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Planning Energy
for a Sustainable World

Ofgem LCNF Tier 2 Evaluations

GB Flexibility Market

Northern Power Grid

Final Report

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CONTENTS

Explanatory Note

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

- the original full submissions that were received from the DNOs in August 2012;
- subsequent question responses through the formal written question process; and
- discussions held at meetings between the DNOs and the Expert Panel and/or PPA Energy.

In October 2012 the DNOs were given an opportunity to submit revised proposals. The traffic light indicators and the metrics shown in Sections 1 to 8 have not been changed to reflect any changes made by the DNOs in these revised submissions.

Section 9 of this report contains an addendum, which summarises 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:	The GB Flexibility Market	Short name:	GBFM
		Total cost:	£34.159 million
DNO group:	Northern Power Grid (NPG)	LCNF funding request:	£18.258 million

The Problem(s): Electricity demand is expected to grow significantly due in part to Low-Carbon Technologies such as Electric Vehicles (EVs) and heat pumps. Traditionally DNOs have reinforced networks to cater for demand increases; an alternative is to contract flexibility to release capacity. In addition, the demand from DNOs for flexibility is likely to increase due to the impact of increasing amounts of intermittent renewable generation and increased levels of Distributed Generation (DG). Flexibility services are currently contracted bilaterally, which creates a number of barriers. These include:

- limited financial incentives from DNOs;
- high transaction costs associated with bilateral contracts;
- low customer awareness of the potential to sell Demand Side Response (DSR) due to a lack of transparency in the market; and
- lack of access across the value chain – flexibility is unavailable to DNOs as it is already committed to other market participants.

The Method(s): The project proposes to trial two sets of commercial arrangements, Method 1 and Method 2, which aim to reduce the costs of flexibility to DNOs.

Method 1: Network operator trials – Trilateral agreements to facilitate sharing flexibility services between DNOs and the System Operator (SO).

Method 2: Multi party trials – Trading flexible service provision via a multi-party market platform, aiming to reduce transaction costs. A GBFM operator will run the market.

The Trial(s): A trial for each method will be carried out in Northern Power Grid's (NPG) distribution area, drawing on technology and customer groups

used by the Customer Led Network Revolution (CLNR) project.

Method 1 Trial: The "network operator" trial will involve trialling simulation and physical tests of resources against, near-term conditions, as well as 2020 and 2030 scenarios. Demand for flexibility services will be simulated; the response provided will be real (physical). A physical trial involving all participants of Method 1 is proposed for winter 2013/14 and summer 2014.

Method 2 Trial: The "multi party" trial is proposed to take place in winter 2014/15, summer 2015 and winter 2015/16. A market platform will be developed for the trial, which will match flexibility providers and purchases. Again, the requirements for flexibility will be simulated, but the response will be real.

Customer types (providers) are expected to include large industrial and commercial customers, aggregators and energy storage, and domestic customers for Method 2 only. Customer involvement will be voluntary. Purchasers will include the SO, DNOs, suppliers and energy traders.

The Solution(s): The project aims to trial commercial arrangements to reduce the cost of flexible services to the DNO by enabling sharing in the case of Method 1 and additionally reducing transaction costs in the case of Method 2. The solution will release network capacity, and reduce barriers to entry for both providers and purchasers of DSR and other flexibility services, which should result in lower customer bills.

Key strengths and weaknesses against the criteria

Strengths:

- This project has the potential to generate knowledge that is relevant to other DNOs, as it is proposing the development of a market for flexibility services in which DNOs can participate to give them access to service providers, who are otherwise more likely to be selling DSR, in particular, in other platforms.

- The key benefit to DNOs is the reduction in costs of accessing flexibility due to enabling sharing of flexibility between the System Operator (SO) and DNOs in the case of Method 1, further reducing costs due to sharing with suppliers and traders in Method 2 and additionally reducing transaction costs in the case of Method 2.

- Areas of new knowledge are expected to include making flexibility a commercial reality, trialling methods to evaluate how DSR can be shared with other purchasers, informing on how

providers of flexibility react to providing services to multiple purchasers, and developing market arrangements.

- Increasing the quantity of flexibility available to DNOs is important and has the potential to add significantly to the reduction of barriers to entry for low carbon technologies on the network.

- Benefits have been identified for key stakeholder groups. Clearly a significant amount of effort has gone into these calculations.

- This is a strong team, with relevant experience and appropriate expertise. NPG has secured at least one of each type of participant required for the trails, as either a project partner or collaborator. A good number of partners are contributing external funding.

Weaknesses:

- A more detailed breakdown and explanation of costs has been provided, which gave rise to concerns about the level of resources in the project, as well as day-rates for some of the partners. While further assurance has been provided on value for money in terms of rates, the level of resource requirements remains high. NPG has proposed to review project costs in their revised submission.

- There is significant uncertainty in the estimates of financial benefits. The estimates are based on many assumptions; the project aims to evaluate and inform on these assumptions.

- While there are sound reasons behind the project partner selection, the process for recruiting partners seems limited in terms of identifying new partners.

- While recognising the time required for project learning and a roll-out, and the timing of GBFM in relation to GB and European policy developments, the estimated requirements for flexibility in 2020 are small in comparison with those in 2030, which raises the possibility that this is a future rather than current need.

- The methodology for sharing flexibility with the System Operator, in particular for Method 1, is not discussed in detail. However, it is recognised that the commercial framework design will be developed during an initial phase of work.

1 Summary of Assessment against Evaluation Criteria

Criteria	Overall Assessment	
(a) Low carbon and benefits		As well as making references to how GBFM will support the low-carbon transition in broad terms, Northern Power Grid (NPG) has also identified three direct impacts of the project on carbon emissions. Total savings have not been quantified, but it is likely that the most significant savings will be due to reducing the requirement for reserve to the System Operator from large thermal plants. Financial benefits due to Methods 1 and 2 have been estimated, in terms of savings against network reinforcement (£/kW/year) and total savings per stakeholder across GB up to 2040. There are many assumptions and a detailed spreadsheet behind these figures. It is clear that a considerable amount of effort has gone into these calculations. NPG has stated there is significant uncertainty in these figures, but that conservative assumptions have been used and the purpose of the project will be to fully evaluate the benefits. Capacity released at the project scale has been estimated based on analysis from a previous project, Customer Led Network Revolution (CLNR). The figures claimed do not seem unreasonable compared with methods to shift and reduce demand. The capacity released across GB has been estimated, based on the Smart Grid Forum Work stream 3 model. It is noticeable that the demand for flexibility (and capacity released) increases significantly from 2020 to 2030.
(b) Value for money		NPG has estimated financial savings to three sets of stakeholders; DNOs, the SO and suppliers/traders. Benefits to DNOs are significant in absolute and relative terms,

		although there is uncertainty in these figures. Most of the learning outcomes are relevant to the distribution system. However, as this is a project involving multiple stakeholders, they will inevitably benefit from the learning in this project. NPG has identified "policy and regulation" and "market participants" as key audiences for learning from this project. NPG has identified an £8.7 million cost item associated with intellectual property development. NPG targeted CLNR partners (British Gas, EA Technology and Durham University), claiming the benefits of this include leveraging experience and contributions. As this is a large part of the project budget which has been allocated in what appears to be a non-competitive manner, more assurance was sought that measures have been taken to ensure value for money in contractor costs. While further assurance has been provided on value for money in terms of rates, the level of resource requirements remains high. NPG has proposed to review project costs in their revised submission.
(c) Generates knowledge		This project has the potential to generate new knowledge that is relevant to other DNOs, since it is proposing the development of a market for flexibility services in which DNOs can participate to give them access to service providers who are otherwise more likely to be selling DSR, in particular, in other platforms. Areas of new knowledge include making flexibility a commercial reality, trialling methods to evaluate how DSR can be shared with other purchasers informing on how providers of flexibility react to providing services to multiple purchasers, and developing market arrangements. It is considered that NPG has a methodology for knowledge dissemination that has been well thought through, with some novel ideas of dissemination activities (e.g. GBFM simulation

		trading day).
(d) Partners and Funding		This project requires the participation of several stakeholders, and NPG has secured at least one of each type of participant required as either a project partner or collaborator. In addition to requiring market participants, resources with expertise are required to undertake a significant portion of the project activity. This is a strong team, with relevant experience and appropriate expertise. With eight project partners and five collaborators, the team is large, although NPG has weighed up the risks to project complexity and delivery of including more participants against the benefits of wider learning, and decided not to involve more suppliers / traders. Most partners and collaborators have signed a Memorandum of Understanding (MOU), and there are existing collaboration agreements between a number of partners. National Grid has reserved their position on committing to Method 2 trials, pending the evaluation of the business case. NPG has identified a number of contingency options in the event that National Grid decides not to proceed with the Method 2 trials. A good number of partners are contributing external funding, amounting to around 10% of project costs.
(f) Relevance and timing		The project identifies the growth in demand associated with heat and transport electrification, the impact of intermittent electricity supplies from renewable generation, and the increase in local embedded generation as reasons why DSR and storage, in particular, are needed to defer network reinforcement requirements and to maximise the flexibility of capacity on the network. In terms of timing, the amount of flexibility that is assumed will be required by DNOs is 42-48 MW in 2020, rising to 925-944 MW in 2030,

		and decreasing thereafter. The requirements for flexibility in 2020 are small in comparison with those in 2030, which raises the possibility that this is a future rather than current need. However, undertaking the project in 2013 - 2016 will allow the method to be rolled out by 2020, if it is demonstrated that there is a net benefit, and will also allow interactions between GBFM and GB/EU markets to be investigated and informed. The novel aspects of this project are the use of flexibility services to reduce costs for DNOs, the development of a system to share and trade flexibility between purchasers and improved access to distribution customers to provide flexibility.
(g) Methodology		The proposed sharing of flexible resources between DNOs and the System Operator (SO) is novel and potentially challenging in terms of ensuring that the relevant parties have access to the services they need at the right times. It is noted that "a significant piece of desktop research will be carried out" prior to undertaking trials. This and the uncertainty around the likely effectiveness of the methods to be trialled in providing benefits to DNOs suggests that the project is at an early stage of development. There are three main areas of concern around project feasibility. The first is sharing flexibility with the System Operator – the methodology for this, in particular for Method 1, is not discussed in detail. However, it is recognised that the commercial framework design will be developed during an initial phase of work. The other two are customer engagement for trial participation and dependency on CLNR outputs. These have been identified and discussed by NPG, either in the project risk register or in subsequent discussions and information provided, to a reasonable level of detail. Proceeding with Method 2 is dependent on outcomes of desktop research and market

		modelling. A break point has been included in the plan to decide whether Method 2 trials should be undertaken. NPG has identified the impact of Method 2 not proceeding on project costs and learning. NPG has proposed significant resources for project management, for the project as a whole and individual work streams. Overall the approach to project management appears to be well thought through.
Successful Delivery Reward Criteria		The original set of SDRC has been revised; the changes include more identified pieces of evidence for the SDRC, and more detailed descriptions of the evidence. It is considered that key outputs are captured by the SDRC. It was suggested that the evidence could be more specific; NPG has responded to this with further revisions to the SDRC and are proposing to review the SDRC in their revised submission.

The "traffic light" system used in the table above gives an indication of PPA Energy's assessment of the information provided by the DNO in support of the project in respect of its detail, alignment with the LCNF evaluation criteria, identification and management of project risks 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 PPA Energy believes merit particular scrutiny or consideration. Thus:-

	• Seems to be generally in line with the objectives and requirements of the LCN Fund evaluation criteria, • Whilst there are some areas where additional information would be useful, that provided is generally comprehensive and provides no immediate cause for concern.
	• Some indication that the project is in line with the objectives and requirements of the LCN Fund evaluation criteria. However further scrutiny is required to ensure this, • There are some gaps in the information provided, • Further assurance is needed to confirm that the project is viable and that risks are appropriately managed.
	• Significantly more assurance is required that the project is in line with the objectives and requirements of the LCN Fund evaluation

	criteria, • There are some major gaps in the information provided, • Considerable scrutiny is needed to confirm that that the project is viable and that risks are appropriately managed, • Potential major risks to the viability of the project.

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

Criterion:	Accelerates the development of the low carbon energy sector and has the potential to deliver net financial benefits to future and/or existing consumers
Overall assessment:	As well as making references to how GBFM will support the Low-Carbon Transition in broad terms, NPG has also identified three direct impacts of the project on carbon emissions. Total savings have not been quantified, but it is likely that the most significant savings will be due to reducing the requirement for reserve from large thermal plants. Financial benefits due to Methods 1 and 2 have been estimated, in terms of savings against network reinforcement (£/kW/year) and total savings per stakeholder across GB up to 2040. There are many assumptions and a detailed spreadsheet behind these figures. It is clear that a considerable amount of effort has gone into these calculations. NPG has stated there is significant uncertainty in these figures, but that conservative assumptions have been used and the purpose of the project will be to fully evaluate the benefits. Capacity released at the project scale has been estimated based on CLNR analysis. The figures claimed do not seem unreasonable compared with methods to shift and reduce demand. The capacity released across GB has been estimated based on the Smart Grid Forum Work stream 3 model. It is noticeable that the demand for flexibility (and capacity released) increases significantly from 2020 to 2030.

Metrics (where available):

	Method 1 (Network operator)	Method 2 (Multi-party)
Net financial benefit (£)[1]:	£23.502 million (between now and 2040 at project scale)	£80.032 million (between now and 2040 at project scale)

[1] 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

Network capacity released (kW)[2]:	925,000 kW (by 2030 at GB scale)	944,000 kW (by 2030 at GB scale)
Base case time to release capacity (months)[3]:	4 months	4 months
Method time to release capacity (months)[4]:	0 months	0 months
Potential for replication[5]:	67%	

Sub-criteria	**Assessment**
Carbon claims (including quantitative, if provided)	There are high level references that GBFM can contribute to the carbon plan by releasing capacity more cost-effectively than reinforcement; facilitating the roll-out of Low Carbon Technologies (LCTs) such as heat pumps and Electric Vehicles (EVs); managing the impact of intermittent generation on the distribution network; and directly, by reduced carbon emissions associated with system balancing. The capacity released claims are discussed more in the sub-criterion below. NPG has identified three direct impacts on carbon emissions from GBFM. They are (i) reduction in the requirement for large-scale thermal plant to provide reserve, (ii) a small increase in losses due to networks operating at higher load

the project) which has been proven on the GB Distribution Systems) **– Method costs** (the costs of replicating the method at the trial scale once it has been proven successful)

[2] The network capacity released by each method (the additional headroom released on the distribution system following implementation of the Method)

[3] The time it would take in months to deliver the capacity shown in "Network capacity released" under the Base Case

[4] The time it would take in months to deliver the capacity shown in "Network capacity released" using the replicated Method

[5] The estimated number of sites or % of the GB Distribution System where the method could be rolled out, up to 2040

	factors, and (iii) "reduced" requirement for asset replacement and associated "embedded carbon". Although quantitative carbon savings have not been provided, it is likely that the former of these will have the most significant impact on carbon savings, as asset reinforcement may be delayed rather than reduced altogether.
Quantitative analysis	NPG has not quantified the total carbon savings associated with the methods. In relation to the three areas of direct impact on carbon emissions that NPG identified, the claims are: (i) reduced requirement for reserve from thermal plant – NPG has claimed that there could be 70-90% potential saving in carbon emissions from every MW of reserve provided through DSR rather than large-scale plant. This is based on the savings in carbon emissions associated with making reserve available by part-loading large coal or gas generation. (ii) transformer losses will remain at 0.23% if reinforcement is deferred, rather than reducing to 0.21% if it is, i.e. losses will be maintained, rather than decreasing, if reinforcement is deferred. (iii) embedded carbon associated with deferring asset replacement has not been quantified. This is not considered to be a significant contributing factor to carbon savings from this project.
Robustness of financial benefits	The financial benefits have been estimated as the reduced costs of flexibility to DNOs (methods 1 and 2) compared with network reinforcement (base case). The cost to the DNO of flexibility is reduced by the methods due to sharing flexibility services with the SO (method 1) and additionally with suppliers and traders (method 2), and reduced transaction costs (method 2). The costs for 2017 are estimated as: Base case (cost of network reinforcement): £37/kW Method 1 (cost of flexibility): £25/kW Method 2 (cost of flexibility): £10/kW The base cases costs are based on the Common Distribution Charging Methodology (CDCM) and the Extra-high voltage Distribution Charging Methodology (EDCM). NPG has

	provided the asset costs that have been used to derive this figure – these costs appear to align with published cost data. The method costs have been derived by starting with the cost of flexibility (based on STOR prices), and then making adjustments to take account of transaction costs (or savings), confidence level in flexibility compared with network reinforcement, potential for sharing between DNO and SO, etc. The benefits have been determined at the project scale by applying the flexibility savings against base case costs (£/kW) by the assumed capacity released across 20 primary substations, between 2017 and 2040, less the one-off market platform costs for Method 2. This results in £20.1 million savings to the DNO due to Method 1 and £34.0 million savings due to Method 2. The steps from the £/kW savings to these benefit figures seem reasonable. The assumptions on capacity released are discussed in the sub-criterion below. The benefits for all GB DNOs have been estimated at £221.7 million and £397.4 million for Methods 1 and 2 respectively. This is based on an assumption of the capacity released to DNOs to 2040, which shows a significant increase from 50MW in 2020 to 925 / 944 MW (methods 1 / 2) in 2030. A model from work stream 3 of the Smart Grid Forum has been used to derive released capacity figures; the DNO requirement for flexibility is the capacity released divided by 67% (assumed reliability of flexibility). These figures are discussed more in the sub-criterion below. Benefits to other parties, namely the SO and suppliers / energy traders, have also been calculated, across GB to 2040. The savings (£/kW) are derived in the same model as those for the DNO. The assumptions include the requirements for flexibility from the SO and suppliers/traders. SO and supplier demand for flexibility from GBFM are based on DNO requirements for flexibility. The total savings from 2017 to 2040 are estimated as: SO: £33.8 million Method 1, £138.7 million Method 2 Suppliers / energy traders: None Method 1, £330.8 million Method 2. There are many assumptions and a detailed spreadsheet behind these figures. It appears that some important assumptions

	include: • The cost allocation of flexibility between NPG (DNOs) and National Grid (SO) is assumed to be 20% to NPG and 80% to NG for Method 1. • The figure for capacity released by 2030 is estimated to be around 1 GW, dropping to around 800 MW in 2040. • It appears to have been assumed that flexibility services from providers will be available to meet all DNO demand for flexibility services. NPG has provided further clarity and explanation on the above points. Part of the project is to fully evaluate the potential benefits of both methods. NPG states that there is a large degree of uncertainty over the net benefits, although they claim that conservative assumptions have been used to ensure reasonable estimates. Aside from the levels of savings identified, NPG is confident that there will be savings through sharing access to flexibility services for purchasers (Methods 1 and 2) significant savings in transaction costs (Method 2); this does not seem unreasonable.
Capacity released (and how quickly)	It appears that different approaches have been used to estimate capacity released at the project scale and GB wide. At the project scale, capacity released estimates are based on analysis from the CLNR project. The analysis suggests 10% of domestic peak load and 5% of general load can be shifted, which translates to 2-3 MW per primary. These figures claimed do not seem unreasonable compared with methods to shift and reduce demand. NPG has identified 20 primaries that are suitable for use in the trials for this project, 17 of which are currently forecast to exceed firm capacity within planning timescales. Therefore based on the above savings per substation, capacity released during this project is 40-60 MW. NPG has taken the mid-point of this range. Across GB, the capacity released is estimated to be 925 MW and 944 MW for Methods 1 and 2 respectively by 2030, based

	on the Smart Grid Forum Work stream 3 model. NPG has provided an overview description of the model and how it was used. The model compares costs and the impact on distribution network capacity available for a range of options for releasing capacity. It then chooses the most cost-effective options for managing the demand increase associated with the uptake of Low Carbon Technologies (the uptake of LCTs is based on DECC scenarios). The figures of 925 and 944 MW represent the capacity released in 2030 from DSR and Electrical Energy Storage (EES). The assumed capacity released due to DSR is 5%, which is in line with the above project figures. It is noticeable that the demand for flexibility (and capacity released) increases significantly from 2020 to 2030.
Replication (applicability of technology, dependence on specific network characteristics)	NPG has estimated that the feeder types, which they have identified to be covered by the GBFM trial, make up 67% of the total system. These feeder types make up 4 out of 7 feeder types in the work stream 3 model, and have been selected as they are present in NPG's network and will be tested during the trials. NPG believes that the methods will be applicable to the other feeder types not covered by their trial, but these have not been taken account of in their financial analysis. It seems that a reasonably conservative approach has been taken to estimating the replicability of the methods.

3 Criterion (b) Value for Money

Criterion:	Provides value for money to distribution customers
Overall assessment:	NPG has estimated financial savings to three sets of stakeholders; DNOs, the SO and suppliers / traders. Benefits to DNOs are significant in absolute and relative terms, although there is uncertainty in these figures. Most of the learning outcomes are relevant to the distribution system. However, as this is a project involving multiple stakeholders, they will inevitably benefit from the learning in this project. NPG has identified "policy and regulation" and "market participants" as key audiences for learning from this project. NPG has identified an £8.7 million cost item associated with intellectual property development. NPG targeted CLNR partners (British Gas, EA Technology and Durham University), claiming the benefits of this include leveraging experience and contributions. As this is a large part of the project budget which has been allocated in what appears to be a non-competitive manner, more assurance was sought that measures have been taken to ensure value for money in contractor costs. While further assurance has been provided on value for money in terms of rates, the level of resource requirements remains high. NPG has proposed to review project costs in their revised submission.

Metrics (where available):

	Method 1	Method 2
Size of benefits to distribution system[6]	£221.7 million (to 2040, GB scale)	£397.4 million (to 2040, GB scale)

Sub-criteria	**Assessment**

[6] Size of benefits attributable or applicable to the Distribution System versus elsewhere

Proportion of benefits attributable to distribution system (as opposed to elsewhere on supply chain)	NPG has identified that benefits from this project accrue to DNOs, the SO and suppliers / energy traders. They have estimated that the financial benefits to each party from now to 2040, due to each method, which are as follows: • DNOs: £221.7 million Method 1, £397.4 million Method 2 • SO: £33.8 million Method 1, £138.7 million Method 2 • Suppliers / energy traders: None Method 1, £330.8 million Method 2. Giving rise to total GB benefits of £255.6 million from Method 1 and £866.9 million from Method 2. The proportions of the benefits among the beneficiaries are as follows: • Method 1: 87% DNOs, 13% SO • Method 2: 46% DNOs, 16% SO, 38% Suppliers / traders On the basis of the figures presented, the benefits to DNOs become more diluted under Method 2. The potential savings to Suppliers under Method 2 are significant, which raises the issue of funding contributions; this is discussed further under Criterion (d). In addition to all DNO customers benefiting from reduced costs to DNOs, customers that take part in the market will be paid for their services.
How learning relates to the distribution system	NPG has listed the learning outcomes expected from this project in their full submission. Some of these are directly relevant to the distribution system, including how DSR can provide flexibility to DNOs, how storage can supply flexibility to DNOs and the technological changes required for DNOs to access flexibility. As this project involves a range of stakeholders as both purchasers and providers of flexibility services, some of the learning outcomes relate to the wider system, such as the implementation of the multi-party GBFM. Policy and regulation has been identified as one of the key areas for knowledge dissemination from this project, as well as potential market participants.

Approach to ensuring best value for money in delivering projects	NPG has claimed two means of ensuring value for money in procurement, which are using competitive processes for technology inputs (e.g. the market platform and customer DSR technologies) and engaging partners with CLNR experience who are bringing contributions to the project. Regarding technology inputs, it is not clear how many cost items the competitive process will apply to. There will be a procurement process for the market trading platform, and customers' DSR technology, which is estimated to cost £1.2 million, so it is assumed this competitive process will apply to at least these items of equipment. NPG has received eight replies to a Request For Information (RFI) for the delivery of the market trading platform with which they were satisfied. Regarding the engagement of relevant partners, there is £9.661 million for contractors, and NPG has identified an £8.7 million cost item associated with intellectual property development. NPG targeted CLNR partners (British Gas, EA Technology and Durham University), claiming the benefits of this include leveraging experience and contributions. British Gas is making new contributions of £1.508 million (and CLNR equipment of £1.473 million) and EA Technology is contributing £0.3 million, so there is some basis to this claim. NPG claims that industry partners have included time at cost or at zero cost, and consultancy partners have provided discounted charge rates; the level of discount is not specified. As this is a large part of the project budget which has been allocated in what appears to be a non-competitive manner, more assurance was required that measures have been taken to ensure value for money in contractor costs. This is discussed further in the sub-criterion below.
Identify and review major cost items, examine justification for relevant costs, assess choice of discount rates	The Tier 2 funding request has increased from £17 million to £18.258 million between the Initial Screening Process (ISP) and Full Submission stages. NPG has provided an account of the increases, which include additional costs in IT and network monitoring equipment due to the development and refinement of the project methods. There is also an additional £0.5 million for Durham University. This covers additional consultancy support for social research and simulations for the network trials. The original description of this work was not considered to be very detailed, given the level of the cost; subsequently a more detailed description of these activities has been provided. The DNO extra contribution is £9.274 million, which

	comprises electrical energy storage, network control systems and network monitoring. These are the costs of equipment that has been procured and paid for by the CLNR project. NPG claims that without the use of these items, GBFM project costs would increase significantly. They will remove these items from their submission if requested to do so. Similarly, some of British Gas's contribution relates to CLNR equipment. One of the largest cost items is the £8.7 million of intellectual property. The deliverables associated with this cost item include models, assessments, recommendations, tools and a roadmap for implementation. The key outputs are a set of commercial and operating frameworks for DNO-TSO (Transmission System Operator) flexibility sharing (Method 1) and a design and trial of a prototype market platform (Method 2). A more detailed description of these outputs than was available in the full submission has been provided. A more detailed breakdown and explanation of costs than was available in the Full Submission was requested, giving a breakdown of contractor, IT and equipment costs by workstream. The response provides the person days associated with activities for each contractor; some contractors have provided a more detailed breakdown than others. Frontier Economics' and EA Technology have provided discounts on their day-rates. NPG believes that the contractor rates align with rates used by themselves and in other consultancy organisations. It is understood that "cost challenges" took place throughout the proposal process, which resulted in, for example, Elexon reducing their prices. Durham University's rates are based on the Transparent Approach to Costing Methodology (TRAC). While further assurance has been provided on value for money in terms of rates, the level of resource requirements remains high. NPG has proposed to review project costs in their revised submission. The market platform is another high cost item of the project. NPG has described the RFI process they have been through for the delivery of this platform; the market platform costs have been based on the responses to this. NPG and Elexon, who ran the process, received eight satisfactory responses, which sounds like a reasonable sized base to draw costs from. The estimated cost above is based on the mean cost of the responses

	to the RFI, excluding an outlier. NPG labour costs are £1.777 million. A 2% interest rate is used in budget cost calculations. A contingency of 8% (of LCNF Tier 2 funding) has been included.

4 Criterion (c) Generates Knowledge

Criterion:	Generates knowledge that can be shared amongst all DNOs
Overall assessment:	This project has the potential to generate new knowledge that is relevant to other DNOs, since it is proposing the development of a market for flexibility services in which DNOs can participate to give them access to service providers who are otherwise more likely to be selling DSR, in particular, in other platforms. The project is about reducing costs to DNOs of procuring flexibility services, and understanding whether there are / the level of benefits. Although there may be some overlap with another proposed LCNF Tier 2 project (which NPG has identified and discussed), the areas of new knowledge include making flexibility a commercial reality, trialling methods to evaluate how DSR can be shared with other purchasers, informing on how providers of flexibility react to providing services to multiple purchasers, and developing market arrangements. It is considered that NPG has a methodology for knowledge dissemination that has been well thought through, with some novel ideas of dissemination activities (e.g. GBFM simulation trading day). Of the parties for whom learning will be valuable, DNOs are one of many.
Metrics (where available):	
Conforming to default IPR arrangements:	Yes

Sub-criteria	**Assessment**
Potential for new/incremental learning to be generated by the project	NPG has identified six learning outcomes from this project. They include addressing questions such as "How can DSR provide flexibility to DNOs?" and "How can storage supply flexibility to DNOs?". Regarding the former, the extent to which this will be new learning is not clear. Regarding the latter, NPG has identified that there could potentially be overlap with the proposed LCNF Tier 2 project "Smarter

	Network Storage" (SNS). NPG has discussed the potential to collaborate on this project. Other learning outcomes are "How should the network operator sharing arrangements be implemented?" and "How should the multi-party GBFM be implemented?". It is considered reasonable that this will be new learning. Subsequent to their full submission NPG has identified six new areas of learning, which include making flexibility a commercial reality, trialling methods to evaluate how DSR can be shared with other purchasers informing on how providers of flexibility react to providing services to multiple purchasers, developing market arrangements. NPG has considered international experience on flexibility markets and indicated how this project adds learning, in an appendix. Overall it is considered that this project will produce new learning.
Applicability of learning to other DNOs	This project has the potential to generate knowledge that is relevant to other DNOs, as it is proposing the development of a market for flexibility services in which DNOs can participate to give them access to service providers, who are otherwise more likely to be selling DSR, in particular, in other platforms. It is considered that the learning from this project will be of interest to all DNOs, as there are several drivers for flexibility requirements, which are likely to increase. As noted previously, the learning will also be of interest to other parties, in particular policy makers and other market participants.
Proposed IP management and any deviations from default IP principles	The project does not intend to deviate from the default conditions for IPR. The project plans to manage IP in accordance with the LCN Funding Governance Document.
Credibility of proposed methodology for capturing learning from the trial and plans for disseminating	NPG has outlined their proposed methodology for knowledge dissemination. These include producing a quarterly report summarising the outputs of the project; a project website based on the existing site for the CLNR project; the publication of relevant papers; issuing press releases; and participation in the LCN fund annual conference. The project is proposing to develop a brand for GBFM to ensure uniformity of appearance to third parties. A novel and interesting dissemination idea is a

	GBFM simulation trading day for cross-industry participants, to disseminate learning on the market functionality. Work stream managers will be made responsible for knowledge dissemination. In addition, NPG proposes to have a "communications manager", whose responsibilities include writing summaries in appropriate style and language and synthesising across work streams. These are important considerations. In general the methodology for capturing learning, although at a high level, seems well though through.

5 Criterion (d) Partners and Funding

Criterion:	Involvement of other partners and external funding		
Overall assessment:	This project requires the participation of several stakeholders, and NPG has secured at least one of each type of participant required as either a project partner or collaborator. In addition to requiring market participants, resources with expertise are required to undertake a significant portion of the project activity. This is a strong team, with relevant experience and appropriate expertise. With eight project partners and five collaborators, the team is large, although NPG has weighed up the risks to project complexity and delivery of including more participants against the benefits of wider learning, and decided not to involve more suppliers / traders. Most partners and collaborators have signed a Memorandum of Understanding (MOU), and there are existing collaboration agreements between a number of partners. National Grid has reserved their position on committing to Method 2 trials, pending the evaluation of the business case. NPG has identified a number of contingency options in the event that National Grid decides not to proceed with the Method 2 trials. NPG has targeted CLNR partners to leverage experience. Some partners, e.g. National Grid and Elexon, have been selected for their unique position and experience in the power sector. NPG claims to have undertaken a "consultancy assessment" to identify consultancy partners. This appears to have only resulted in the inclusion of one new partner. However, there is sound reasoning behind the partner selection. A good number of partners are contributing external funding, amounting to around 10% of project costs.		
Metrics (where available):			
Total cost of project (£):	£34.159 million (£23.412 excluding CLNR items)	LCNF support (£):	£18.258 million
Costs met by DNO	£11.367 million (£2.093 million	Costs met by others	£3.950 million

(£):	compulsory and £9.274 million extra)	(£):	external funding
LCNF support (% of total cost):	53.5% (78% excluding CLNR items)	Costs met by DNO (% of total cost):	33.3% (8.9% excluding CLNR items)
Costs met by others (% of total cost):	11.6% (10.6% excluding CLNR items)	Number of consortium members:	8 partners 5 Collaborators

Sub-criteria	**Assessment**
Appropriateness of collaborators (including experience, expertise and robustness of commitments)	This project requires the participation of the SO, suppliers / traders, and providers of DSR including storage, aggregators, and Industrial and Commercial (I&C) customers. The GBFM partners include the flexibility purchases National Grid (SO) and Centrica Energy (energy trader), and the flexibility providers British Gas (supplier / customer aggregator). In addition project collaborators include the flexibility providers Asda (large I&C), KiWi Power and Energy Services Partnership (commercial aggregators), Flexitricity and EnerNOC. NPG has secured at least one of each type of participant required as either a project partner or collaborator. In addition to requiring market participants, expertise is required to undertake modelling, design and/or develop the commercial arrangements (trilateral agreements and multi-market model), design the trials, etc. GBFM includes Durham University as an academic partner, EA Technology, Frontier Economics for consultancy support and Elexon for market design and operation. NPG has summarised the project partners and the benefits they bring to the project in an appendix. This is a strong team, with relevant experience and appropriate expertise. Although a large team, the project has the benefit of having the trial market participants committed to the project, which will reduce the risk of market participants not coming forward to take part in the trials. National Grid has reserved their position on committing to Method 2 trials, pending the evaluation of the business case. NPG has identified a number of contingency options in the event that National Grid decides not to proceed with the Method 2 trials, although they note that National Grid will be

	strongly encouraged to maintain a role in the project. Most partners and collaborators have signed a Memorandum of Understanding (MOU). NPG is in the process of signing an MOU with Asda, Flexitricity and EnerNOC. In addition, they have an existing collaboration agreement with British Gas, Durham University and EA Technology. This is considered to be a reasonable level of commitment at this stage.
Level of external funding (presented on a comparable basis with other Projects)	£3.950 million of external funding has been contributed by a number of partners. The most significant of these is £3.053 million by British Gas, which comprises CLNR equipment (originally paid for by DECC heat pump grants, the CLNR project and British Gas) and new contributions (equipment, contractors, IT and travel and expenses). British Gas has provided a breakdown of the items this contribution covers, which is largely a Service Delivery Platform (SDP) layer ("Machine-2-Machine layer to distribute calls for demand response services to multiple providers and request verification, passing normalised data back up to the Virtual Power Plant application"), as well as Smart Meters. NPG notes that, in addition, British Gas has negotiated contributions from technology providers for DSR technology (e.g. heat pumps and microCHP units). However, it should be noted that a significant amount of the project costs are attributable to British Gas. British Gas will benefit from the learning in the trials regarding customers and their behaviour, as well as having significant input into the market design. In response to queries on the level of contribution from British Gas compared with the potential benefits, NPG has noted areas where British Gas is contributing that have not been quantified in their external funding contribution (e.g. management time, input from marketing and customer service experts on customer recruitment, the use of call centres to contact and sign up customers, additional costs associated with Smart Meters). NPG also notes that suppliers in general stand to benefit from the project in terms of financial savings, should the project be rolled out; all learning, including that relating to suppliers and traders, will be disseminated; suppliers will be engaged with in the early stages of design; and the market will be designed to be user-friendly, limiting the "first-mover" advantage from participation in trials. £0.9 million of the external funding comes from commercial aggregators, Frontier Economics, EA Technology and National

	Grid. It is not clear what this covers. A good number of partners are contributing external funding, amounting to around 10% of project costs.
Effectiveness of process for seeking and identifying new project partners and ideas	NPG has noted that selecting the right mix of project partners is critical for the successful delivery of this project, as the project depends on the quality and expertise of resources. The reasoning behind the partner selection is as follows: • NPG has targeted CLNR partners in order to leverage experience (British Gas and through them Centrica, EA Technology and Durham University). • National Grid and Elexon are involved due to the specific and unique nature of their roles. • NPG states that a number of "consultancy assessments" were made, in terms of holding meetings with parties to discuss project ideas and assess potential partners. NPG claims that this process resulted in the selection of Durham University, Frontier Economics and EA Technology, although two of the three are listed as CLNR partners. NPG claims that no requests for meetings were refused. While it is noted that other consultancy firms were considered in the initial stages of the project, the process seems limited in terms of identifying new project partners. However, there is sound reasoning behind the partner selection, and, as noted by NPG, the project was not sufficiently developed in the early stages to invite consultancy companies to tender. NPG considered the inclusion of another supplier / trader, as well as British Gas and Centrica, but concluded that the additional complexity and risks to delivery outweighed the benefits of potential wider learning. NPG states that any known differences between the trial participants and other market participants that they represent will be taken account of through simulations or input of views. NPG is proposing to review the level of involvement of a wider set of market participants as part of their revised submission. The market platform developer will be selected via a tender or

	vendor assessment process.

6 Criterion (f) Relevance and Timing

Criterion:	Relevance and timing		
Overall assessment:	The project identifies the growth in demand associated with heat and transport electrification, the impact of intermittent electricity supplies from renewable generation, and the increase in local embedded generation as reasons why DSR and storage, in particular, are needed to defer network reinforcement requirements and to maximise the flexibility of capacity on the network. In terms of timing, the amount of flexibility that is assumed will be required by DNOs is 42-48 MW in 2020, rising to 925-944 MW in 2030, and decreasing thereafter. The requirements for flexibility in 2020 are small in comparison with those in 2030, which raises the possibility that this is a future rather than current need. However, undertaking the project in 2013 - 2016 will allow the method to be rolled out by 2020, if it is demonstrated that there is a net benefit, and will also allow interactions between GBFM and GB/EU markets to be investigated and informed. The novel aspects of this project are the use of flexibility services to reduce costs for DNOs, the development of a system to share and trade flexibility between purchasers and improved access to distribution customers to provide flexibility.		
Metrics (where available):			
Start date:	January 2013	Elapsed time of project:	4 years

Sub-criteria	**Assessment**
Significance in the project in: (a) overcoming current obstacles to a low carbon future	Increasing the quantity of flexibility available to DNOs is important and has the potential to add significantly to the reduction of barriers to entry for low carbon technologies on the network. The particular challenges NPG references are the increase in electrification of heat and transport (and in particular their potential contribution to peak demand), distributed generation (increased power flows on networks)

	and intermittent generation (variability). NPG has estimated DNO demand for flexibility GB-wide; it is around 40-50 MW in 2020 and 925-944 MW in 2030. This shows a significant increase from 2020 to 2030. Therefore the extent to which these are current, rather than future, obstacles is questionable. In addition, part of the project involves procuring and installing technology to facilitate flexibility for domestic and non-domestic customers, which suggests there is not sufficient flexibility resource currently available for the trials. However, in relation to timing, NPG notes that the project duration is 2013 – 2016, so taking account of roll out time would mean GBFM could be in place around 2020. In addition, there are likely to policy developments, in GB and Europe, which the learning from GBFM could inform.
(b) trialling new technologies that could have a major low carbon impact	Offering Demand Side Response to the System Operator (SO) for balancing is not new. This is in use in various countries, and through various means, e.g. interruptible tariffs and a "negawatts" demand aggregation platform (Enerweb, South Africa). However, these are typically arrangements between the SO and large industrial customers. The novel aspects of this project are the use of flexibility services to reduce costs for DNOs and the development of a system to share and trade flexibility between purchasers. In addition, the project aims to improve access to providing DSR to smaller customers (e.g. domestic and SMEs). Given the range of LCTs, if successful this project could make a significant contribution to the low carbon transition.
(c) demonstrating new system approaches that could have widespread application	The trials incorporated within the project have been designed to include a range of network conditions and load types to maximise their relevance for other DNOs. The focus of the project on linking the provision of flexibility to the DNO and to the TSO means that there are technical and commercial challenges to the speed/ease with which this solution could be rolled out nationally. NPG notes that the detailed methodologies for sharing access to flexibility services will be developed during the project. NPG has had discussions with National Grid (NG) during the bid process; NG will provide input to the project at no cost.
Applicability of the	If the methods are successful, flexibility could be factored into

project to future business plans, regardless of uptake of Low Carbon Technologies (LCTs)	business plans and network reinforcement deferred. Part of the project is to understand the confidence that can be placed in flexibility, in order to inform DNOs for future planning. A lower uptake of Low Carbon Technologies (LCTs) would reduce the forecast requirement for network reinforcement. However, NPG notes that even with lower levels of uptake of certain technologies, there may be "clustering" which could cause problems in certain parts of the network.

7 Criterion (g) Methodology

Criterion:	Demonstration of a robust methodology and that the project is ready to implement		
Overall assessment:	The proposed sharing of flexible resources between DNOs and the TSO is novel and potentially challenging in terms of ensuring that the relevant parties have access to the services they need at the right times. It is noted that "a significant piece of desktop research will be carried out" prior to undertaking trials. This and the uncertainty around the likely effectiveness of the methods to be trialled in providing benefits to DNOs suggests that the project is at an early stage of development. There are three main areas of concern around project feasibility. The first is sharing flexibility with the System Operator – the methodology for this, in particular for Method 1, is not discussed in detail. However, it is recognised that the commercial framework design will be developed during an initial phase of work. The other two are customer engagement for trial participation and dependency on CLNR outputs. These have been identified and discussed by NPG, either in the project risk register or in subsequent discussions and information provided, to a reasonable level of detail. Proceeding with Method 2 is dependent on outcomes of desktop research and market modelling. A break point has been included in the plan to decide whether Method 2 trials should be undertaken. NPG has identified the impact of Method 2 not proceeding on project costs and learning. NPG has proposed significant resources for project management, for the project as a whole and individual work streams. Overall the approach to project management appears to be well thought through.		
Metrics (where available):			
Requested level of protection against cost over runs (default 5%) (%):	0	Requested level of protection against direct benefits (default 50%) (%):	0

Sub-criteria	Assessment
Feasibility of project proposal	NPG claims to have learned about successful delivery from the current CLNR project. They site several reasons why the project will be able to start in a timely manner, including that they will continue readiness preparation until the funding decision in November and the project team is a strong consortium who has been involved in the bid. Learning from CLNR includes allowing significant amounts of resource for mobilisation and project management. The project plan indicates three stages of activity and four work streams are outlined in the appendices. Of the activities listed, the areas of most concern for project feasibility are: • Sharing flexibility with National Grid – the aim of the project is to develop the methodologies in detail. Currently there seems to be more detail behind Method 2 than Method 1. • Engaging customers to take part in the trials – NPG is aiming to secure 20 MW of flexibility for the trials. There is a work stream on customer engagement; British Gas, Asda and aggregators have lead responsibility on this. There are plans to engage CLNR customers in the GBFM trials. Customers will receive payment for services provided. A summary of the customer target plan and customer engagement process is provided in the submission. • Building on outputs from CLNR – It is planned to use outputs from CLNR such as the Grand Unified Scheme (GUS, a power flow management system), network monitoring and Electrical Energy Storage equipment. This is discussed more in below under "risks". The latter two of these concerns seem to have been considered, with possible mitigating actions identified. Regarding the former, NPG has provided an explanation as to why they, along with National Grid, are confident that it will be feasible to share flexibility resources between the SO and DNOs.
All risks, including customer impact, exceeding forecast	NPG discusses measures in place to address cost over-runs. Contingency costs have been included, amounting to 8% of total cost budget. Managing project costs will be a standing

costs and missing delivery date	item of the agenda for the GBFM steering group meetings. Large cost risk items have been identified as the multi-party trial platform and person days required for the project. The mitigation action for the former has been to run a Request for Information for the multi-party platform, to ensure a robust financial estimate. Regarding the latter, the application states that the bid process has "illuminated" the scale of resources required; risk mitigation on this does not appear to have been discussed. The project is ambitious in terms of the number of market participants required to take part in the trials, particularly for method 2. In particular, National Grid is key in terms of their unique role as system operator. NPG has at least one of each type of market participant as a project partner or collaborator, including National Grid, which should reduce the risk of appropriate participants being available to take part in the trials. The level of the commitment from all members to the method 2 trials is not clear. Customer participation has been considered in the risk register; a number of ways this is being addressed have been identified. The project is planning to utilise the central power flow management system (GUS) and the Electrical Energy Storage (EES) components of the CLNR project trial - this creates a dependency on progress outside the immediate project, which will need to be monitored carefully. Interfaces are also needed between the NPG DSR control system and GBFM platform. NPG has provided an update on the status of CLNR; the network control system has been procured; the network equipment, including the EES equipment, is being procured. NPG believes the risk of the EES equipment not being available is low, but has discussed mitigations. NPG has identified a decision point for Method 2 at the end of the first year of the project. This will be based on whether the potential incremental benefits from the multi-party platform warrant a trial, based on the desktop research and modelling activity performed in stage 1. NPG believes, from initial analysis, that it is likely that Method 2 will be shown as being beneficial. However, they have outlined the impact on project costs if Method 2 does not proceed, as well as providing a detailed description of how the learning outcomes would be change. In summary, if Method 2 does not proceed to trial then of the six learning outcomes one will be fully addressed, four will be partially addressed and one will not be addressed

	at all. NPG notes that trialling the two Methods in separate LCNF projects will result in delaying learning and outputs.
Whether items within project budget provide value for money	See Criterion (b), and in particular sub-criteria "Identify and review major cost items".
Project methodology (including depth and robustness of project management plan)	There are three stages in the project plan: desktop assessment, TSO-DNO trials and multi-party market. The project plan has identified activities to a reasonable level of granularity, and a clear plan for managing each stage of the project has been provided. In terms of methodology, there appears to be more detail provided for Method 2 than for Method 1. E.g. a proposed GBFM market design has been included in the appendices for Method 2 (noting that the project is not committed to this proposal). On request, NPG has provided the deliverables associated with Method 1, which are: • Development of proposals to enable DNO-TSO sharing • Development of DNO-TSO market relationship with other market participants • Innovative trilateral agreements • Operational learning captured during the trial phase • Engineering guidelines and codes of practice for use of shared flexibility with the TSO by a DNO • A roadmap to national roll-out There are four work streams: market design, delivery and trials; customer engagement; network technology and learning and dissemination. For each work stream, the party with lead accountability and parties with lead responsibilities have been identified. Delegations of authority have been discussed in the submission, in terms of making sure decisions are taken at the right level. NPG has proposed significant resources for project management, for the project as a whole and individual work streams. They have also identified some "key themes for values / behaviours", e.g. understanding the project goals,

	planning to succeed, keeping focused on outcomes. Overall the approach to project management appears to be well thought out.
Appropriateness of Successful Delivery Award Criteria (SDRC)	See Section 8 below.

8 Successful Delivery Reward Criteria

Criterion:	Appropriateness of the SDRC definitions and timing and adequacy of links to key project milestones.
Overall assessment:	The original set of SDRC has been revised; the changes include more identified pieces of evidence for the SDCR, and more detailed descriptions of the evidence. It is considered that key outputs are captured by the SDRC. It was suggested that the evidence could be more specific; NPG has responded to this with further revisions to the SDRC and are proposing to review the SDRC in their revised submission.
Review:	The original submission included a set of learning outcomes which mapped onto the Successful Delivery Reward Criteria and outputs. Following comments from the Expert Panel, NPG presented a revised set of SDRCs at the consultants meeting. These have been provided in writing via the formal question process. The changes include more identified pieces of evidence for the SDRCs, and more detailed descriptions of the evidence. Two key outputs from the project are the trilateral agreement arrangements and the multi-party market platform. These have been captured in the evidence associated with SDRC 4 and 5 ("operating procedures and commercial frameworks for the trial" and "prototype market trading platform"). Other outputs have also been captured as evidence for the SDRCs. Customer recruitment for the trials is a key element of the work; this has been captured by SDRC1. The consultants suggested that the evidence could be more specific. For example, the size of the trials in terms of number of customers or MW of flexibility is not specified, the number and type of market participants, the specific technologies to be provided for the trial by British Gas. NPG has subsequently made further revisions to the SDRC and are proposing to review the SDRC in their revised submission. The delivery dates appear to be fairly evenly spread throughout the project.

9 Addendum: Changes made in resubmission

9.1 Summary of Changes

NPG submitted a revised full submission in mid-October 2012 following meetings and discussions with the Expert Panel and/or PPA Energy, and after receiving and responding to written questions.

The key changes that NPG has made to their submission are:

- Reduced project costs and increased external funding;
- A more extensive stakeholder engagement process; and
- Revisions to the SDRC.

These are discussed in more detail below.

NPG has made other changes, which have limited impact on the issues identified in the previous sections of this report. These include:

- Reflecting in the full-submission that one of the project collaborators, Flexitricity, has now signed a Memorandum of Understanding (MOU);
- A discussion on the potential planned interruptions; and
- Minor changes to the table summarising key business case assumptions, to improve clarity.

Overall the LCNF funding request has reduced by £1.879 million, from £18.258 million to £16.379 million. Total project costs have reduced by £2.086 million, from £34.159 million to £32.073 million.

9.1.1 Project costs

NPG has reviewed and subsequently, overall, reduced project costs. The LCNF funding has reduced by £1.879 million, from £18.258 million to £16.379 million. NPG has provided a breakdown of the reductions to total project costs in an Appendix to their summary of changes to the full submission. In broad cost areas, the largest reductions are in the costs of contractors and contingency allowances. The reductions to the total project costs are summarised in the following table, by category as per the full submission spreadsheet.

Category	Reduction
Contingency	£960,911
Contractors	£693,674
Travel and Expenses	£911
Payments to Users	£105,089
IT	£250,000
IPR Costs	£75,000
Total cost reduction	**£2,085,585**

Of the contractor cost reductions, Frontier Economics is the only project partner whose reduction refers to day-rate discounts, although the reduction is also attributed to re-profiling of costs, reduced days and changed mix of resources. The discount on day-rates offered by Frontier Economics to GBFM has increased by an additional 5%. The other contractor reductions are due to reducing contingencies, changing the mix of resource type, reducing the number of person-days, reducing travel expenses and amending methodology. It is noted that some of costs that have been categorised as contractor or IT costs (above) are described as contingencies.

The average day-rates of the parties have changed as follows between the original and the revised full submission:

- No material change: British Gas and Centrica Energy, Elexon, Northern Power Grid and EA Technology; and

- Decreased: Durham University / B2B marketing consultancy.

The Durham University / B2B marketing consultancy reduction in average day-rates is attributed to amending the delivery methodology.

Due to the increased scope of customer engagement, the budget for industry engagement has increased.

9.1.2 Stakeholder engagement

The most significant change to the content of the revised full submission relates to the inclusion of a more extensive stakeholder engagement process, in order to achieve more "buy-in" from industry to GBFM.

The aims of the stakeholder engagement process are to understand the requirements of all potential users in order to inform the market design stages, and to undertake industry-wide engagement in order to support the future development of a national market. The elements of the stakeholder engagement process include:

- A PR campaign – to raise awareness of the project brand, and attract and encourage stakeholders to engage with the project, e.g. through the working groups.

- Road-shows and working groups – to introduce the project, gather input on market participants' requirements, to give an opportunity for market participants to comment on the proposed market design/detailed market rules and to discuss other elements of the project (e.g. emerging results and draft implementation roadmaps). Some of these events will be aimed at market participants; others will be open to all identified stakeholder groups.

- Consultation processes – written consultation processes on the market design, evaluation of method 2, and final evaluation, recommendations and implementation roadmaps.

- Trial observation opportunities – gathering feedback from stakeholders on the trial results as the trials proceed.

A diagram has been included in the revised full submission to illustrate the timing of the above activities.

Knowledge dissemination activities, as outlined in the original full submission, will run in parallel with this process. The project management plan has been updated to include the stakeholder engagement activities.

9.1.3 Revised SDRC

The SDRC have been revised following feedback given at various points during the evaluation process. In general, more pieces of evidence have been included, and the SDRC reflect the proposed stakeholder engagement activities.

9.2 Impact on LCN Funding Application

The impacts of the changes made by NPG to their submission are considered for each criterion.

9.2.1 Criterion (a) Low Carbon and Benefits

The revised submission is not considered to impact on the evaluation against this criterion.

9.2.2 Criterion (b) Value for Money

A key concern with the project was relating to value for money, in terms of project costs and proposed resource requirements. NPG and the project partners have reviewed project costs; this has resulted in a reduction of £1.879 million in the amount of LCN funding required, which is a reduction of over 10%. A breakdown of the reductions has been provided; these are largely associated with reductions in contingency and contractor costs. Frontier Economics has further reduced their average day-rate. These cost reductions improve the evaluation of this project against this criterion.

9.2.3 Criterion (c) Generates Knowledge

It is considered that the potential to generate knowledge that could be shared with all DNOs was demonstrated in the original full submission. The additional information on the stakeholder engagement process further supports this view.

9.2.4 Criterion (d) Partners and Funding

A concern in this area related to the potential benefits to British Gas, compared with other suppliers, in having significant input to the market design. In their revised submission NPG has put forward a stakeholder engagement process, which aims to better understand the requirements of all market participants. This will be via workshops, as well as several stages of written consultations, allowing market participants to both discuss their potential requirements, as well as reviewing the detailed market rules. It is considered that this improves the evaluation of the project against this criterion.

9.2.5 Criterion (f) Relevance and Timing

The revised submission is not considered to impact on the evaluation against this criterion.

9.2.6 Criterion (g) Methodology

Whilst recognising that the commercial framework design will be developed during an initial phase of work, the key concern against this criterion was the level of detail on the methodology for sharing flexibility between DNOs and the System Operator, in particular for Method 1. This has not been addressed in the revised full submission. However, the stakeholder engagement process that has been described aims to increase the level of industry engagement throughout the project, in order to support the future development of a national market. This is considered to improve the feasibility of a GBFM roll-out beyond the timescale of this project.

9.2.7 Successful Delivery Reward Criteria (SDRC)

The SDRC have been revised to contain more detailed pieces of evidence associated with each criterion. In addition, the SDRC have been updated to cover the stakeholder engagement process. It is considered that the additional detail provided in the evidence improves the SDRC.