

**Ofgem Low Carbon Network Fund Tier 2 Evaluations - 2013**  
**Northern Powergrid (Northeast) Limited – Activating Customer Engagement (ACE)**

Project No. 379526

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## Authorisation

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## History

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## Explanatory Note

This report, including the “traffic light” indicators that reflect the salient points and material issues of concern identified during the evaluation process, (other than Section 9) is based on:-

- the original full submissions received from the DNOs in August 2013;
- subsequent question responses through the formal written question process;
- discussions held at the initial bilateral meetings between the DNOs and the Expert Panel on 28 August 2013;
- discussions held at the Consultant-DNO meeting on 5 September 2013;
- discussions held at the second bilateral meeting between DNO and the Expert Panel on 25 September 2013; and
- subsequent clarifications by the DNO.

In October 2013 the DNOs were given an opportunity to submit revised proposals. The traffic light indicators and the metrics shown in Sections 1 to 8 do not reflect any changes made by the DNOs in these revised submissions.

Section 9 of this report contains an addendum, which summarises the main changes made between the original and revised submissions, and the impact this has on the evaluation of the project against the criteria. Any significant changes to figures/metrics are noted in this addendum.

## Project Summary

Full name:	Activating Customer Engagement (ACE)
DNO Group:	Northern Powergrid (Northeast) Limited
The Problem(s):	DNOs have difficulty in using tariffs to effect demand-side response (DSR). This project is an investigation into alternative methods of achieving demand-side response without the use of tariffs, especially in locally constrained networks. Increases in low carbon technology and demand require network reinforcement. This project looks at ways communities can be activated to respond to specific local network issues faced by a DNO, through the use of non-tariff DSR interventions.
The Method(s):	<p>Direct control of demand. For example, appliances could be controlled remotely to reduce load at peak times.</p> <p>Static profile balancing. This would aim to encourage participants to habitually shift their use of certain appliances. Customers could shift load from peak times to any other time, or to specific times of low load / generation to help address voltage issues.</p> <p>Dynamic profile balancing. Dynamic balancing could encourage participants to shift their use of certain appliances from peak load times to times of low load / generation occasionally upon receipt of a signal from the DNO. The signal could be sent based on dynamic forecasting undertaken by the DNO using RTTR devices and weather forecasts.</p>
The Trial(s):	<p>1) Innovative customer engagement methodologies and incentives.</p> <p>How best to engage with each type of customer and identification of gaps in research allowing the development of intervention designs, including 'The Gen Game'. Focusing research on public sector I&amp;C customer types (local authority sites), and domestic customers (accessed through schools, and wider community engagement), and investigate the potential for time-shifting demands.</p> <p>2) DSR diagnosis and forecasting tool.</p> <p>To produce a power flow sensitivity tool and to develop a DSR diagnostic tool. The power flow sensitivity tool will be used to identify future constraints on the system. The diagnostic tool will draw in the results of other trials to determine the potential DSR capacity over time and the level of confidence in its achievement from customer types within the customer base.</p>
The Solution(s):	<p>To establish best practice on engaging with customers to achieve a DSR.</p> <p>To provide a tool for planners to estimate the cost and potential for</p>

	DSR.
Key strengths and weaknesses against the criteria	
Strengths:	<p>Project benefits from the enthusiastic participation of Durham County Council.</p> <p>Once proven the assumed potential benefits in terms of DNO capital savings and energy savings to customers when rolled out across GB DNO could be significant.</p> <p>Customers would benefit from lower energy bills.</p>
Weaknesses:	<p>As the benefits are geared towards localised network issues and intervention, the benefits may not be scalable to GB DNO without prohibitive administrative costs.</p> <p>The success of the project is heavily dependent on the success of 'The Gen Game' to encourage active participation amongst customers, and on the enthusiastic participation of Durham County Council. Whether similar results could be achieved with a less proactive local authority is questionable.</p> <p>Carbon savings are not quantified.</p>

## 1. Summary of Assessment against Evaluation Criteria

Criteria	Overall Assessment
(a) Low Carbon and Benefits	<p>Whilst total carbon savings have not been quantified, the proposal claims to reduce the carbon emissions associated with asset replacement, shifting peak loads to reduce fossil fuel generation at times peak demand; and overall load reduction by changing customers habits, which would also contribute to lower network losses.</p> <p>Since the benefits are geared towards localised network issues and intervention, this raises the question regarding the scalability of the benefits to other GB DNOs without prohibitive increases in administrating the DSR schemes.</p>
(b) Value for Money	<p>The project itself has around 70 man years allocated to it, based on around 220 attendance days per year, which seems a significant amount for what is essentially a customer-engagement methodology and a localised network constraint and DSR forecasting methodology. Whether this warrants a further £7m in LCN funding is questionable.</p> <p>However, whereas the benefits claimed from the trial are modest, once proven the assumed potential benefits in terms of DNO capital savings and energy savings to customers when rolled out across GB DNO are significant.</p>
(c) Generates New Knowledge	<p>The project is claimed to provide DNOs with a method of engaging with customers and local authorities in a specific way and demonstrate what can be achieved in terms of load reduction and DSR through their involvement with schools and customers. A further output from this will be the development of a DSR diagnosis and forecasting tool to allow DNOs to identify potential local network constraints and assess the feasibility of potential DSR capability.</p>
(d) Partners and Funding	<p>The partners and collaborators appear to have relevant experience and expertise. In particular the enthusiasm of Durham County Council to engage with an initial 10 schools and possibly expand the project to 25 schools illustrates their commitment to the trials.</p> <p>External funding is modest. The key contributor is Durham County Council. £0.5m of their contribution is dependent on the Council being able to secure EU funding.</p>
(e) Relevance and Timing	<p>In addition to targeting local authority I&amp;C customers to encourage Demand Side Response (DSR) and energy savings, this project has targeted the next generation of customers (10/11 year olds) to demonstrate what can be achieved by actively</p>

		<p>encouraging the end customer to consider how and when to use electricity. The assumption is that the children will be the messenger to their families and thus get parents involved in the trials and to actively participate in DSR. The trials will also target domestic customers accessed through the wider community.</p>
(f) Methodology		<p>The project has two main objectives:</p> <ul style="list-style-type: none"> <li>• To trial customer engagement methodologies and commercial arrangements to elicit a localised DSR response;</li> <li>• To develop a DSR diagnosis and forecasting tool to allow DNOs to identify potential local network constraints and assess the feasibility of potential DSR capability.</li> </ul> <p>This will be achieved by engaging with customers through school programmes, information, and competitions; localised community interventions to drive behavioural changes through an internet game; and targeting local authority I&amp;C premises through advice, competitions, and pledges.</p> <p>There is a risk that customer interest does not reach expectations and hence the DSR benefits forecast are not achieved, or are not replicable across the UK.</p> <p>One of the potential causes could be lack of interest in or short-lived impact of 'The Gen Game', and hence limited changes to the energy profile of those customers involved in the trial.</p>
(g) SDRC		<p>The SDRC stages and targets outlined in the Submission section 9 are reasonable and provide a good indication that the trial is meeting the objectives at the specified intervals.</p>



### Key to Traffic Light Colour Codes

The “traffic light” system used in the table above gives an indication of BPI’s assessment of the information provided by the DNO in support of the project in its detail, alignment with the LCNF evaluation criteria, identification and management of project risk and other aspects for each of the criteria. This is not intended to suggest whether projects should be funded or not, but to point out those areas which BPI believes merit particular scrutiny or consideration. Thus:-

	<ul style="list-style-type: none"> <li>• Seems to be generally in line with the objectives and requirements of the LCNF evaluation criteria;</li> <li>• Whilst there are some areas where additional information would be useful, that provided is generally comprehensive and provides no immediate cause for concern.</li> </ul>
	<ul style="list-style-type: none"> <li>• Some indication that the project is in line with the objectives and requirements of the LCNF evaluation criteria. However, further scrutiny is required to ensure to ensure this;</li> <li>• There are some gaps in the information provided;</li> <li>• Further assurance is needed to confirm that the project is viable and that risks are appropriately managed.</li> </ul>
	<ul style="list-style-type: none"> <li>• Significantly more assurance is required that the project is in line with the objectives and requirements of the LCNF evaluation criteria;</li> <li>• There are some major gaps in the information provided;</li> <li>• Considerable scrutiny is needed to confirm that the project is viable and that risks are appropriately managed;</li> <li>• Potential major risks to the viability of the project.</li> </ul>

In the following evaluations against the criteria, if the project is addressing various problems and/or trialling several methods and solutions, separate analysis of metrics and sub-criteria will be provided, if appropriate, for relevant criteria.

## 2. Criterion (a) Low Carbon and Benefits

<b>Criterion:</b>	Accelerates the development of the low carbon energy sector and has the potential to deliver net financial benefits to existing and/or future customers.	
<b>Overall assessment:</b>	<p>The proposal claims to reduce carbon emissions in four ways:-</p> <ol style="list-style-type: none"> <li>1: Reduced carbon associated with asset replaced as less is required.</li> <li>2: Shifting peak to off peak would reduce burden on the grid to run up fossil fuel generation at times peak demand.</li> <li>3: An overall reduction in demand by changing customers' habits.</li> <li>4: Moving load should reduce overall network losses.</li> </ol> <p>(A base case modelled figure of 73GWh up to 2050 is quoted)</p> <p>The carbon benefits case appears to lack impact due to a lack of quantitative analysis of carbon savings, however this is in accordance with Ofgem guidance. The proposal states "In line with the comments from the Expert Panel in their 2011 report, we have not quantified total carbon savings".</p> <p>The trial will need to demonstrate that the behavioural changes are sustained or much of the carbon benefits will be short lived and diminishing. The effect of greater intermittent low carbon generation may dampen benefit 2 over time which appears to be recognised. The benefits appear to be geared to localised network issues raising a question for the scalability of the benefits to other GB DNOs without prohibitive increases in administrating the DSR schemes.</p> <p>The proposal assumes that the results of the trials will be applicable to 86% of DNO customers, and the technology initially appears transferable. It is not network specific, however the application of DSR may be more localised.</p>	
<b>Metrics (as quoted by the project):</b>		
	<b>Method</b>	<b>Comments</b>
Net financial benefit (£) <sup>1</sup> :	£2,440,878 To 2050	Data from Excel spread sheet Ref: LCNF-NPG_2013_ACE_09092013
Network capacity release (kW) <sup>2</sup> :	37,581	As above

<sup>1</sup> The financial benefit of each method (at the trial scale) compared to the most efficient existing method; **Net financial benefit = Base case costs** (the lowest cost of delivering the Solution (on the scale outlined as part of the project) which has been proven on the GB Distribution Systems) – **Method cost** (the cost of replicating the method at the trial scale once it has been proven successful)

<sup>2</sup> The network capacity released by each method (the additional headroom released on the distribution system following implementation of the Method)

	(38MW) to 2050	
Base case time to release capacity (months) <sup>3</sup> :	4	As above
Method time to release capacity (months) <sup>4</sup> :	0	As above
Potential for replication <sup>5</sup> :	86%	As above

Sub-criteria	Assessment
Carbon claims (including quantitative, if provided)	<p>ACE aims to stimulate demand side response (DSR) by focusing on ways that a DNO can use novel commercial arrangements rather than tariffs to achieve voluntary customer participation in DSR.</p> <p>ACE claims to help facilitation of Low Carbon Technologies (LCTs) by using targeted DSR to address local network issues such as thermal loading and voltage issues.</p> <p>ACE claims to contribute to the Carbon Plan in three ways</p> <ol style="list-style-type: none"> <li>1. Creation of headroom to facilitate roll out of LCTs</li> <li>2. Help manage the impact in intermittent generation</li> <li>3. Directly reduce carbon emissions</li> </ol> <p>These are all plausible claims from DSR.</p> <p>Specifically the DSR proposed includes:-</p> <ul style="list-style-type: none"> <li>• <b>Direct control</b> – of appliances to reduce peak load</li> <li>• <b>Static profile balancing</b> – encourage customers to habitually move load off peak times</li> <li>• <b>Dynamic profile balancing</b> – occasional moving of load to off peak times on signal from the DNO</li> </ul> <p>The proposal claims to reduce carbon emissions in four ways:-</p> <ol style="list-style-type: none"> <li>1: Reduced carbon associated with asset replaced as less is required.</li> <li>2: Shifting peak to off peak would reduce burden on the grid to run up fossil fuel generation at times peak demand.</li> <li>3: An overall reduction in demand by changing customers' habits.</li> <li>4: Moving load should reduce overall network losses.</li> </ol> <p>( A base case modelled figure of 73GWh up to 2050 is quoted)</p> <p>The carbon benefits case appears to lack impact due to a lack of</p>

<sup>3</sup> The time it would take in months to deliver the capacity shown in “Network capacity released” using the Base Case

<sup>4</sup> The time it would take in months to deliver the capacity shown in “Network capacity released” using the replicated Method

<sup>5</sup> The estimated number of sites or % of the GB Distribution System where the method could be rolled out, up to 2040

Sub-criteria	Assessment
	<p>quantitative analysis of carbon savings, however this is in accordance with Ofgem guidance.</p> <p>The trial will need to demonstrate that the behavioural changes are sustained or much of the carbon benefits will be short lived and diminishing. The effect of greater intermittent low carbon generation may dampen benefit 2 (reduced peak time fossil fuel generation) over time, which appears to be recognised.</p> <p>Since the benefits are geared towards localised network issues, it is assumed in the base case that DNOs are able to undertake a range of conventional and smart network reinforcement options, and to access DSR at a cost comparable to the current cost of STOR. The benefits of ACE are then calculated by comparing the cost of ACE measures to the costs of all of these alternative ways to release capacity.</p>
Quantitative analysis	<p>The proposal states <i>“In line with the comments from the Expert Panel in their 2011 report, we have not quantified total carbon savings”</i>.</p>
Robustness of financial benefits	<p>The proposal suggests a modelled net financial benefit at a project scale of £2.4m between now and 2050, which equates £81k per annum (Ref: p16). This has been modelled using the Transform model, which includes a range of alternative smart and conventional options for releasing network capacity, including DSR. In this modelling, DSR in the base case is assumed to be available to DNOs at a cost comparable to the current cost of STOR. The benefits of ACE are then calculated by comparing the cost of ACE measures to the costs of all of these alternative ways to release capacity. It is not at all clear that the values associated with STOR (£43/kW), which require short term reductions in demand for system frequency conditions, are appropriate for DSR applications or that this project could meet the basic criteria of 3MW at 4 hours notice from NGC for which the STOR value relates.</p> <p>However, the project scale benefit appears low enough to warrant careful consideration on the prioritisation of LCN funding.</p> <p>Given that the GB scale net financial benefit is estimated at £827m equating to £27m per annum, assuming the ability to be rolled out on a significantly larger scale.</p>
Capacity released (and how quickly)	<p>Network capacity is claimed to be released at least four months sooner than traditional reinforcement, which is likely to allow more rapid connection of LCTs. (Ref: p19/20).</p> <p>The proposal estimates that 38MW of capacity could be released at project scale up to 2050 in the base case. (Ref; P86)</p> <p>The proposal also estimates that across the GB distribution system an average of 54MW of additional DSR could be released per year from 2020 – 2050 using the methods, in comparison to the base case (Ref; p21).</p>

Sub-criteria	Assessment
<p>Replication (applicability of technology, dependence on specific network characteristics)</p>	<p>The replication claim (Ref; p5) appears to be based on a demographic analysis that the County Durham trial area represents a majority (86%) of GB customer types. The trial is targeting domestic customers (accessed through schools) and the wider community (through internet based games), and local authority industrial &amp; commercial, to address three main research gaps.</p> <p>The proposal assumes that the results of the trials will be applicable to 86% of DNO customers, and the technology initially appears transferable. The technology suggested includes:</p> <ul style="list-style-type: none"> <li>• Internet based 'Gen Game' – While this is highly transferrable, the benefit proof will be in the sustained interaction.</li> <li>• Power flow sensitivity tool – to analyse constraints on the primary network (33-132kV). This appears transferable for DNOs.</li> <li>• DSR diagnostic tool – to help DNOs decision-making on selecting and implementing DSR.</li> </ul>

### 3. Criterion (b) Value for Money

<b>Criterion:</b>	Provides value for money to distribution customers
<b>Overall assessment:</b>	<p>The project itself has around 70 man years allocated, based on around 220 attendance days per year, which seems a significant amount for what is essentially a customer-engagement methodology and a localised network constraint and DSR forecasting methodology. Whether this warrants a further £7m in LCN funding is questionable.</p> <p>However, whereas the benefits claimed from the trial are modest, once proven the assumed potential benefits in terms of DNO capital savings and energy savings to customers when rolled out across GB DNO are significant.</p> <p>No benefits are claimed to any parties other than DNOs and their customers (through energy savings), although DSR benefits may spill over to other parties in the supply chain through DSR, such as reduction of TSO, supplier, and generator costs.</p>
<b>Metrics (where available):</b>	
Size of benefits to distribution system <sup>6</sup>	<p>Net benefits are valued at £27m per annum at GB scale, amounting to £827m to 2050. 100% of these benefits apply to DNO customers. Savings in DNO capital and operating expenditure across GB by the adoption of ACE are given as £480m to 2050.</p> <p>Energy savings to customers are estimated at £347m to 2050.</p>

<b>Sub-criteria</b>	<b>Assessment</b>
Proportion of benefits attributable to distribution system (as opposed to elsewhere in the supply chain)	<p>All benefits claimed are to distribution systems and their customers.</p> <p>On a project scale, ACE is expected to yield £81k per annum (£2.4m to 2050). However benefits scaled up across the UK are estimated to be significantly higher.</p> <p>Savings in DNO capital and operating expenditure across GB by the adoption of ACE are given as £480m to 2050.</p> <p>Energy savings to DNO customers are given as £347m to 2050, based on a simple assumption of 5% energy saving.</p> <p>No benefits are claimed to any parties other than DNOs and their customers (through energy savings), although DSR benefits may spill over to other parties in the supply chain through DSR, such as reduction of TSO, supplier, and generator costs.</p>

<sup>6</sup> Size of benefits attributable or applicable to the Distribution System verses elsewhere

Sub-criteria	Assessment
	<p>If the project was adopted across GB, Oswald Consultancy may benefit from the potential enlarged market for 'The Gen Game'.</p>
<p>How learning relates to the distribution system</p>	<p>The learning is focused towards DNOs in terms of innovative customer engagement methods and DSR incentives, and the development of a tool to identify network constraints and predict DSR capability.</p>
<p>Approach to ensuring best value for money in delivering projects</p>	<p>The proposal states that value for money is achieved through review of major cost items and competitive tendering.</p> <p>Procurement packages are summarised as:-</p> <ol style="list-style-type: none"> <li>1. Software development for the network diagnostic tool</li> <li>2. Installation of network household monitoring equipment</li> <li>3. Marketing consultants</li> <li>4. IT relating to The Gen Game, and</li> <li>5. Consultants to support identification I&amp;C peak shifting customers.</li> </ol> <p>The project itself has around 70 man years allocated, based on around 220 attendance days per year, which seems a significant amount for what is essentially a customer-engagement methodology and a localised network constraint and DSR forecasting methodology. Whether this warrants a further £7m in LCN funding is questionable.</p>
<p>Identify and review major cost items, examine justification for relevant costs, assess choice of discount rates</p>	<p>The cost of designing and implementing the wider community (Gen Game) trials is £826 per household (£1.65m spread across 2000 households).</p> <div data-bbox="491 1310 1353 1550" style="background-color: black; width: 100%; height: 100%;"></div> <p>The costs have been split into fixed and variable costs. Fixed costs include trial design, developing and installing the IT system, project analysis, evaluation and knowledge dissemination, and cover the work by university partners. Variable costs include recruitment, equipment such as smart plugs, and prizes.</p> <p>It is noted that NPG proposes to allocate 10,036 man days to this project, at a cost of [REDACTED]. This equates to around 46 man years*.</p> <p>Newcastle University expects to allocate 2,145 man days to this project, at a cost of [REDACTED]. This equates to around 10 man years*.</p> <p>Durham and Exeter Universities expect to expend 1,426 man days on this project, at a cost of [REDACTED]. This equates to around 7 man years*.</p> <p>With the 1,568 man days (7 man years*) provided by Durham County</p>

<b>Sub-criteria</b>	<b>Assessment</b>
	<p>Council as benefit in kind, this amounts to a total of 70 man years allocated to this project*.</p> <p>* based on approximately 220 attendance days per year</p>



#### 4. Criterion (c) Generates New Knowledge

<b>Criterion:</b>	Generates knowledge that can be shared amongst all DNOs	
<b>Overall assessment:</b>	<p>The project is claimed to provide DNOs with a method of engaging with customers and local authorities in a specific way and demonstrate what can be achieved in terms of load reduction and DSR through their involvement with schools and customers. A further output from this will be the development of a DSR diagnosis and forecasting tool to allow DNOs to identify potential local network constraints and assess the feasibility of potential DSR capability.</p> <p>It is apparent that the success of the project is heavily dependent on the enthusiastic and proactive participation of Durham County Council. Whether similar results could be achieved with a less proactive local authority is questionable.</p> <p>A key part of the project is 'The Gen Game', an internet-based game to encourage customers to volunteer load for instant demand response in exchange for league points and opportunities for prizes. Whether this game will capture and retain customers' interest and produce the expected results is questionable.</p>	
<b>Metrics (where available):</b>		
Conforming to default IPR arrangements:	YES	

Sub-criteria	Assessment
Potential for new/incremental learning to be generated by the project	<p>Investigating the potential for non-tariff interventions to address barriers to DSR from time of use tariff signals alone, identified by previous work;</p> <p>Testing methods of integrating earlier work (with academic partners) into a diagnostic tool to identify DSR potential;</p> <p>Focussing on groups such as public sector I&amp;C customers not targeted in previous GB trials;</p> <p>Learning from successes in previous trials and focussing on games, school interventions, and I&amp;C energy efficiency advice;</p> <p>Using 'The Gen Game' to provide incentives for direct control and peak shifting.</p>
Applicability of learning to other DNOs	<p>The project is claimed to provide DNOs with a method of engaging with customers and local authorities in a specific way and demonstrate what can be achieved in terms of load reduction and DSR through their involvement with schools and customers.</p> <p>It does not go down to the smaller entities such as Parish Councils,</p>

Sub-criteria	Assessment
	<p>where they are unlikely to have the necessary resources and expertise.</p> <p>It is apparent that the success of the project is heavily dependent on the success of 'The Gen Game' to encourage active participation amongst customers, and on the enthusiastic and proactive participation of Durham County Council. Whether similar results could be achieved with a less proactive local authority is questionable.</p>
<p>Proposed IP management and any deviations from default IP principles</p>	<p>The proposal complies with LCN Fund's requirements on IPR.</p> <p>A key part of the project is 'The Gen Game', an internet-based game to encourage customers to volunteer load for instant demand response in exchange for league points and opportunities for prizes.</p> <p>Oswald Consultancy owns the copyright to 'The Gen Game' and slogans associated with it. It intends to patent and Trademark 'The Gen Game' at its own cost. The Gen Game is treated as associated with background IPR. Oswald Consultancy intends to licence the background IPR on reasonable terms.</p> <p>Oswald Consultancy has agreed to comply with the default conditions in relation to IPR, allowing deployment of IPR where it is material to the dissemination of learning.</p>
<p>Credibility of proposed methodology for capturing learning from the trial and plans for disseminating</p>	<p>The learning dissemination plan identifies appropriate target audiences and provides a reasonable dissemination methodology.</p> <p>A key part of the project is 'The Gen Game', an internet-based game to encourage customers to volunteer load for instant demand response in exchange for league points and opportunities for prizes. Whether this game will be successful in capturing and retaining customers' interest and produce the expected results is questionable.</p>

## 5. Criterion (d) Partners and Funding

<b>Criterion:</b>	Involvement of other partners and external funding.		
<b>Overall assessment:</b>	<p>The partners and collaborators appear to have relevant experience and expertise. In particular the enthusiasm of Durham County Council to engage with an initial 10 schools and possibly expand the project to 25 schools illustrates their commitment to the trials.</p> <p>External funding is modest. The key contributor is Durham County Council. £0.5m of their contribution is dependent on the Council being able to secure EU funding.</p>		
<b>Metrics (where available):</b>			
Total cost of project (£):	£7,975,000 <del>£7,762,380</del>	Number of consortium members:	Five (including DNO)
Cost met by DNO (£):	£703,030	Cost met by DNO (% of total cost):	8.8%
LCNF support (£):	£6,115,000	LCNF support (% of total cost):	76.7%
Cost met by others (£):	£944,350* Or £430,350*	Cost met by others (% of total cost):	11.8%
* NB £944k costs met by others includes £514k application for EU funding. If this is not forthcoming, the costs met by others will reduce to £430k.			

Sub-criteria	Assessment
Appropriateness of collaborators (including experience, expertise and robustness of commitments)	<p>The collaborators have the relevant experience and expertise. In particular the enthusiasm of Durham County Council to engage with an initial 10 schools and possibly expand the project to 25 schools illustrates their commitment to the trials.</p> <p>(On a GB scale, whether similar involvement could be achieved from less proactive local authorities is questionable.)</p>
Level of external funding (presented)	External funding is modest in comparison to other projects.

Sub-criteria	Assessment
<p>on a comparable basis with other projects)</p>	<p>Durham County Council has offered to provide a contribution of £430k in manpower. However, whether the Council can commit this level of manpower input (equivalent to 7 man years at 220 days per year) given their budgetary constraints remains to be seen.</p> <p>Durham County Council is also applying to the EU for a further £514k for the enhanced trials (Ref; p24).</p> <p>Oswald Consultancy (Key Collaborator) contribution of £50k of 'benefit in kind'.</p>
<p>Effectiveness of process for seeking and identifying new project partners and ideas</p>	<p>The selection rationale for project partners and knowledge development appears to be well thought through:-</p> <p>The project partners include:-</p> <ul style="list-style-type: none"> <li>• Durham County Council</li> <li>• Newcastle University</li> <li>• Durham University</li> <li>• Exeter University</li> </ul> <p>Oswald Consultancy will also be working with the team as a collaborator.</p> <p>The selection consideration has included</p> <ul style="list-style-type: none"> <li>• Relationship strengths</li> <li>• Financial contribution commitment</li> <li>• Previous experience and continuity of incremental work</li> <li>• Access to resources</li> </ul> <p>The proposal does not go into detail of how NPG originally sought to attract interest from the market place, although it appears some are relationships are from previous projects.</p>

## 6. Criterion (e) Relevance and Timing

<b>Criterion:</b>	Relevance and timing.		
<b>Overall assessment:</b>	In addition to targeting local authority I&C customers to encourage energy savings, this project has targeted the next generation of customers (10/11 year olds) to demonstrate what can be achieved by actively encouraging the end customer to consider how and when to use electricity. The assumption is that the children will be the messenger to their families and thus get parents involved in the trials.		
<b>Metrics (where available):</b>			
Start date:	2 January 2014	Elapsed time of project:	Circa 4 years 31 October 2017

Sub-criteria	Assessment
Significance in the project in: (a) overcoming current obstacles to a low carbon future	The main obstacle to a project of this nature is the ability to recruit and maintain a general public involvement in such a trial. By using Primary school children this will certainly improve the number of participants and it may be possible to establish whether such techniques have a longer term impact on the behaviour of customers.
(b) trialling new technologies that could have a major low carbon impact	The only new technology is software rather than hardware or equipment that has an impact on the low carbon future.  A key part of the project is 'The Gen Game', an internet-based game to encourage customers to volunteer load for instant demand response in exchange for league points and opportunities for prizes. Whether this game will be successful in capturing and retaining customers' interest and produce the expected results is questionable.
(c) demonstrating new system approaches that could have widespread application	The project is heavily reliant on the involvement of Durham County Council, who is clearly prepared to devote resources to encourage energy saving and time of use changes in their locality and thus bring about carbon savings.  There is some doubt as to whether other Council Authorities would devote so much time and effort to achieve the energy changes, especially at a time when their budgets are being cut and the general fiscal constraints on all public bodies.
Applicability of the project to future business plans, regardless of uptake	The consideration and application of DSR is likely to be a feature of all DNO business plans in the future.  The learning from this project together with the output from the

<b>Sub-criteria</b>	<b>Assessment</b>
of Low Carbon Technologies (LCTs)	network tools could be used to inform future business plans.

## 7. Criterion (f) Methodology

<b>Criterion:</b>	Demonstration of a robust methodology and that the project is ready to implement.		
<b>Overall assessment:</b>	<p>NPG has a detailed project plan and partners in place, benefiting from experience in previous project trials.</p> <p>The project has two main objectives:</p> <ul style="list-style-type: none"> <li>To trial customer engagement methodologies and commercial arrangements to elicit a localised DSR response;</li> <li>To develop a DSR diagnosis and forecasting tool to allow DNOs to identify potential local network constraints and assess the feasibility of potential DSR capability.</li> </ul> <p>This will be achieved by engaging with customers through school programmes, information, and competitions; localised community interventions to drive behavioural changes through an internet game; and targeting local authority I&amp;C premises through advice, competitions, and pledges.</p>		
<b>Metrics (where available):</b>			
Requested level of protection against cost over runs (default 5%) (%):	0% [Page 33 of submission.]	Requested level of protection against direct benefits (default 50%) (%):	None requested. [Page 33 of submission.]

Sub-criteria	Assessment
Feasibility of project proposal	<p>The trial is certainly feasible and can be implemented reasonable quickly. Engagement of employees of Durham County Council and Schools could be attained fairly quickly given the keen involvement of the County Council.</p> <p>Whether this would be replicable across GB DNO given the significant proactive input into the trial by Durham County Council is questionable.</p>
All risks, including customer impact, exceeding forecast costs and missing delivery date	<p>NPG has provided a reasonable risk register.</p> <p>It is unlikely that there would be any significant cost over-run as the cost of smart plugs and house monitors are known and the volumes fixed.</p> <p>However, there is a risk that customer interest does not reach expectations and hence the DSR benefits forecast are not achieved, or are not replicable across the UK.</p> <p>One of the potential causes could be lack of interest in or short-lived impact of 'The Gen Game', and hence limited changes to the energy</p>

Sub-criteria	Assessment
	<p>profile and consumption of those customers involved in the trial.</p> <p>It should also be borne in mind that the project delivery is partly dependent on Durham County Council providing 1,568 man days to the project at no cost.</p> <p>The project also includes an application for £514k of EU funding.</p>
<p>Whether items within project budget provide value for money</p>	<p>NPG proposes to allocate 10,036 man days to this project, at a cost of £2.689m. This equates to around 46 man years*.</p> <p>Newcastle University expects to allocate 2,145 man days to this project, at a cost of £843k. This equates to around 10 man years*.</p> <p>Durham and Exeter Universities expect to expend 1,426 man days on this project, at a cost of £666k. This equates to around 7 man years*.</p> <p>With the 1,568 man days (7 man years*) provided by Durham County Council as benefit in kind, this amounts to a total of 70 man years allocated to this project*.</p> <p>Although the daily rates have been calculated based on full time equivalent rates and appear reasonable, it is questionable whether this amount of manpower represents value for money.</p> <p>* based on approximately 220 attendance days per year</p>
<p>Project methodology (including depth and robustness of project management plan)</p>	<p>The project has two main objectives:</p> <ul style="list-style-type: none"> <li>• To trial customer engagement methodologies and commercial arrangements to elicit a localised DSR response;</li> <li>• To develop a DSR diagnosis and forecasting tool to allow DNOs to identify potential local network constraints and assess the feasibility of potential DSR capability.</li> </ul> <p>This will be achieved by engaging with customers through school programmes, information, and competitions; localised community interventions to drive behavioural changes through an internet game; and targeting local authority I&amp;C premises through advice, competitions, and pledges.</p>



## 8. Successful Delivery Reward Criteria

<b>Criterion:</b>	Appropriateness of the SDRC definitions and timing and adequacy of links to key project milestones.
<b>Overall assessment:</b>	The SDRC stages and targets outlined in the Submission section 9 are reasonable and provide a good indication that the trial is meeting the objectives at the specified intervals.
<b>Review:</b>	<p>The final report stage is covered in 9.11, but the six monthly progress reports need to be included in the SDRC.</p> <p>Data Protection is covered in 9.3 together with the Customer Engagement Plans.</p>

## 9. Addendum: Changes made in Resubmission

<p><b>9.1 Summary of Changes</b></p>	<p>Following meetings and discussions with the Expert Panel and the Consultants, and after responding to written questions, NPG submitted a revised full submission in mid-October 2013.</p> <p>The resubmission incorporates some significant changes from the original submission, including greater clarity and additional information, with greater emphasis on the DSR planning tool and DSR benefits, with perhaps slightly less focus on ‘The Gen Game’. The key changes in NPG’s resubmission include:</p> <ul style="list-style-type: none"> <li>• A reduction in NPG manpower and other project costs, leading to a lower funding request;</li> <li>• A revised benefits case, including lower, mid, and upper estimates. This indicates a significant increase in potential benefits.</li> </ul> <p>NPG has sought to address the concerns of the Expert Panel and the Consultants by providing additional information and clarity in areas that were of most interest to the Expert Panel and the Consultants. This includes:</p> <ul style="list-style-type: none"> <li>• Further information on the purpose and functionality of the DSR planning tool;</li> <li>• Clarification regarding the degree to which ACE could be scaled up across GB;</li> <li>• Further assurance of Durham County Council’s commitment to the project;</li> <li>• NPG’s plan for customer recruitment and retention;</li> <li>• The inclusion of delivery of the diagnostics tool in the SRDC; and</li> <li>• Although not a major issue, NPG has quantified the estimated carbon savings.</li> </ul> <p>Overall, the project costs have reduced from £7,975k to £7,405k, and NPG’s LCN funding request has reduced by almost £500k, from £6,115k to £5,621k.</p> <p>Mid-point estimated project-scale benefits have been increased from £81k per annum (£2.4m to 2050) to 119k per annum (£3.6m to 2050), whilst the ‘headline’ estimated GB-wide DNO benefits to 2050 have increased significantly from £827m to £3.4bn, equating to £114m per annum.</p>
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<b>9.2 Criterion (a) Low Carbon and Benefits</b>		<p>NPG has made significant changes to their benefits case, and their revised submission includes a new Section 3 and Appendix 12, and amendments to the benefits estimates in Section 4, based on less conservative assumptions.</p> <p>NPG now provides a range estimate for benefits, with the lower and upper bounds representing more conservative and less conservative assumptions respectively, and a headline central case estimate at the midpoint of this range. They have also provided estimated and monetised values for the carbon benefits associated with energy savings and reductions in losses, which were not shown in their original submission.</p> <p>They have tabulated the breakdown of the benefits to clarify how benefits are distributed between customer types, and this can be demonstrated as follows:</p>
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Benefit Metrics at Project Scale (to 2050)					
	Benefits to all DNO customers	Additional benefits to ACE households	Additional benefits to ACE I&C customers	Carbon Benefits	Total net benefits
Lower boundary	£39m	£62m	£3m	£2.1m	£107m
<b>Mid-point</b>	<b>£87m</b>	<b>£83m</b>	<b>£4m</b>	<b>£2.8m</b>	<b>£177m</b>
Upper boundary	£134m	£104m	£5m	£3.4m	£247m

Benefit Metrics at GB Scale (per Annum)					
	Benefits to all DNO customers	Additional benefits to ACE households	Additional benefits to ACE I&C customers	Carbon Benefits	Total net benefits
Lower boundary	£16m	£11m	£0.5m	£0.5m	£28m
<b>Mid-point</b>	<b>£62m</b>	<b>£49m</b>	<b>£2m</b>	<b>£2m</b>	<b>£114m</b>
Upper boundary	£107m	£86m	£4m	£3m	£201m

NPG has increased the headline estimate of the GB-wide benefits that the ACE project will deliver from £827m to £3.4bn to 2050, which equates to £114m per annum. This represents a significant increase on the benefits case assumed in the original full submission. NPG's sensitivity analysis estimates that benefits could be even higher under a more optimistic scenario for LCT take-up and energy savings, where the range of benefits would increase to £3,196m to £7,408m (or £107m to £247m annually).

NPG has estimated direct Carbon savings of between 72,000 and 620,000 tonnes of carbon to 2050, from reduced energy use, reduced losses, and peak shifting. These direct carbon savings have been included in the monetised benefits.

Questions have been raised regarding the appropriateness of valuing DSR in the base case at a cost comparable to the current cost of STOR. NPG has sought to provide a clearer explanation of the rationale for using DSR priced at the cost of STOR, alongside other smart and conventional measures. Whilst this may still be questionable, it is noted that the cost of alternatives, such as network reinforcement or DSR from I&C customers, is likely to be comparable.

In terms of additional network capacity released, NPG's analysis using the Transform model now estimates that an average of 242MW of additional DSR could be released per year from 2020-2050 using ACE methods, in comparison to the base case [p.21]. This is an increase of 188MW per year compared to the figure assumed in the original submission.

Whilst the benefits case is clearer and better presented, it should be noted that the significant increases in financial and network capacity benefits are largely the result of less conservative assumptions in comparison to the original submission.

Some of the original concerns remain, however, in that the predicted increases in intermittent low carbon generation may dampen the level of benefits in the future. In any event, the trial will need to demonstrate that behavioural changes are sustained, or much of the carbon benefits will be short lived and diminishing.

Nevertheless, the revised submission is an improvement on the original submission in this area, and is sufficient to reconsider the original evaluation against this criterion.

<p><b>9.3 Criterion (b) Value for Money</b></p>	<p>The main changes to the estimated benefits are shown in 9.1 above. From a project point of view, the assumed headline benefits have been increased from £81k per annum to 119k per annum. The tables shown provide clarification of how the benefits are distributed between customer types.</p> <p>Concerns were raised on the original submission regarding the amount of man years allocated to the project, which the Consultant estimated at around 70 man years, based on around 220 attendance days per year. This was particularly the case with NPG itself, which proposed to allocate 10,036 man days to this project</p> <p>NPG sought to address by stating that the allocation was based on 260 days per year. This would mean that the time allocated to the project includes holidays, Bank Holidays, and other non-attendance time. It would perhaps be more appropriate to incorporate the cost of non-attendance time into the charge-in daily rate so that only the man days actually worked on the project are shown. Whichever way this is looked at, the costs allocated to the project would be the same, and it is still a significant amount of time allocated.</p> <p>Nevertheless, NPG has sought to address the concerns, and has made a £439k reduction (19%) in its funding request relating to NPG manpower, by the removal of 1.5 FTEs from the project and by reducing the time allocated to the project for other roles.</p> <p>There has also been a significant reduction in academic cost input (£98k), a reduction in energy efficiency advice on the local authority trials, a £63k reduction in technical contract support relating to the identification of trial locations and monitoring requirements, and a £41.6k reduction in the cost of home monitoring installations. This has been partly offset by reinforcing the social marketing resources to assist with recruitment and engagement (£141k), and an increase in software support for the development of the DSR planning tool (£73k). These appear to be sensible changes.</p> <p>Changes to manpower input can be summarised in the following table:-</p>
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	Original Full Submission		Revised Full Submission	
	Day Rate	Number of Days	Day Rate	Number of Days
Northern Powergrid				
Newcastle University				
Durham and Exeter Universities				
Durham County Council				

\* benefit in kind

		<p>The overall cost of the project has reduced from £7,975k to £7,405k, and NPG's LCN funding request has reduced by almost £500k, from £6,115k to £5,621k. This does represent an improvement to the project value for money, and the impact of this reduction is sufficient to reconsider the original evaluation against this criterion.</p>
<p><b>9.4</b>      <b>Criterion (c)</b> <b>Generates Knowledge</b></p>		<p>One of the concerns with the original submission was the prominence given to 'The Gen Game', and its key role in encouraging customers to volunteer load for instant demand response in exchange for league points and opportunities for prizes. Whether this game will capture and retain customers' interest and produce the expected results was a source of concern.</p> <p>Whilst the Gen Game remains an integral part of ACE, the resubmitted proposal appears to give it slightly less prominence, focussing more on the DSR Planning Tool and clarifying the purpose and functionality of the tool [Section 2]. This is an improvement on the original submission. However, some of the changes in terminology include inviting customers to participate in 'internet-based direct control DSR propositions', rather than internet based games, although these appear to be one and the same.</p> <p>Nevertheless, NPG has provided more detail on previous internet trials, together with details of their plans for customer recruitment and retention [Appendix 13], although it is still not clear how much of the significant estimated financial and network capacity benefits are dependent on the success or failure of the Gen Game.</p> <p>A further concern raised was the dependence of the project on the enthusiastic and proactive participation of Durham County Council. The revised submission provides further assurance of Durham County Council's commitment to the success of ACE. However, the question of whether similar results could be achieved with a less proactive local authority remains.</p> <p>The revised submission is an improvement on the original submission in this area, and is sufficient to reconsider the original evaluation against this criterion.</p>
<p><b>9.5</b>      <b>Criterion (d)</b> <b>Partners and Funding</b></p>		<p>The revised submission is not considered to impact on the evaluation against this criterion.</p>
<p><b>9.6</b>      <b>Criterion (e)</b> <b>Relevance and Timing</b></p>		<p>The revised submission is not considered to impact on the evaluation against this criterion.</p>

<b>9.7</b>	<b>Criterion (f) Methodology</b>	The revised submission contains some greater detail and clarity on the methodology, in particular with regards to the DSR Planning Tool and its purpose and functionality, but is not considered to impact on the evaluation against this criterion.
<b>9.8</b>	<b>Successful Delivery Reward Criteria</b>	The only major change is the inclusion of the provision for the DSR planning tool to be made available to other DNOs. This is not considered to impact on the evaluation against this criterion.