost in relation to the learning that will be achieved. There should be evidence that the team has reviewed the results from LCNF and other trials and taken account of experience from abroad. Some of the submissions and presentations were very clear in terms of indicating the learning they were building on and the knowledge niche that their project would address.

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

This criterion specifies that new learning must be generated; and this learning should be relevant to the planning, development and operation of an efficient distribution system and of value to other DNOs. The

project will often provide learning for third parties, but it is important that it should be of value and relevant to the DNOs and their customers.

In one of the projects, the presentation team commented that the project would primarily be of value to and implemented by renewable energy generators. In the Panel's view, unless there is a clear benefit to the DNO, the criterion is not fulfilled.

The Panel was pleased to see strong dissemination plans for all of the projects. In one case, the Panel particularly requested that a non-DNO partner should take particular care to fully disseminate all of its findings.

2.5 (d) Involvement of other partners and external funding.

It is important that there is some evidence of a process or at least some logic underpinning the selection of partners. The Panel recognises that selection of experienced partners reduces project risk – though if there are no new entrants to the competition this reduces the number of contractors that gain experience and therefore does not build additional capacity for the marketplace.

The Panel would also like to see clear evidence of some process to ensure the services of partners and sub-contractors are acquired at a competitive price. There was more evidence of competitive tendering this year but the Panel would like to see more competitive tension in, for example, the engagement of university support.

Evidence of external funding is particularly important where there appears to be some benefit to the third parties from their participation. The Panel was pleased to see that in most instances this had been recognised in the submissions this year.

2.6 (e) Relevance and timing.

All of the submissions addressed problems that are relevant to the immediate future assuming the continued support for LCTs. There should

be a clear potential to integrate the method into business as usual if the trial is successful.

2.7 (f) Methodology.

As in previous years, the Panel was concerned that there was often insufficient clarity around what precisely would be done in each of the methods or tasks listed: specific information on the method often being buried in the appendices or not available at all. The Panel would like to see greater clarity with the specific tasks listed for each method with an indication of which of the partners would perform the task.

The project must be ready to implement. If, for example, the project depends on a certain piece of technology and this is not yet fully developed – then this criterion is not fulfilled. Tier One funding is available for this purpose.

The majority of the submissions involved direct contact with customers: the Panel was pleased to see that in general there were sensible customer protection measures.

Overall, the Successful Delivery Reward Criteria were an improvement on previous years: it is important that these should where possible be linked to the project outputs and objectives rather than to processes or stages in the methodology.

2.8 Presentations.

The presentations are an important part of the process. They provide the Panel with assurances over the level of senior commitment in the DNO; an understanding of how the project will be delivered and whether there are implementation concerns; they also provide (during the second bilateral meeting) an opportunity for the discussion to focus down on the specific questions that the Panel requires to be clarified. The Panel found the bilateral discussions particularly helpful this year; all the teams focused on the questions during the second discussion. In most cases, there was a senior Director present to help convince the Panel that this

work would be fully delivered and, if successful, integrated into the company's activities. In a number of cases this was complemented by a sense of strong commitment from the submission team.

The only concern the Panel had was that in one or two cases key partners were not included in the presentation teams: where a project is heavily dependent either on the commitment of the local community or a partner providing a particular technology or piece of software, it is helpful if the Panel meets a senior member of that team.

3 EVALUATION AGAINST THE CRITERIA

3.1 Anglesey Community Energy (ACE)

Scottish Power Manweb

Total cost: £11.125m

Cost to LCNF: £ 9.242m

Description of project.

This project aims to trial demand reductions and peak shifting using a local social enterprise as an aggregator to trial Demand Reduction (DR) and Demand Side Response (DSR) and to engage the community with a view to reducing demand (and peak loads) through energy efficiency advice and the application of home automation devices (e.g. for water heaters). A key aspect of this project is the outsourcing of the community involvement to a local social enterprise set up by Mentor Mon – a public body charged with community development.

The trial will be held in Anglesey. In the original submission the plan was to focus on 1200 domestic premises recruited via social housing providers, plus a further 600 domestic properties and 25 industrial and commercial customers. We understand from the resubmission that there will now be 300 private residential houses, 600 social sector houses (from the public and private sectors), a new development with an estate of 600 holiday homes and 300 low cost starter homes and a possible hotel – we

understand that this development is in the early stages of development. There will now be 40 industrial/commercial customers.

The objective is to engage the community in providing reliable load reduction/peak shifting in response to signals sent by the DNO. The local social enterprise run by Mentor Mon will provide demand response services to the DNO; the DNO will provide instructions to Mentor Mon to allow them to take the necessary community-wide actions to manage the load - primarily through direct control of home automation devices (e.g. water heater controllers).

The Anglesey distribution network is facing a challenge: there is an expectation that a large amount of low carbon generation will come on stream and new load centres are being created in previously uninhabited areas. The cost of the necessary reinforcement has been estimated at £15 m. The assumption is that a trusted intermediary, such as Mentor Mon, working with the community will be more successful in ensuring participation in managing load than direct engagement by a DNO.

The work will focus on community (rather than individual) engagement; it will investigate what is successful in terms of encouraging change, forms of stimulus and automation and other devices; it will also investigate how a community could balance their own energy needs in a self-contained market working with the DNO.

Carbon and financial benefits.

If effective, this project will increase capacity of the network and allow for the development of wind farms and other LCTs on Anglesey. In addition, any reduction in energy consumption should reduce carbon emissions and save money for local consumers. The DNO suggests that the savings will be around 20% for each household (10% from energy efficiency and 10% from time-of-use savings). Overall, it is estimated that the scheme will save 0.9% of the Anglesey load.

The submission suggests that a deferment of the £15m investment for a 9 year period will save the DNO around £160k in NPV terms; it will also provide optionality.

The financial model presented in this submission suggested that the financial sustainability of this approach could be a problem – in essence the savings to the DNO do not allow for significant payments to Mentor Mon - so for the social enterprise to be viable in the future, each householder will have to share any savings they make with Mentor Mon. The figures presented assume that each household could save £240 from energy efficiency and time of use savings with an additional £40 per year as network utilisation payments received via Mentor Mon – this overall saving would be shared between Mentor Mon and the customer. The Panel considered these savings figures to be on the high side. Even with the revenue that would then accrue from these savings to the social enterprise, Mentor Mon would operate on relatively slim margins with high fixed costs and would be financially vulnerable if participation rates or the value of savings were less than forecast.

The financial savings to the DNO would appear to be relatively modest in relation to the cost of the project (£11m) – the annual cost to the DNO was in the region of £227k against gross savings of £385k. Furthermore, it is possible that even with these demand reductions, it may not be possible to defer the reinforcement for the 9 years; in addition, there is a risk that the anticipated energy savings will not be delivered.

Value for money for distribution customers.

There is a considerable amount of time allocated to this project. Around 25 man years' work has been allocated to Bangor University and Durham University and 17man years to Mentor Mon. SP expects to spend around 11.5 man years. There is no evidence of competitive tendering.

The Panel were concerned that the submission failed to make a strong case on the potential financial benefits for the DNO (around £158k per year). This, taken with the high cost of the overall project, (£11m with

£9m from LCNF), led the Panel to question whether this would be value for money for DNO customers.

Generates knowledge for DNOs.

The Panel recognised the importance of Mentor Mon and considered that the creation of a self-standing community intermediary was innovative and the results could be of interest to other DNOs – although the replicability of this approach of putting in place a community aggregator might depend in part on being able to identify a suitable intermediary and the financial viability of offering such services.

The Panel were concerned that Anglesey, an island community, might not be generally considered representative, hindering take up by other DNOs. The Panel was also aware that other trials had tested the control of household load using home automation devices.

The dissemination plan appeared sound.

Partners and external funding.

The key partners were considered strong : Mentor Mon (a local development organisation with the capability for delivery of community based projects); the University of Bangor with specific experience in behavioural analysis; the University of Durham – who will provide economic inputs; and Global Smart Transformation (GST), providing technical, commercial and stakeholder management input – particularly to Mentor Mon.

The Panel was concerned that there appeared to have been little evidence of competitive tendering in relation to the universities and GST.

Relevance and timing.

There is some limited evidence that the proposal had reviewed learning from other schemes where communities collaborate to reduce energy use and save carbon. This project would produce learning on a new way for such communities to interact with DNOs and as a result share in the

benefits of deferring or avoiding investments in the network. Such information would be relevant and timely.

In addition, the submission stresses that Anglesey is facing severe network constraints and the application of this community involvement model is expected to release sufficient network capacity to allow investment to be deferred.

Robust methodology ready to implement.

The Panel found some aspects of the submission and presentation less than clear**.** Initially the submission suggested that the trials would mainly focus on social housing with participation being assured through contracts with the social landlords. The resubmission has made substantial changes to the household mix – and the Panel were not clear how participation and the payment of fees (based now on savings) to Mentor Mon would be assured. During discussions, it appeared that a proportion of the housing development that is now an important part of the mix has not so far been built. The Panel was also concerned about the economics of Mentor Mon – the business plan assumes that the savings from electricity use, constraint payments and an annual payment from the DNO created enough net value to share with the householders and allow the aggregator to make a profit.

The trial did not appear to have been constructed in a way that would allow the responses of different subsectors of the community to be tested – for example which groups would be willing to engage with the trial – and how much of the savings they would be willing to share; and there was little information on how the control groups would be used or the alternative approaches would be tested.

In addition there was insufficient clarity in relation to the equipment that was to be installed in the households, for the industrial and commercial premises and for the 33kV network.

Panel conclusions.

The Panel considered there were a number of interesting ideas in this project - it relied on the DNO subcontracting to a local enterprise the role of an aggregator to encourage local participation. However, the Panel considered this to be a project that appeared expensive in relation to the benefits to the DNO; they were concerned about the transferability of the learning and they felt aspects of the trial methodology had not been well thought through. On the analyses presented, the Panel were not confident that the social enterprise would be commercially viable.

3.2 Solent Achieving Value from Efficiency (SAVE)

Southern Electric Power Distribution (SEPD)

Total cost: £9.975m

Cost to LCNF: £8.293m

Description of project.

This project seeks to capture information on how implementation of different electricity energy saving approaches by households will affect local demand and whether consumers can, through time of use tariffs, be encouraged to shift the timing of their peak demand. The information from this and other trials will be used to build a network investment decision tool.

SEPD note in their submission that strengthening LV circuits is expensive. The approach proposed may allow physical works to be delayed and if demand subsequently reduces, as more energy efficient technologies become available, the investment may prove unnecessary.

Domestic properties located in the Solent area (Isle of Wight and South Hampshire) will be recruited for the trial; the households will be selected so that they represent categories of socio-economic groupings and different types of location. There are four methods (one was removed during the course of the submission). In the first three there will be 1000 participants in each with a further 1000 as a control group. The trials will last 2.5 years – the first six months will be used to collect baseline data.

The trials include the installation of LED lighting for certain groups of customers (the lighting will be installed by the contractor as part of the project); a customer engagement programme (including provision of data to the customer to reinforce behaviour); and DNO price signals to encourage peak shifting. A further two groups of 1000 households will receive coaching through an 'embedded coach' to encourage behaviour change. The households in some of the trial method groups will be required to install monitoring equipment and smart plugs; monitoring equipment will also be installed at the neighbourhood and substation level for measuring the impact of community trials.

The team includes the University of Southampton; their role includes ensuring that representative samples are recruited for the trial. There was evidence that the team has reviewed learning from previous trials.

The outputs will include information on how different categories of customer behave in relation to different interventions; a model of the impact of measures; information on what impact these interventions have had; and a network investment tool for DNOs.

Carbon and financial benefits.

Improved energy efficiency is a key part of the Carbon Plan. It may offset the additional load resulting from LCTs and help to avoid or defer investments in strengthening circuits. Building an understanding of likely behaviours and of the impact of new energy saving technologies and the role and reliability of consumer peak shifting are important.

The information arising from these trials will therefore help facilitate the management of the networks under the expected Low Carbon pressures.

SEPD argue (using Ofgem data) that a 5% reduction in energy use at peak will result in cost savings in terms of the infrastructure to a total of between £143m to £275m GB wide – in addition to saving in the energy itself. Separately, they calculate that introducing LEDs alone would save the Solent network £21m in network cost and £2.3bn GB wide.

Overall, it is clear that the DNO and its customers will achieve savings from energy efficiency and peak shifting measures, providing the consumer behaviour change can be delivered and sustained. The project should provide evidence on whether the cost (which could be high) of delivering these benefits would be adequately outweighed by the resulting benefits.

Value for money for distribution customers.

While the Panel consider that the trials on energy efficiency would yield valuable learning, it was concerned about the high level of costs associated with the overall project. There were specific concerns about the costs, roles and amount of days allocated to a number of the partners. Following discussions between the Panel and the submission team, one of the methods was dropped, two of the partners were removed from the project and the approach and associated costs were tightened up. A work package would be tendered where it had previously not been competitively procured. As a result the Panel considered the project would provide value for money..

Generates knowledge for DNOs.

The trials will provide information on how consumers react when they are encouraged to implement energy efficiency and time shifting measures (technology, advice, coaching and Time of Use –TOU - tariffs); it will also provide advice on the effect of replacing lighting with LEDs. More importantly, the aim is to analyse the results by different types of customer and their location – in principle providing more reliable information about the areas in which such interventions are likely to be most successful.

The dissemination plan appeared sound.

Partners and external funding.

The main partners are DNV KEMA (management of and evaluation of trials); Southampton University and Maingate (who have a major role in

providing a data centre, aggregating data, customer engagement and supply of devices). The Panel was concerned about the cost of some of the partner inputs – this concern has been addressed in the final submission.

Relevance and timing.

There is a need in the Solent area for reinforcement of the network – arising from increasing demand and the connection of LCTs. Energy efficiency and peak shifting are an important tool for reducing demand and associated carbon – provided any behaviour based reductions can be relied on and can be shown to be sustainable.

The Panel considered this project to be relevant and timely.

Robust methodology ready to implement.

The methods proposed for identifying and recruiting consumers and the analysis of data (including the impact on the network) appeared well constructed. The Panel considered the outputs had the potential to be difficult to interpret and use effectively for building the tool as the range of groups and types of trial were complex. There was less clarity around the exact nature of the investment tool output and the precise form in which this would be made available to other DNOs and how it would 'talk' to other network planning models. The Panel understood following discussions that the 'model' would provide a decision tool to help understand the consequences of different types of interventions in different types of neighbourhoods.

Panel conclusions.

The objective of this project is to build an add-on for network planning tools that would indicate the potential in specific locations for consumer DR and DSR actions. The trials were well constructed to provide data that would allow the potential demand reduction and response from different types of neighbourhoods to be estimated. The translation of the data for use in the tool is going to be challenging. While not inexpensive, the Panel felt this project could provide valuable learning. They were pleased to note that the

learning from previous LCNF trials on DSR via supplier price signals (CLNR and other trials) would be incorporated into the tool.

3.3 Activating Customer Engagement (ACE)

Northern Powergrid

Total cost: £6.115m

Cost to LCNF: £5.621m

Description of Project.

The aim of this project is to examine the impact of measures designed to elicit Demand Side Response (DSR) from customers and thereby release capacity on the networks. The approach trials novel ways of achieving behaviour change – competitions, games, etc. - with a particular focus on the role of school children in encouraging change. A diagnostic and forecasting tool will be developed based on the outputs from this trial as well as from other DSR trials: its aim will be to assist DNOs to forecast the DSR potential using the non-tariff customer engagement techniques that will be trialled.

The project will focus on providing DSR specifically to meet the needs of DNOs. There are three trials proposed: programmes run primarily through schools (10-25 schools targeting 500-1250 customers); up to 2000 customers in the wider community; and 40 Local Authority premises. (The higher number of schools is dependent on Durham County Council being successful with a bid for EU funding).

In the first set of trials, schools are being targeted as a conduit to households – there is evidence that children provide a good channel of communication, thereby enthusing their parents. Households will be provided with whole house monitoring systems and smart plugs. Data will be fed back to schools and it is intended to create within and inter school competitions. In the second set of trials there will be a wider community engagement targeting up to 2000 households, with the trials used for direct control, and static and dynamic profile balancing to address peak loading and voltage issues. These households will be

encouraged to choose to use the GEN Game. Game participants are provided with a self-installed smart energy kit capable of monitoring their energy use and controlling appliances instantaneously via the smart plugs and remotely from a centralised GEN Game control system. Customers are therefore able to offer their domestic load for instant demand response (but with the on-going option of overriding this). Points are awarded and a small weekly prize provided which can be taken individually or donated to a community group.

The DSR diagnosis and forecasting tool would produce forecasts of future load and analyse the effect of that load growth on the network. Based on these and data from other trials, it is intended to provide guidance on the DSR flexibility likely to be available based upon an analysis of customer types and demographics. The study will also provide best practice guidance on how to engage with customers to achieve the DSR response.

Carbon and financial benefits.

The carbon benefits would primarily arise through facilitating the Carbon Plan and allowing LCTs to be connected without creating constraints and the need for strengthening the network

The net financial benefit of the proposed actions at project scale is £119k per year or a 2% return on the cost of the project if achieved. This assumes a 10% decrease in peak demand and a 5% decrease in energy demand. If successfully rolled out to the rest of GB the value might be between £28m and £201m per year.

Value for money for distribution customers.

A considerable number of man years have been allocated to this project: Newcastle, Durham and Exeter Universities have been allocated 17 man years; NPG allocated 44 man years – together with the 7 man years provided (at no cost to the project) by Durham County Council, this totals almost 70 man years. The level of resource has reduced in the resubmission to roughly 60 man years. The majority of the reduction is allocated to NPG.

The Panel considered this project, given the objectives, could have been delivered at lower costs. The GEN game will cost around £800 per customer - partly because of the developments costs. It was noted that the previous trial was limited to 20 participants for a period of two months only.

Generates knowledge for DNOs.

These trials will undoubtedly add to the body of knowledge being accumulated around how to bring about behaviour change in customers. The approach builds on a number of previous studies, but there are some genuinely innovative techniques – such as the GEN Game. The Panel questioned whether the DSR diagnostic tool required further trials to be undertaken or whether it could be built using data from elsewhere. However, the addition of a further robust, well-constructed trial on behaviour change would in the view of the Panel further the understanding of the potential of customer DSR.

The Panel was concerned that other DNOs might not consider the trial provided a sound basis for network planning; behaviour change is important – but to what extent the results of the school and game outcomes in the specific context of this trial would prove replicable might be hard to assess.

The dissemination plan appeared sound.

Partners and external funding.

Durham County Council is an important partner in this project. It will provide access to schools and assist with engaging with teachers; provide access to council buildings and staff; and assist with engagement of the wider community. They are providing a significant contribution, with a possibility of further funding via the EU. Newcastle University have a major role in the development of the diagnostic tool and work with the data from the trials. Durham and Exeter Universities will provide input into the design of the interventions to be used in the trials and the

evaluation and documentation of the results. Oswald Consultancy will make the GEN Game available and undertake any necessary development work.

Relevance and timing.

It is clearly both relevant and timely to seek new ways of engaging consumers and look at different ways to reduce peak loads in constrained areas.

Robust methodology ready to implement.

The involvement of Durham County Council is clearly an important aid in engaging schools and, through them, households. The Panel questioned whether Durham County Council could commit its resources (over 1500 man days) for the length of the project; the council noted that managing peaks in consumption in Council buildings could have financial benefits insofar as 30% of their total electricity costs were incurred at peak times. In addition, engagement with staff, schools and the community to reduce carbon was a County aspiration. The Panel considered this a strong element in the bid.

The Panel noted that the project was reliant on the GEN Game (it would be played by around 2000 households, the largest group of consumers in the trials). It was not clear how the trials would be structured and how the GEN Game would be compared with other consumer engagement mechanisms. The Panel are supportive of the principle of competitions as a way of engaging households in energy saving – but to be of value to DNOs this engagement needs to be sustained. The Panel were conscious that the this particular game has had limited trials; it was not clear whether when it was rolled out how engaged children and their parents would be – and whether it was planned that the game would be adapted for different age groups. The Panel were surprised that no-one from the Oswald Consultancy attended the Presentations. As the game has only been trialled on 20 homes for two months and the game is not publicly available, the Panel found it difficult to assess whether it was sufficiently developed and whether it would engage the customers. The Panel also

noted that it may be difficult to engage with the GEN Game without access to the internet (to receive both automatic load control signals and feedback for behaviour change). This could restrict the involvement of certain households in the project. Furthermore these trials were not testing a range of games to produce learning on whether this will prove a valuable approach – rather it would primarily evaluate the GEN Game.

The Panel considered that there was limited detail on how the planning tool would be constructed: the integration of data from this trial and other data into the software planning tool will be a complex task and the Panel were concerned that perhaps insufficient thought had been given to some of these complexities and how to construct a tool that the other DNOs would consider reliable.

Panel conclusions.

The Panel considered the role of behaviour change as an aid to overcoming network constraints to be important and welcomed this submission as adding valuable knowledge on this aspect. But they were concerned about the state of readiness of this overall project. There was insufficient evidence that the GEN Game was ready to be rolled out and would prove successful and they were concerned about the trial method and interpretation of outcomes; they were also concerned about the state of readiness of the model specification and the complexities of the modelling and the integration of the data from the LCNF and other projects.

Overall, the panel would like to have seen this work delivered at a lower cost; to have had greater confidence that the game would achieve the goals; and would have preferred to see the trials set within a broader methodological context testing the value of games alongside other consumer engagement mechanisms. The panel would also have liked to feel more confident that the data produced would be generically useful for the model and convincing for other DNOs.

3.4 Eta: creating efficient distribution networks

Electricity North West (ENWL)

Total cost: £8.933m

Cost to LCNF: £8.438m

Description of project.

This project is designed to help manage the thermal, harmonic and voltage challenges that increased use of LCTs will place on the LV network. LV circuits will be joined together using active switches in the LV link boxes and substations. These controllable switches have been designed by Kelvatek (the Weezap and Lynx). Voltage will be controlled using on-load tap changing transformers and capacitors to optimise the voltage profile across the HV and LV networks. Intelligent switching devices will be installed that can be remotely controlled. This will allow for centralised LV network management - a Siemens network management system will provide the control system for the switches and for optimising the network. The voltage will be controlled so as to allow the system to be operated at optimum energy efficiency and provide increased voltage margins. The overall reduction in average voltage on the LV network will allow all appliances to work effectively while reducing the energy consumed. This voltage management will also be applied in the HV networks, reducing losses.

The project will deploy optimisation software designed to balance network flows and reduce losses.

The trials will be held in the DNO's area with three locations so far identified: Manchester, Wigan and Wigton. The project includes work streams on safe working practices (with changes where necessary to working procedures) and an assessment of whether customers perceive any effects from the voltage changes.

Carbon and financial benefits.

The DNO in the submission states that releasing capacity in this way will be four times faster and 40% cheaper than traditional reinforcement techniques – allowing LCTs onto the system at less cost to DNO customers. They also point out that the embedded carbon in this method

is far lower than traditional reinforcement. The submission includes calculations carried out by the Tyndall Centre, showing a range of carbon savings that may be achieved associated with the implementation of the method and reduced energy use.

The financial modelling calculations that have been carried out by the DNO (based on 160 trial circuits) suggest a release in capacity of over 9 Megawatts, with the method costing £ 464 per kW (when rolled out following the initial work) compared with a traditional cost of £929 per kW. The submission suggests that the customer savings if adopted GB wide could amount to £8.6 billion.

The Panel considered that the application of the proposed method, if successful, would offer considerable benefits in terms of financial benefits to DNOs, avoidance of disruption caused by physical reinforcement, reduction in carbon emissions and potentially lower customer bills.

Value for money for distribution customers.

As we note below (under Project Partners), the Panel consider the costs associated with the inputs of each of the partners to be reasonable.

The Panel were concerned about the cost and usefulness of some of the customer survey work. In the final submission, this work has been refocused and the costs reduced.

The Panel considered that this project would provide value for money.

Generates knowledge for DNOs.

The Panel considered this project would be of considerable interest to other DNOs. It will provide a demonstration of active management of the LV system – providing an alternative way to manage overloading on the circuits as well as managing harmonics – a possible concern where PV has been installed.

The dissemination plan appeared sound.

Partners and external funding.

There is a strong set of project partners: Kelvatek (providing the switches); Siemens (providing the network management system); and specialist consultants TNEI, with academic input from Manchester and Belfast.

The Panel particularly welcome the significant contribution (provided through discounted pricing and benefit in kind) being made by Kelvatek to allow this technology to be demonstrated. The Panel also considered the pricing and contribution arrangements from other suppliers and partners was appropriate.

Relevance and timing.

The Panel considered this work to be both relevant to other DNOs and to be timely – given the concerns about the impact of LCTs on the LV network.

Robust methodology ready to implement.

The trials appear to be well constructed. In selecting sites, the DNO plans to take account of voltage levels, circuit types, customer types, low carbon technology uptake and physical constraints – i.e. the physical possibility of installing the equipment. The trials have been constructed to look at the implications for customers; the cost and time associated with implementing the method; the role of the method compared with other solutions in dealing with uptake of LCTs; the extent to which network losses are reduced; and different ways of using the technology. Care will be taken to minimise any impact on customers.

Panel conclusions.

The Panel considered this method would, if successful, offer a valuable approach to releasing capacity on the LV circuits. The trials appear to have been well thought through – both in the range of interventions, as well as the methodology to test the impact. The method should provide some additional benefits in terms of some reduction in consumer bills.

3.5 Clean Energy Balance (CEB) – circumventing electricity network constraints

Western Power Distribution

Total cost: £13.012m

Cost to LCNF: £12.75m

Description of project.

From the DNO's perspective, this project examines an innovative approach to avoiding serious constraints arising from the connection of new wind generation. The local 33 kV grid in Cornwall is at capacity and the local community at Wadebridge would like to build and connect a 6 MW wind farm. Currently the DNO is able to offer 1 MW firm export capacity, above which the generator may be constrained.

The method comprises a 1 MW electrolyser, a hydrogen store, a gas injection module and a 1.4 MW gas engine. The hydrogen generated will be stored and blended with natural gas; it will be used to generate electricity when constraints allow. A further trial will examine injecting the hydrogen gas into the network – the hydrogen content is currently limited to 0.1% by regulation – there is a plan to seek a derogation to allow a 2% content. This generation mix will also be used to provide load balancing services. The proposal is to 'thrash' the electrolyser (as it was described by the project team) when there is a high price for balancing services.

Carbon and financial benefits.

In principle, the use of the wind energy that would otherwise be constrained off the system will offer carbon savings that would not otherwise occur: the submission suggests that conversion to hydrogen offers considerable scope – this has been calculated as between 300k to 900k tonnes of hydrogen per annum.

The method needs to demonstrate that it could be rolled out at a lower cost than other available solutions. The Panel had concerns over the

revenue assumptions and could find no clear evidence that this scheme would offer financial savings compared with traditional approaches. It was clear from the discussions that given the nature of the constraints it would not normally be economic to connect a large wind farm at this site.

The evaluation of the financial aspects was made more complex because of the integrated nature of this scheme. There are two key components: generation and connection to the network under different scenarios; and the gas generation/gas engine element. (There is also a micro CHP scheme that is largely irrelevant to the key methods being tested under the scheme). A wind farm development on that site would need to determine what price the gas electrolyser scheme will be prepared to pay for the electricity provided; and the wind farm owners would then need to decide whether this would make the economics of the wind farm sufficiently attractive. The Panel found it difficult to disentangle these two elements (the assumption was that wind generated electricity was provided free to the gas electrolyser), but based on the financial information provided, the Panel did not consider that other DNOs would favour this as a method of overcoming constraints from renewable generation compared with alternative methods.

Value for money for distribution customers.

The Panel did not consider this project value for money when taking account of the extent of the learning for DNOs that would be delivered, the overall benefits of the scheme to DNOs and the level of funding requested.

Generates knowledge for DNOs.

The Panel was not convinced that other DNOs would apply this method in order to avoid constraints and the Panel did not consider the assumptions behind the projected roll out of the method to be credible. In discussion, the submission team suggested that this scheme would be more likely to be owned by a generator, with the DNO's involvement being limited to the connection.

Partners and external funding.

The local partner was WREN (Wadebridge Renewable Energy Network). The Panel considered it disappointing that they did not appear in either presentation as part of the presenting team. The Panel also found some of the discussion at the presentations confused: there appeared to be some lack of detailed understanding of this complex project and this gave some concern whether the project would be implemented effectively. The Panel was also concerned that apparently there was no experienced wind farm developer currently engaged.

Relevance and timing.

There is a serious constraint that is preventing connection of further renewables at this location**.** The Panel considered this project timely – however they were not convinced that such an approach would be integrated into future business plans.

Robust methodology ready to implement.

The Panel considered that the project, as presented, was unnecessarily complex. For example, the micro CHP did not bear a logical linkage to the method of utilising spilled wind – nor was it relevant to the financial benefits of the project. The injection of gas into the grid is critical to the sizing of the project: it is not clear within the time scale that an appropriate derogation could or would be made. Finally, there are a large number of factors that would be essential for the successful delivery of this project – it was not clear that sufficient thought had been given to the implementation methodology. The SDRCs did not adequately reflect successful or completed project outcomes – there was no reference to the actual operation of the methods by the end of the project as part of these criteria.

Panel conclusions.

This is a complex and ambitious project. It is an interesting idea to use hydrogen to avoid constraints arising from wind generation. There are

necessarily large energy losses associated with such a conversion and, on the figures available, the Panel was not convinced that the overall scheme could be made to be economic when compared with traditional approaches. The Panel did not consider that this project would be value for money for DNO customers, nor that other DNOs (or wind farm developers) would consider this a cost effective method for avoiding constraints.

3.6 Vulnerable Customers and Energy Efficiency (VCEE)

London Power Networks (LPN)

Total cost: £3.852m

Cost to LCNF: £ 3.322m

Description of project.

This project examines how to engage effectively with vulnerable and fuel-poor customers. This group represents around 2.4 m households in England alone and is rising. Their engagement in energy efficiency and demand shifting could help reduce their bills and release capacity on the network. The DNO notes in its submission that the roll out of smart meters could give these customers a better understanding of how to control their energy use. But this is dependent on finding effective ways to engage with a group that utilities have found difficult in the past. These are also customers that often rely on pre-payment meters. As part of RIIO-ED1, Ofgem places new obligations on DNOs, requiring them to play a pro-active role in addressing consumer vulnerability.

550 social tenants from Tower Hamlets would be chosen for the trial – there is an ethnically mixed population in the selected location (around 10% not speaking English well - or at all). There will be two trials. The first will address DR and energy saving – smart meters, energy saving devices and energy advice will be provided. The second will address DSR and include energy shifting devices to control appliances (water heaters etc) and Time of Use tariffs. During the first phase of the trials, half of the group will act as a control; throughout the trials there will be

an external control group outside of the area; this control group has already been fitted with monitoring devices within the households.

Carbon and financial benefits.

The submission includes estimates of the carbon and financial benefits – around 0.34t CO_2 per consumer over the trial period and a saving of £0.6m to £2.28m to the DNO if the reinforcement could be deferred indefinitely. There are considerable uncertainties in these figures – but it is clear that the carbon and financial benefits in themselves are likely to be small even if rolled out across GB.

However, this group of consumers accounts for a significant proportion of households and their engagement in these energy efficiency and DSR approaches can be seen to be important for the success of the Carbon Plan for a number of reasons. It is important that these customers are able to access the anticipated benefits of the smart grid and understand how to interact with future developments designed to benefit customers. In an environment where electricity prices are expected to rise, energy efficiency and time shifting may offer ways of reducing cost for the individual consumer - which is particularly relevant for the cost conscious. It must be a matter of concern if the smart grid is not developed in a way that maximises the way that fuel-poor and vulnerable customers are engaged. These trials have the potential to increase knowledge around the most appropriate ways of achieving this while offering DNOs learning on how to work with this group to manage constraints. In some areas there are very high proportions of fuel-poor and vulnerable customers – in effect creating clusters on the local LV network. Proper engagement of this group could offer a useful local solution to local constraints.

Overall, the Panel recognised the immediate carbon and financial benefits were low, but considered that understanding this segment of the customer base was important for the effective implementation of the Carbon Plan. The work will provide valuable information for the DNOs. This information should potentially result in cost savings for DNOs,

suppliers and customers. Fuel-poor and vulnerable customers are expected to benefit financially by between £16 and £61 per year.

Value for money.

Taking account of the above discussion, the overall cost and the significant partner contributions and the considerable amount of learning which may be delivered for the DNOs the Panel considered this project good value for money.

Generates knowledge for DNOs.

In principle, the knowledge created by this trial should be of considerable value to all DNOs when dealing with fuel-poor and vulnerable customers. The Panel questioned whether the selection of this particular trial area would reduce the value of this trial to other DNOs insofar as Tower Hamlets has a far higher proportion of consumers with English as a second language than is generally representative of a fuel-poor area. We understand the aim is to categorise customers according to, for example, their ability to speak English and it is intended that this should provide more granularity in the results, thereby increasing the value to other DNOs.

The dissemination programme is well constructed. However the Panel were concerned that British Gas should give assurances that the learning was fully shared with other Suppliers; the Panel was pleased to see in the final submission that this aspect had been included in the SDRCs.

Partners and external funding.

A considerable amount of work appears to have been put into identifying appropriate partners. These include appropriate specialists for engaging Tower Hamlets residents (social housing landlords and the Bromley-by-Bow Centre) as well as NEA and CAG Consulting who have developed the engagement and recruitment strategy. Partners also include University College London (responsible for research design and data analysis) and British Gas. UK Power Networks and British Gas are both

providing a financial contribution. British Gas is contributing all the smart equipment that will be installed in the customers' premises as part of their 'business as usual' processes; they are also contributing staff and IT costs to support this.

Relevance and timing.

The plan is that smart meters should be rolled out to all customers by 2020. The DNO argues that because many of the vulnerable and fuel-poor live in 'difficult buildings' and are difficult to make contact with, the work on installing smart meters to this group may be left to the latter part of the programme. In their submission, they argue that the information may also help with other programmes where engaging the fuel-poor and vulnerable is important.

Robust methodology ready to implement.

The Panel considered the methodology well thought through and implementable.

A key risk is that difficulties of engaging with these customers will undermine the project. The risk mitigation arguments in the submission appear robust – and the learning on this risk will itself be of value. There is also a risk that the savings to the DNO will be less than anticipated if the individual customer's potential energy savings are offset by improved comfort levels.

The Panel noted that the submission was presented at the meetings with considerable clarity and genuine commitment.

Panel conclusions.

The trials will gather data about an important consumer sector – one where there is limited information. The claimed DNO benefits are small – however the cost of the project is also proportionately less. The wider learning for the Carbon Plan and assisting all consumers to access the benefits of the smart grid and engage in DR and DSR actions are both important outcomes from this work. The Panel were given additional

confidence by the well-constructed approach (including choice of partners) and the clear enthusiasm and competence of the team and its support from senior management.

3.7 Flexible Urban Networks – Low Voltage (FUN-LV)

UK Power Networks (UKPN)

Total cost: £ 8.867m

Cost to LCNF: £ 6.528m

Description of Project.

Connecting Low Carbon Technologies (LCTs) will place additional demands on the Low Voltage Networks. This has the potential to overload the transformers and underground cables and cause fluctuations in voltage levels. At present LV networks are passive with the flow determined by the load and circuit characteristics.

This submission plans to trial the use of active devices to control the flow of real and reactive power on meshed networks; specifically on LV feeders from two or more sub stations. The use of power electronics will allow the demands on the two or more circuits to be managed better in real time. Overall, this approach has the potential to increase capacity on the circuits that are meshed together, as load is shared over the wider network.

Three methods of using increasingly complex technology will be trialled over 36 sites in Brighton and London. The first will involve an actively controlled switch opening and closing the meshed circuit. The other two methods use power electronics to control the flow of real and reactive power for each phase separately

The company has calculated these approaches have the potential for releasing around 150MW of shared capacity across GB.

Carbon and financial benefits.

LCTs will place additional load on the system; this will require the LV network to be strengthened in the absence of lower cost methods for managing the load. In addition, the take up of LCTs is expected to occur in clusters, with the possibility that a particular LV circuit is stressed while neighbouring ones have spare capacity. This project, if successful, offers a method of managing these stressed circuits and as such allows the connection of LCTs, while deferring or avoiding altogether the costs and disruptions associated with strengthening the physical circuits. The DNO estimates that on average the cost of this method (when rolled out) will be lower than the conventional reinforcement approach. The method also provides a degree of optionality – investment can be deferred allowing the work to be undertaken at a later time (should it be needed).

Their submission includes a calculation that looks at the comparative cost of using this approach on 577 sub-stations; they calculate a GB wide saving of up to £9 -10 million per year compared with conventional strengthening. It is also stressed that a key benefit (not quantified) is the avoidance of disruption associated with road works and other activities required for physical works on cabling and sub stations.

Value for money for distribution customers.

The costs associated with the project were considered by the Panel as offering value for money; the process for selecting vendors, the day rates of the consultants and the contributions to be offered by the partners were all considered acceptable – as presented in the final submission.

Generates knowledge for DNOs.

The Panel understands that power electronics, though widely used in some other sectors and on the HV network, have not so far been utilised on the LV network. The Panel considered that the work would spur the vendors to develop appropriate technology and the trials themselves would provide learning of considerable value to DNOs GB wide. The

proposed approach for disseminating the information was well developed.

Partners and external funding.

UKPN selected key partners following a process to identify those with the most appropriate skills and their previous experience on LCNF projects. These include GE Digital Energy (supplier of the DNO control system used by many of the DNOs); CGI (providers of the planning tool) and Imperial Consultants (assisting with the power electronics trials). The key technology vendors (of the power electronics itself) will be selected following an initial tendering process.

The Panel noted there was a difficult trade-off between selecting experienced and reliable partners, creating competitive tension in the pricing and encouraging new entrants into the market. However, the selection process adopted and the contributions to be made by the partners were considered acceptable.

Relevance and timing.

The Panel considered the method relevant and timely for two reasons: there is likely to be an increasing demand on the LV network and power electronics technology is only now becoming available in a form that can be used on the LV circuits (in part an issue of developing equipment small enough to use on the street and in substations).

Robust methodology ready to implement.

The Panel considered the methodology to be well constructed and deliverable. The key risk is that the vendors will be unable to supply the technology; however the Panel were satisfied that UKPN believed that from early discussions with the vendors that the necessary technology would be available. A key issue would be the reliability of the newly developed equipment when this was deployed. The Panel asked that all technical problems should be recorded and the results disseminated so

that DNOs could build confidence in this solution; this is now included in the SDRCs.

Panel conclusions.

The Panel recognised the value in testing a technology that was new to the LV network that could make a real contribution to easing constraints caused by local clusters of LCTs. It is expensive (the costs are expected to come down in the roll out), but then could potentially be less expensive than traditional reinforcement – particularly where the physical works would cause disruption.

4 Recommendations to the Authority

4.1 We set out below our recommendations to the Authority on the funding of the 2013 projects.

4.2 The Expert Panel recommends that the following are funded without any conditions:

- **Solent Achieving Value from Efficiency – Southern Electric Power Distribution**
- **ETA: creating efficient distribution networks – Electricity North West**
- **Vulnerable Customers and Energy Efficency –London Power Networks**
- **Flexible Urban Networks – Low Voltage – UK Power Networks**

4.3 The Panel recommends that the Authority does NOT fund the following projects.

- **Anglesey Community Energy – Scottish Power ManWeb.** The Panel did not feel the potential benefits or transferability of this project provided value for money given the cost.

- **Activating Customer Engagement – Northern Powergrid.** The Panel considered the cost to be high in relation to the objectives. It did not consider the methodology was sufficiently robust or ready to implement.
- **Clean Energy Balance – Western Power Distribution.** The Panel did not consider that this project was employing a solution that would provide financial benefits or would offer a lower cost method of managing renewable constraints. It did not believe it would be value for money for distribution customers.

4.4 The Panel was pleased to see a further improvement in the quality and clarity of the submissions. In Section 2, we have set out a number of concerns and issues that arose during the evaluation. The Panel would like to stress that many of the points listed below were adequately addressed in at least some of the submissions – the primary purpose in reiterating them is to remind DNOs that these points are important, allow for easier evaluation and, in some cases, strongly influence the Panel's conclusions.

- The Panel would like to see more clarity on the specific activities that would be undertaken for each method proposed – and where a sub-contractor or partner is responsible for a task or set of tasks, then there should be a clear description of the scope that allows the Panel to understand the role and whether the cost represents value for money.
- The financial and carbon benefits to the DNO must be split out from the benefits to third parties – for example, where the solution provides a way of avoiding a constraint, the financial savings for the DNO must be broken out separately and it must clearly identify, and compare the benefits with, the lowest cost alternative. There must be a clear break down of the costs and benefits of each method along with a statement of the assumptions underpinning the financial and carbon calculations.
- Tier One offers an opportunity for DNOs to test the method or technology that they wish to trial and ensure the approach is potentially viable. Where the project depends upon the success of a

method (and where its cost is relatively high), the Panel is likely to gain confidence in the project if Tier One funding has been used to test the method before submission of a Tier Two bid.

- The Panel would like to see a clear logic behind the selection of partners and sub-contractors. In particular, the Panel is keen to see some effort made to attract new vendors, universities and other partners in order to encourage innovation and build capacity in the marketplace. Where the project benefits an incumbent or opens up a new market for a supplier, then the Panel will expect to see a serious contribution and clear commitments for information dissemination from that partner.
- Projects must offer value for money: the potential benefits (financial, carbon and new learning) must offer good value in relation to the trial cost and to the subsequent roll out cost.
- It is important that the SDRCs take account of the key deliverables and outcomes; some of the submissions still tie the SDRC to a successful stage in the process.
- At the presentations, it is helpful if a representative of key partners is present, particularly where the success of the project depends on a piece of technology or the involvement of a community.
- Similarly, the clear input and involvement of a senior executive from the DNO often gives the Panel confidence that the DNO is committed to the success of the project.
- Finally the Panel were pleased to see that some of the final submissions reflected the discussions with the Panel and were more focused and offered better value for money. However the Panel were concerned where there appeared to be fundamental changes to the approach - it would prefer that the initial submissions had been sufficiently thought out and internally critiqued to avoid this. Furthermore given the evaluation process it is then difficult to re-examine and re-question the new information in the necessary detail – and overall it does not give the Panel great confidence that the methodology has been properly thought through or that the project is ready to implement.

4.5 The carbon and financial benefit calculations once again presented the Panel with difficulties. For carbon, estimating the long term effect of consumer DR and DSR, assessing the benefits of allowing more LCTs on an LV network or evaluating the carbon value of overcoming constraints are all subject to considerable uncertainties partly driven by the specificity of the characteristics of the location where the method is implemented. For financial benefits, estimating the cost of the method at scale or, for example, the future value of DSR services to the network is subject to large uncertainties.

The following is offered for guidance and the Panel will have a discussion with Ofgem about how to assist the submission teams to provide clearer calculations.

- First, the carbon and financial benefits to different parties should be calculated separately (e.g. where consumers or suppliers receive a benefit from the method);
- The physical impact (e.g. MW capacity released) must be quantified as robustly as possible – generic figures (such as likely savings from energy efficiency schemes) should only be used where there is absolutely no alternative.
- The carbon and financial benefits should be compared separately by method with the best available alternative solution – this is important as previous LCNF and other trials are already offering lower cost solutions; assumptions underpinning the calculations must be shown;
- Where possible, scenarios should be provided for the benefits that would accrue DNO-wide and GB-wide of rolling the scheme out; this should be shown as an annual saving (not savings up to 2050)).) The scenarios should indicate the type and quantity of relevant sites for the method and the potential carbon benefits and financial savings for each type of site.
- Where possible, this information should be summarised in tabular form and the whole Benefit Cost Analysis set out, in the text in summary form, and in an Appendix with the assumptions and calculations set out clearly; this cost table should be analysed by method and show costs,

capacity, carbon and financial benefits accruing to different parties and expressed as annual costs and savings for the trial, the DNO region and GB once the method is rolled out.

4.6 There is one other general point the Panel would like to draw attention to. In this and last year's competition we have had interesting integrated projects that have used surplus wind to generate hydrogen. In each case these have had strong local support. This competition is paid for by GB-wide DNO customers and the governance document requires us to assess the project's merits from the perspective of the DNO, the financial benefits to the DNO's customers, the learning that will be created for other DNOs and whether the knowledge will be of use and the method has the potential to become business as usual compared to the other options available to the DNO. In these cases a fundamental question must be: would the DNO offer this package as a connection this package to a developer that wished to connect and would the developer consider this to be more economic than the next best option; alternatively would the DNO see this as a way to lower the costs of connection? Unless the Panel can feel reasonably confident that this is a viable method for lowering the costs of connection it is not in a position to recommend funding.

This principle holds for other complex schemes. The Panel is keen to encourage community-based energy projects – but again the DNO benefits test must be satisfied. Where a community scheme is designed to manage constraints, perhaps the key question to be satisfied is: could other DNOs be expected to use and adapt this learning so as to apply this as a technically and financially viable option in managing constraints or does it depend too much on local circumstances?

4.6 The Panel would like to thank the Project Teams for their work – the Panel was particularly impressed by the commitment and enthusiasm shown by a number of the submission teams. We would also like to thank the external consultants and the Ofgem team for all of the support and assistance that was provided.