

Thames Valley Vision Addendum

Proforma box number/ Spreadsheet	Where the latest information can be found
Successful delivery reward Criteria. Box 13	Response to clarification question - SSE031
Carbon Benefit Model - Appendix A - Full Submission Spreadsheet.	Response to SSE036 provides the final assessment of the carbon benefits associated with the Thames Valley Vision.

/Low Carbon Networks Fund Full Submission Pro-forma

In completing this proforma DNOs should consider the regulation, governance and administrative processes set out in the LCN Fund Governance Document

Section A: Project details

Project Summary

Box 1: Please provide details of the Project, the Method and Solution

Thames Valley Vision (TVV)

LOOKING BEYOND PROBLEMS

To date, the country's low voltage (LV) networks have been designed in a way that would be similar to a motorway accommodating peak periods such as a sunny Bank Holiday Monday, but resulting in poor overall utilisation. In the case of LV networks, utilisation is around 20%. Low carbon technologies are expected to increase network peak demand and, without innovation will reduce utilisation factors.

Existing corporate and industry procedures will result in overspending on, and delays to, load related reinforcement with consequential deterioration in Quality of Supply; Customer Minutes Lost (CML); Customer Interruptions (CI); and a resulting restriction on low carbon connections.

The low carbon future will require fundamental change across the entire energy industry value chain. This requires a bold project to address all the customer, company and industry impact, including the evaluation of a **Distribution System Operator (DSO)** role, and the opportunity for new entrants such as **Energy Service Companies (ESCos)**.

However, the alternative solutions – which without careful evaluation may promise much but deliver little – must not be allowed to result in over-specification, unnecessary delay and cost.

These new solutions need a period of rigorous evaluation in a **real environment**, and we believe that the Thames Valley location, in conjunction with our project approach, will provide the necessary vision to facilitate this change for SEPD, its customers and the industry - to provide truly representative learning for the future.

FOCUSING ON SOLUTIONS

A location that has a representative customer base and network topography is vital, so that the outputs present a scaleable solution applicable widely to GB.

Bracknell's diverse demographics includes a variety of housing types, and combination of domestic and commercial demands on the system that are representative of a great many urban areas in the UK. There are no special features in its network topology, and crucially, from a learning perspective, there are no major 'eco' initiatives in the town at present, thereby allowing carbon reductions achieved by our Project to be more accurately attributed to our activities.

Since Bracknell is not involved in other low carbon initiatives, the impact and results of our own activities will not have to filter out 'white noise' from other local initiatives.

The solutions centre around creating an intelligent distribution network that:

- creates a modelling solution to determine the likely impact and locality of low carbon technologies on the network;
- enables new technologies and techniques to be evaluated in a rigorous manner; and
- facilitates active community engagement and knowledge-sharing with multiple stakeholders.

Customer and community engagement will be vital to the success of our Project and we have already established a manageable range of Public and Private sector collaborators.

Through the active promotion of PV installation and the innovative use of storage devices to replicate a future concentration of new technologies (EVs, GSHPs, PVs), our Project will be equipped to illustrate the impact of these new loads on the network that may not otherwise materialise for some years. Promoting low carbon solutions will also demonstrate the potential appetite for customer acceptance of these products, with a particular emphasis on **alleviating fuel poverty**.

Our Project will be conducted on such a scale, and in such a manner that individuals, communities and businesses across the UK will see the opportunity and derive the benefit. We intend to engage and communicate with all our stakeholders with the objective that "no-one is left behind".

“M” IS FOR METHODS

Our Project will develop a **Monitor, Model and Manage methodology** to provide an SEPD and electricity industry alternative to traditional network reinforcement, to determine the most efficient and effective ways to meet the needs of our customers reliably over the coming years, and on a longer time horizon towards 2050. This approach, illustrated in Appendix 1.1, proposes that we will:

- **Monitor** real time data on our networks, and establish a level of ‘observability’ not previously envisaged, that will anticipate low-carbon related network constraints before they impact the system and affect quality of supply to customers;
- **Model** and forecast how energy will flow in a low carbon distribution network, and design and develop the tools, systems and processes required for network forecasting, operational planning, network control and investment decisions in the future. These will provide key learning and real applications to allow SEPD and the UK power sector to determine alternative network and customer based solutions as an alternative to traditional re-enforcement; and
- **Manage** the network by introducing new operational techniques and procedures, utilising new network technologies, and engaging industrial and commercial (I&C), small/medium enterprise (SME) and domestic customers in solutions that will deliver real benefits all parties. Such alternative solutions will comprise:
Active Network Management; embedded generation control; self-configuring switchgear; real-time cable rating; network storage applications; and I&C, SME and Domestic customer demand side response through the promotion of technology and commercial incentives.

To contribute to our Project and provide valuable learning channels and facilities, we will also promote low carbon technologies to determine the most effective contact solutions, and engage with the local community and other industry parties.

ENVISAGING THE PROJECT

The Thames Valley Vision (TVV) will **develop and rigorously validate new least cost solutions**, including making extended use of existing business systems. Our project will:

- determine the optimum amount of network sensors monitoring required;
- develop the modelling and planning tools necessary to allow active network planning and management;
- revise existing codes, and create the new standards for the application of smart technologies and commercial arrangements, so establishing a **Smarter Network Operation and Design Manual**;
- optimise load-related investment and significantly improve asset utilisation factors; and
- engage with a wide range of local groups to identify benefits for both customers and DNOs.

The preparation for this Bid has comprised the completion of ten detailed Work Packages reflecting a significant level of project readiness against which to implement our Project. A summary of the Work Packages can be made available upon request, and a high level schematic is shown in Appendix 1.2. Appendix 1.3 illustrates the proposed technical solution provided by our Collaborator, GE.

Our Work Package(WP) elements comprise:

- A Project Management Work Package managing each subsequent WP including a technology and commercial solutions deployment layer;
- An Integrated Operations Environment where all data collection and control scenarios will be operated and evaluated;
- A Modelling WP that provides the necessary data and advice for future planning and operational tools; and
- A Learning and Dissemination WP that ensures project materials and learning points are captured and made available.

Box 2: Please provide a description of the Project

LOCATION

Bracknell is a vibrant community in the heart of the Thames Valley. The diversity in demographics, housing types and network topology will present difficult but highly valuable local challenges to be addressed by alternate technical and commercial solutions. This will ensure maximum learning that can be employed widely across GB.

Our Project area supplies approximately 33,000 customers, with the direct involvement of at least 1000 domestic and 100 industrial, commercial and SME customers. See Appendix B – Diagrams and Maps of Bracknell and its Electricity Network.

The Thames Valley Vision is characterised by the following methodology and solution:
“Monitor – Model – Manage”

MONITOR

To identify the detailed localised network characteristics that may arise in a low carbon future, our Project will establish a **Bracknell Grid Monitored Network** comprising over 300 LV sub-stations with sensors to capture the electrical characteristics of the HV/LV network and consumer behaviour. We will achieve this volume of installations with no Customer Interruptions to ensure minimum disruption during wider deployment. Appendix 2.1 provides proposed monitoring details.

Advanced/smart metering in three highly metered **‘focus zones’**, will provide the modelling data required to extend the derived value over the full geographical network grouping by means of a customer typology characterisation and extrapolation techniques.

Although the level of monitoring is intentionally greater than anticipated in full smart grid deployments, we will evaluate the approach robustly, to determine the optimum cost-effective monitoring, communications and control architectures to be defined for wider application.

MODEL

Building on successful applications in the retail sector - which have resulted in increased services and reduced costs - the mathematical demand modelling will be provided under the direction of Prof Peter Grindrod CBE at the University of Reading, Department of Mathematics. In conjunction with this project SEPD is supporting the establishment of a **Centre for Smart World Analytics** at the University of Reading to form a centre of excellence for this topic, thereby providing a significant vehicle for learning and dissemination.

The creation of a dynamic **Tracking and Inferencing Model** will enable short, medium and long term demand forecasts to be derived – essential for managing the more dynamic characteristics of customers in the future and overcoming the severe limitations of today’s capital planning based on average peak demands. Our Project will also develop unbalanced (three phases) **LV state estimation** and evaluate its benefit in this context. We believe this to be a first of its kind. (Refer to Appendix 2.2 for further information on state estimation).

This modelling work will allow network operators and planners to forecast network constraints at LV nodal level. The analytics techniques will dynamically track and characterise large areas of the network through intelligent use of limited data samples combined with wide area modelling.

The development of shorter time horizon forecasting models will allow more targeted use of the emerging network solutions including the deployment and management of localised energy storage, demand response initiatives and innovative customer propositions.

MANAGE

Deployment of advanced monitoring and modelling solutions will, for the first time, enable these networks to be managed closely - enabling improved asset utilisation to be demonstrated, delaying or avoiding traditional reinforcement, and facilitating new techniques such as **real time ratings, active network management, and intelligent switchgear**. **Energy Storage** will be deployed at LV substations, street cabinets, and household locations and its performance assessed utilising this network observability. It will also enable stress testing to simulate customer demand/export real loading conditions. Appendix 2.3 illustrates a before/after business systems architecture for the operation of the TVV Project and subsequent deployment.

INVOLVING CUSTOMERS

Through the **I&C Consumer Consortium**, the development of a **'retrofit' Smarter Building**, and control of customer **Building Management Systems** and **stand-by generation** facilities, our Project will seek to optimise net community carbon benefits in addition to site-only energy efficiency improvements. See Appendix 2.4 for an outline customer proposal.

Bracknell plays host to half of Europe's Silicon Valley and as a result is home to the UK Headquarters of many leading multi-national companies. Through our **Consumer Consortia** and **Smarter Building** solutions, we therefore anticipate our initiatives to be recognised and adopted on a local, regional, national, and international basis.

SME and domestic demand side response applications will be promoted through the development and application of commercial incentives and customer focussed products. Our Project will also address high PV penetration by balancing generation and demand utilising **heat storage** capability in the customer property.

ENGAGING DOMESTIC CUSTOMERS

Our Project will promote existing Government **Low Carbon Promotion** incentives to the local community. This will provide evidence of the challenges of customer acceptance, resulting network constraints, and **a means of alleviating fuel poverty**. We will also facilitate a public sector based **Energy Service Company (ESCo)** with the potential to facilitate direct incentives for low carbon solutions in the planning arrangements at the new build/refurbishment stage. Our Project has assisted the Council with the installation of **Electric Vehicle (EV)** charging posts.

WORKING WITH COMMUNITIES

The engagement with customers and communities is vital to the success of our Project, to underpin effective demand response and participation. To address the challenge of raising community engagement and actively promoting UK industry learning and dissemination, SEPD will establish a **Community Low Carbon Energy Centre** and a flagship **Low Carbon Smarter Networks Centre**. This will communicate the concepts of low-carbon solutions and smarter grids in a highly interactive visual way and provide a 'live window' on to the TVV project.

INDUSTRY DEVELOPMENTS

In addition to contributing the optimum monitoring/metering requirements; network and customer, commercial and technical solutions, our Project will also indicate the required industry changes including **Licence, Governance Codes, and Procedures**. We will demonstrate how a DNO could develop **Distribution System Operator (DSO)** capabilities and how these new responsibilities could be integrated within industry arrangements and a number of business systems, both internal and at external stakeholder organisations.

To ensure the earliest possible engagement of DNOs and potential for shared learning, we will invite DNOs to contribute to the early specification of the Tracking and Inferencing Model and the Low Carbon Networks Centre. 10% of the Centre's time will be made available to other DNOs for purposes consistent with learning and dissemination.

Box 3: Please outline the changes which you have made to the Project since the Initial Screening Process

Does the high level Solution being demonstrated and the high level Method being trialled in the Project remain the same as that contained in your Screening Submission? Yes/No

We confirm the solution and method being trialled is as contained in our screening submission.

Ofgem’s decision letter of 19th July indicated that the Project did not meet the specific requirement (Chapter 2 of the LCNF Governance Document) of “a novel arrangement or application of existing Distribution System equipment”. However, we would affirm that this requirement is met in this Project, due to the fact that we are developing applications, based where appropriate, on existing legacy systems to ensure expediency and cost effectiveness.

Since the ISP submission, due to continuing work, further information has become available to the project team: (i) Storage costs have risen considerable as a result of known tender exercise (DECC Battery), (ii) the Communications and ICT costs have also increased following further studies, and we have also expanded the capability of the intended Low Carbon Smarter Networks Centre.

The local Communications provider, BT and C&W remain as part of the Corporate Customer Consortium. Due to no communication provider being prepared to fund in part/full, we have now decided to make the communications solution subject to tender. A copy of the scope and tender document can be provided if required.

The expansion of the Arqiva/ Thames Water communications/ water meter project will be encouraged by SEPD as part of the Communication Tender.

Access to Imperial College was constrained as a knowledge transfer partner, which we understand was a result of an EDF objection. However, we believe we have more than addressed our knowledge transfer arrangements with the inclusion of the Universities of Reading and Strathclyde, and the addition of the Institution of Engineering and Technology (IET).

Project Costs

These should be the same amounts as detailed in the Full Submission Spreadsheet tab entitled 'Second Tier Funding Request' included as Appendix A

Total Project Cost	£ 32.16m
External Funding	£ 3.848m
DNO Extra Contribution	£
DNO Compulsory Contribution	£ 2.831m
Second Tier Funding Request	£ 24.434m
Project Completion date	03/2015

Derogations or exemptions

If awarded funding, will you require a derogation, licence consent or exemption, or any change to the regulatory arrangements in order to undertake the Project or cater for contingencies? Yes/No

Box 4: If Yes, DNOs must provide a summary of the details of the derogation, licence consent or exemption, or change to the regulatory arrangements required

There is no requirement to seek a derogation from any technical requirements or incentive schemes for the TVV project, nor are any other changes required to the regulatory arrangements. However the project will challenge some of the existing codes and design standards. If any changes are required then we will advise and work along with Ofgem to maximise the least cost solutions.

We are seeking to engage with domestic, industrial and commercial customers regarding potential dispatchable demand. This will require designing new commercial arrangements, including incentive schemes to promote participation. For domestic customers we intend to make *ex gratia* payments as part of the trial and assess any changes to our charging structures for this class of customer following the trial.

For industrial and commercial customers our intention is to encourage participation by developing options under their Ancillary Services contracts. If any changes are required to our charging methodology, they will require Authority approval and we will therefore work closely with Ofgem whilst we develop these trial products to ensure that current licence obligations continue to be met. Our preference is not to seek derogations from our licence obligations, but if these are the most practical way forward for the duration of the trial we will discuss them further with Ofgem.

If any changes are required to our charging methodology, they will require Authority approval and we will therefore work closely with Ofgem whilst we develop these trial products to ensure that current licence obligations continue to be met.

Section B: Project Management

DNOs must provide an organogram outlining roles and responsibilities in the Project and the organisational structure. This must be included as Appendix C.

Contact details of DNO Principle Project Manager:

Name and Title:	Stewart Reid, Future Networks and Policy Manager
Telephone:	01738 455746
Email:	Stewart.a.reid@sse.com
Address:	Scottish & Southern Energy Inveralmond House 200 Dunkeld Road Perth PH1 3AQ

Box 5: Please provide details of your Project plan

DNOs should outline up to ten key milestones associated with their Project.

Date	Milestone
Q2.2011	Consumer Consortia – first meetings held and terms of reference established
Q1.2012	Smart Meter/end-use monitoring installations; and 80% LV Sub-station monitoring complete
Q2.2012	University of Reading Tracking & Inferencing (T&I) Model, built, tested and data integrated
Q3.2012	Network Control Devices installed and commissioned
Q3.2012	Network Energy Storage Devices installed and commissioned
Q3.2012	Domestic/SME Demand Response solutions installed
Q1.2013	Low Carbon Smarter Networks Centre available to other DNOs
Q3.2014	Final University of Reading Tracking & Inferencing Model Report
Q3.2014	Fuel Poor Low Carbon Promotions evaluation results
Q1.2015	End of Project Report

A full Project plan, presented as a Gantt chart, must be provided as Appendix D: DNOs must include a month by month breakdown of the activities associated with a Project; milestones, delivery of outputs and deliverables, dependencies, critical path, responsibilities, phases and key decision points.

Project Budget

DNOs must complete the Full Submission Spreadsheet tab entitled 'Second Tier Funding Request' and include it within Appendix A.

Box 6: Please provide a breakdown of your total employment costs for the total Project which you are project managing and highlight where these are funded by, or provided by others.

Total employment costs should include all the costs used for labour, including pensions but excluding Contractors (whose costs are detailed separately). Personnel with the same role can be grouped together.

Staff type	Total Costs	Person days	Funding
Project Manager (overall project management, control, performance reporting, coordination, escalation – general overall performance) Customer Champion (lead on communications with Domestic, SME and I&C Customers, manage the Consumer Consortium)	£3,182,411	5,323	The funding provided by external collaborators is against the entire project and not specifically allocated to each individual element, therefore, we have assumed that the proportion of funding will be the same for each staff type ie 4%. The remainder being provided by the LCN fund.
Project/ Spec Engineer (Prepare designs, specification of equipment and scope of works, manage technology partners and installation of equipment eg batteries, intelligent switchgear, building management systems, substation monitoring & CTs, Design Comms & ICT software)	£4,886,824	8,354	As Above
Technician (Installation of Substation Monitoring equipment, Smart Meters and End Point Monitoring Equipment, Batteries, Site Installation works, Input Enmac information, Training on new processes and systems, de-commissioning and running the Learning Centre).	£790,778	1,701	As Above

Staff type	Total Costs	Person days	Funding
Craftsperson (Data GIS Cleansing exercise, Installation, Batteries, Building Management Services, End Point Monitoring Equipment, and decommissioning)	£543,170	1,575	As Above
Administration (Admin associated with Data Cleansing, Supporting team, reports, learning centre, dissemination of learning and communications of results, coordinating of events and overall customer programme)	£1,222,979	3,945	As Above
Executive (Attending local customers events, learning and reports, focussed meetings, and conferences sharing finding and results of the TVV project.)	£104,151	125	As Above

Box 7: Please outline the main Equipment costs required for the total Project which you are project managing

Item description & No. of units	Function in Project	Cost per unit	Total Cost	Funding	Direct Benefit
LV Monitoring 1750 - CTs, & Monitors in 325 Substations	Near real-time measurements at HV/LV substations will provide two key solutions. Monitoring will enable SEPD to confirm its network modelling while also providing greater overall observability	£1,619 per Substa	£526,269	LCNF	No Direct Benefits expected in DPCR5
50 S&C Intelli HV Switchgear	Management of the 11kV network, this will be used for active reconfiguration of the network at 11kV.	£27,711 per site	£1,385,556	LCNF	As above
1000 Smart Meters & Data Capture	Observability of the customer and network, may be used for demand side response for the Domestic customer	£100 per house	£100,000	LCNF	As above
300 Cut Out Monitor & Data Capture	The Cut Out Monitors will be used for the observability of Network and Customers	£160 per site	£50,000	LCNF	As above

Item description & No. of units	Function in Project	Cost per unit	Total Cost	Funding	Direct Benefit
3 x 500kWhr Batteries	Community level energy storage units on the 11kV network will store energy during low loading periods, or from solar renewable energy sources when constrained by network conditions, and then release the energy during peak loading periods	£450,000	£1,350,000	LCNF	As above
12 x 50kWhr Batteries	Community level energy storage units on the network will be used to either store energy and release during peak load periods or, to simulate PV, EV charging units on the network.	£50,000	£600,000	LCNF	As above
50 x 10kWhr Batteries	Domestic energy storage units will store energy during low loading periods, or from solar renewable energy sources when constrained by network conditions, and then release the energy during peak or constraint periods	£10,000	£500,000	LCNF	As above
SGS HV/LV Active Network Management	Allow Active Network Management on the lower voltage network to increase utilisation of the existing asset.	£2796842	£2,796,842	LCNF	As above

Box 8: Please outline the Contractor costs required for the total Project which you are project managing

Contractor	Role in Project	Funding	Expected length of contract	Total Cost
Universities of Reading/ Strathclyde, and others	Produce and promote learning material from the project to the benefit of other DNOs and the UK as a whole.	LCNF	36	£200,000
GE & Sub contractors	Install the monitoring CTs and devices, inteli-rupture switchgear, active network management solutions, networks modelling and LV Enmac (services)	£1,585,000 (GE), £2,752,134 (Fund)	36	£4,337,134
Honeywell Building Management Services	Demand Side Response Equipment – 3 x Pilot studies supported by Honeywell	External Collaborator – Honeywell	36	£450,000
University of Reading	Tracking and Inferencing Model, design, build, run and report	£250,000 (UoR) £1,350,000 (Fund)	48	£1,600,000

Box 9: Payments to users or Customers

Please outline the details of any payments you wish to make to users or Customers as part of the Project.

Type of user or Customer	Payment per User	Total Payment	Funding
Domestic/SME Customer Demand Side Response Incentives	£200/customer	£200,000 Estimate – will be validated during the project	From total Project costs/funding
I&C Ancillary Services and other Incentives	Dependent on customers attributed value of load shedding and numbers of customers secured	£450,000 Estimate – will be validated during the project	From total Project costs/funding
Incentives for Battery Involvement	Dependent on customers interest and activity – cost per installation	£88,800 Estimate – will be validated during the project	From total Project costs/funding
Incentives for getting involved in Smart Meter Trials	Dependent on customers interest and activity – cost per installation	£20,000 Estimate – will be validated during the project	From total Project costs/funding

Box 10: Other costs for the total Project which you are project managing. This should be categorised into the following categories: IT costs, Contingency costs, IPR costs, decommissioning costs, abnormal travel costs and costs associated with public engagement and dissemination of learning

Cost Category	Cost Item	Cost
Travel & Expenses	Travel and expenses (£2000 per person per year) [In accordance with SEPD's sustainability policy : PO-COR-033]	£57,100
IPR	Default IPR rules applies	£0
Contingency	Built into Costing	£0
IT	Web Portal Design and operate	£20,000
	End Point Monitoring Data Capture Software	£60,000
	Monitoring Data Capture Software	£19,800
Learning & Dissemination	Learning Centres (i) The Low Carbon Smarter Network Centre will be created as non-revenue entity specifically for the demonstration and education of SEPDs LCNF projects, applications, and results, to a wide range of stakeholders;	£1,500,000
	(ii) Promotional Campaign for the installation of PVs, GSHPs and CERT funded insulation installations in target customer properties – both private and Council (with particular emphasis on the fuel poor). This will include the establishment of a Council supported Community Low Carbon Energy Advice Centre;	£200,000
Large Business (I&C)	Consumer Consortium Events The co-ordination of; and facilitation of Consumer Consortia which will involve a series of bi-monthly meetings to progress the low carbon networks agenda to provide mutually beneficial solutions.	£25,000
Domestic and SME	Consumer Consortium Events The co-ordination of; and facilitation of Consumer Consortia which will involve a series of bi-monthly meetings to progress the low carbon networks agenda to provide mutually beneficial solutions.	£52,500
Technical and Project Risk Management	Technical and project quality assurance provided by KEMA.	£350,000
Technical Risk Management	Technical engineering validation provided by the University of Strathclyde.	£600,000
		£
		£
		£
		£
		£
		£
		£
		£

Cost over-runs & Unrealised benefit

Box 11: Please detail any cost over-run you anticipate requiring for the Project and express this as a percentage of the funding you are requesting

DNOs must outline (as a percentage of the Second Tier Funding Request¹) the level of protection they require against cost over-runs

5 %

If a DNO states that they would like protection against a cost over-run the default position is that the maximum amount that can be requested is 5% of the Second Tier Funding Request. If the level of protection you are requesting is not the default then please justify.

The detailed Work Packages that were produced to support the Bid preparation provides a significant degree of comfort on our cost and funding estimates. However, there are still significant elements of the solution that are still to be tendered or subject to contract finalisation, and may be subject to variation from our assumptions (both up and down). However, we are still comfortable to accept the 5% level of protection.

¹ In the LCN Fund Governance Document the term Approved Amount is used since the description relates to the implemented Project.

Box 12: Please detail the level of protection required against Direct Benefits in excess of the DNO Compulsory Contribution

We do not believe any Direct Benefits from our Project will arise during DPCR5.

Successful Delivery Reward Criteria

Box 13: Please set out your proposed Successful Delivery Reward Criteria

Successful Delivery Reward criterion	Evidence
<p><u>DECC Low Carbon Transition Plan (LCTP) (1) :</u> Improved information to/from consumers and increased customer engagement</p> <p>Consumer Consortia established, first meetings held and terms of reference established by Q2.2011; Community Low Carbon Energy Advice Centre opened.</p>	<p>Documentation and evidence of customers committed to the Consortia; Demonstrable existence of facility, literature etc</p>
<p><u>DECC LCTP (2) :</u> Encouraged and facilitated demand management</p> <p>Final Report on installation of PVs and balanced heat storage management system; DNO interface to I&C customer building management control; I&C, SME and domestic demand side response incentives implemented and evaluated.</p>	<p>Final Report Q3.2014</p>
<p><u>DECC LCTP (3) :</u> Encourage and enable domestic electricity export</p> <p>Increased Penetration of PVs in target customer properties targeting the removal of customers from the fuel poor classification. Final assessment of penetration compared to control group.</p>	<p>Final report comparing the levels of PV installation with a non-targetted area by Q2.2014.</p>
<p><u>DECC LCTP (4) :</u> Improved monitoring & information for network operators</p> <p>750 smart meters/monitors installed; and 80% of Network monitoring installations completed.</p>	<p>Work commissioning reports; demonstration of connection and data capture on systems; photographic evidence.</p>

Successful Delivery Reward criterion	Evidence
<p><u>DECC LCTP (5) :</u> New technologies including energy storage and advanced ICT systems</p> <p>80% installation of energy storage devices; Installation of 50 units of self configuring switchgear.</p>	<p>Work commissioning reports; demonstration of connection, data capture, and active operation of storage devices; photographic evidence. Q3.2013</p>
<p><u>DECC LCTP (6) :</u> More optimal use of networks and limited need for re-enforcement</p> <p>Active network management capabilities combined with technology and commercial solutions to demonstrate peak demand reduction.</p>	<p>Final Report Q4.2014</p>
<p>University of Reading - First Months Demand Forecasts Delivered and Presented to the TVV Team.</p>	<p>Qtr 3 2012 Reports and first Forecasts available</p>
<p>Low Carbon Smarter Network Centre for learning established and available to other DNOs.</p>	<p>Centre available to other DNOs Q1.2013</p>

Section C – Evaluation Criteria

Accelerates the development of a low carbon energy sector

Box 14: Outline how the Solution accelerates the development of a low carbon energy sector

Our customers continue to show increased interest in the low carbon world, this is demonstrated on the attached “Microgeneration Installations in SEPD” graph, see Appendix 14.1. This graph shows the considerable uptake in numbers of installations, and that the installations are getting larger, therefore increasing the potential for generation onto the LV networks. The market initiatives, encouraged by Government incentives, which will include electric vehicles, are occurring regardless of DNO activities, and it falls to the DNO to address the resulting technical challenges.

Our Project is therefore focussed on developing solutions, systems and processes to allow the low carbon technologies to be safely and securely connected to the system in the most cost effective manner.

The considerable challenges arise from the new loads to be accommodated and the loss of diversity inherent in their characteristics, which if not addressed will result in network constraints and detriment to quality of supply. Innovative solutions need to be implemented and rigorously evaluated if costly traditional reinforcement, and/or inappropriate technology investment is to be minimised. These challenges require radical new thinking, new investment, and community acceptance, while recognising that the solutions may bring other opportunities - notably addressing fuel poverty.

As our Project progresses we will tackle and answer the six network challenges set out on DECC’s Low Carbon Transition Plan (2009) as referenced in Box 13 above.

Appendix 14.2 outlines the issues related to calculating ‘net benefits’ (network and carbon). These matters have been the subject of detailed study, and it would not be appropriate to attempt grandiose claims for our Project at this stage. However, this analysis will be a key output of our Project. For Appendix A carbon benefits, we have allowed a modest “peak avoidance” achieved through customer response to our initiatives. We have not included the promotion and very real positive benefits of insulation and renewables installation for the fuel poor; or any quantification of the facilitation of low carbon technologies that may otherwise be “constrained off”.

Appendix E provides the source material referred to in the preparation of this response and the source of any figures used to justify the benefits quantification.

As a result of our Bid preparations, we have already generated considerable interest from local Council, businesses and customers. We have already held our first Business Consortia initiatives – see Appendices 14.3-14.4 which includes some details of the events.

We have also attracted new funding interests in low carbon investment in the area and started discussions with a Public Authority with regard to the possibility of becoming a local generator of energy to assist local businesses and developments. Through project preparation discussions, we have already promoted the opportunity for c.£34 million of renewable energy projects, which would not have materialised on the timeframe of the next DPCR.

Appendix 14.5 provides some promotional material we have used to engage a variety of stakeholders.

Given the nature and range of companies in the Thames Valley area, we believe our Project will provide a significant boost to the DECCs Low Carbon Transition Plan’s aspirations for the UK to be a **world centre of the green economy**. As a wholly owned UK business, and already a leader in renewable generation in the UK, SSE would be proud to be at the forefront of this initiative.

Has the potential to deliver net benefits to existing and/or future customers

DNOs must complete the spreadsheet tab 'Net benefits' within the Full Submission Spreadsheet and include as Appendix A.

Box 15: Please provide a qualitative account of the net benefits which the Solution has the potential to deliver if rolled out across GB.

For all customers, our Project will provide the ability to connect and manage new low carbon devices more cheaply and quickly than would otherwise be the case – through the lowest cost Distribution Use of System (DUoS) charges.

Our Project is designed to facilitate the necessary tools to ensure no low carbon technologies are constrained off and Appendix A has taken a modest assessment of the potential benefits from our intended peak avoidance demand side response.

Our Project will:

- determine a range of technology and commercial solutions that are acceptable to customers;
- identify and promote the necessary new industry arrangements and roles, required for the efficient operation of the arrangements for the customers. This will include the identification and promotion of **Distribution System Operators** and **Energy Service Companies**, which will provide greater choice for customers to manage, or have their energy managed;
- provide the industry frameworks and arrangements for these customers to have access to a choice of new Supplier pricing/tariff structures at lower cost, at appropriate levels of customer service and quality of supply;
- consider the as yet unquantified benefit for Suppliers to have a range of demand/supply balancing mechanisms within their portfolio to reduce wholesale energy purchase costs and reduce prices to customers;
- ensure that the new arrangements do not in themselves lead to an increase in Customer Minutes Lost (CML) and Customer Interruptions;
- ensure no surprises at DPCR6, so that effective industry planning is facilitated to the benefit of customers;
- be conducted on such a scale, and in such a manner that individuals, communities and businesses across the UK will see the opportunity and derive the benefit. We intend to engage and communicate with all our stakeholders with the objective that **“no-one is left behind”**.

Our Project will promote net community low carbon solutions to a range of local, regional, national and international companies, in addition to their own Carbon Reduction Commitment (CRC) energy efficiencies. Since these customers are large consumers of energy, we expect a more substantial and immediate impact on volumes, targeted at peak avoidance measures on the High Voltage (HV) network. We anticipate that the Consumer Consortia will provide the basis for deployment across GB based on the initiative of the customers themselves. We also anticipate that our approach will be significant and is justification for the claimed peak avoidance benefits made in Appendix 14.2.

As a means to demonstrate the challenge of concentrated PV penetration on a network, our Project will also assess the potential to reduce carbon output and alleviate fuel poverty through the promotion of existing Government schemes. This will be in conjunction with the local Council's performance target (NI187) to tackle fuel poverty, and adapting to climate change (NI188). This penetration of renewables is targeted for a local penetration of 15% by 2020.

Direct Impact on the operation of the Distribution System

Box 16: Explain the way in which the Project/Solution has a Direct Impact on the Distribution System

Our Project's primary focus is to ensure that the necessary mechanisms are available to allow timely access to the network for low carbon technologies, whilst minimising customer cost issues imposed through Distribution Use of System (DUoS) charges.

This focus, and the University of Reading modelling is a key differentiator of this Project – see UoR Proposal, and Questions and Answer paper Appendices 16.1 and 16.2.

Appendix 14.2 makes reference to the NPVs derived from the Imperial College/ENA Report, and Ofgem's own Demand Response Discussion document recognises the significant scale of benefits. Even the lowest estimate of £0.5bn represents to a factor 20 compared to the £24.4m funding request.

It was not seen as prudent to attempt to quantify all the potential benefits, since this obviously relates to the most significant unknown that we face. A substantial amount of the consequences of the low carbon future will be unforeseen, and our Project (by virtue of the monitoring and the modelling) will allow foresight of a range of human effects. Appendix 16.3 illustrates some of the potential technical challenges. We would draw a parallel with the Millenium Bridge in London which was subject to detailed design, but was proven to materially flawed when faced with human interaction.

- Our detailed monitoring may uncover a range of issues on the network that would otherwise have remained hidden in terms of losses and quality of supply issues;
- The progressive installation of PVs in localised areas of the network, and the necessary response to them, will create valuable knowledge of a likely, and increasingly apparent, scenario;
- The use of energy storage, for load response, and also the simulation of low carbon loads and the associated efficiency of operation will provide invaluable scenario data;
- The options of network re-configuration may give rise to a range of technical loss scenarios that may not be as expected.

Through the active promotion of PV installation and the inclusion of storage devices to replicate a future concentration of new technologies (EVs, GSHPs, PVs), our Project will be able to illustrate the impact of these new loads on the network that may not otherwise materialise for some years.

The challenge for UK distribution network operators is to adapt existing assets and move from an **“invest then connect”** process to embrace a new **“connect then manage”** alternative so as to accommodate low carbon customer demands at least cost.

With many low carbon technologies likely to increase electricity demand but not improve utilisation factors, existing DNO procedures may result in overspending on, and delays to, load related reinforcement with consequential deterioration in Quality of Supply; Customer Minutes Lost (CML) and Customer Interruptions; and a resulting restriction on low carbon connections.

Our project will develop and rigorously validate new least cost solutions, including making extended use of existing business systems, where practicable. The project will demonstrate active network planning and management intended to optimise load-related capex and improve asset utilisation factors. We will engage with a wide range of customer groups in Bracknell to identify benefits for both customers and DNOs.

Generates new knowledge that can be shared amongst all DNOs Answers to this section should be detailed in boxes 17 to 19

Box 17: Explain the new learning which will result from a successful Project

A key intention of the TVV project is to avoid a “boil the ocean” approach to network monitoring and a “blunderbuss” approach to new technology deployment and demand side response initiatives. Instead the **monitoring, modelling** and targeted **management** solutions will provide rapid, targeted, appropriate and cost effective DNO responses to the uptake of low carbon technology by the end customer.

Our Project will allow the vital preparation for a new regime of planning, development and operational tools to manage the networks. Our Project is seeking to provide the necessary vision and modelling tools for a DNO to prepare their business for the future.

- Prepare DNOs for strategic long (price control submission), medium (network planning) and short-term (network operations) management of HV and LV networks to support the low carbon economy. Appendix 17.1 illustrates a before/after planning process for SEPD.
- Demand Modelling/Customer Behaviour - It is already known that socio demographic data and the housing stock typology is an extremely poor predictor of usage and usage patterns (previous work by UoR/SSE). Analysis of smart meter data has shown that there are approximately 10 -15 different types of weekly household demand patterns commonly observed (some are volatile, some have pronounced late night or week end use; some are the opposite). Those living in energy poverty include some of the most extreme behavioural patterns. We will ensure that we have a variety of household behaviours represented in the project (by deploying extra meters if necessary). As a result, our focused LV networks and the challenge of working with the diversity of Bracknell, will be able to deal with evolving, aspirational, oblivious, engaged, and highly variable (sub) populations.
- Support DNOs as they move from an ‘**invest then connect**’ strategy to ‘**connect and manage**’.
- Demonstrate how the low carbon economy can be supported through the extension of existing operational systems together with the integration of advanced active network management applications.
- Demonstrate how a **Distribution System Operator (DSO) role** can be integrated into the existing regulatory/commercial framework avoiding, as far as practicable, impact on other industry stakeholders. This will be measured by identifying how the Distribution Code, and other relevant secondary legislation/codes of practice, might change to accommodate a DSO role.

Our Project will consider the alternate operation of network based and customer based solutions to address the resultant issues that are witnessed on the system.

Our Project also promotes the deployment of low carbon initiatives and will assess the impact of such technology on the network; but also the success of alternative measures in promoting the low carbon initiatives, so that these can be applied elsewhere.

The mix of customers and their distinctive behaviour in varying network topography, **representing a good surrogate for most GB customers aims to ensure that no-one is left behind or disadvantaged by the low carbon future.**

Learning will be captured by the detailed documentation of the Project, including, for example, the Work Methods developed for the deployment and operation of new technologies on the network.

We will also be keen to include learning points and data from other DNO LCNF projects for input to the demonstration facilities and modelling work.

Box 18: Outline the arrangements for disseminating learning from the Project

Situated in the heart of the Thames Valley, our Project and its various presentation facilities will be accessible to a significant national industry, Government and general audience. It is also convenient for international visitors, who will benefit, but will also provide a useful insight and exchange on activities taking place elsewhere around the world. See Appendix 18.1 – Learning Matrix.

As collaborators, the **Universities of Reading (UoR) and Strathclyde (UoS)** will contribute to Project outputs and their dissemination, through events and publications. Learning will be shared directly with students at undergraduate and postgraduate level, and several post doctorates will be linked to our Project. In addition, the creation of the **Smart World Analytics Centre** at the UoR will provide a lasting legacy of a world centre of expertise.

The Institution of Engineering and Technology (IET) has expressed an interest in becoming a **Knowledge Transfer Partner** and will provide their various events, programmes and publications for dissemination of Project materials.

A flagship **Low Carbon Smarter Networks Centre (LCSNC)** will provide technical replication of the hardware and software that will be deployed in our Project. This will be on the basis of a “street-scene” with “replica” premises, and DNO operations – with interactive material and opportunities for both a technical and non-technical audience. Appendices 18.2 and 18.3 provides details of a similar scheme where our collaborator KEMA is a co-funder and partner.

10% of the Centre’s time will be made available to other DNOs, and a range of stakeholders will be invited to contribute to the Centre’s initial design; to the early specification stage of the Tracking & Inferencing Model; and to suggest operating regimes/approaches for the various initiatives we establish on the Bracknell Network.

The **I&C and SME Consumer Consortia** will be established as a priority with the first meetings occurring in Q1.2011 and Q2.2011 respectively. The intended **Low Carbon Community Accreditation Scheme (LCCAS)** will be launched in Q1.2012; and the **Smarter Building in the Community**, situated in Bracknell will be promoted through the I&C Consortium. Part of the LCCAS will require companies to promote awareness of the low carbon opportunities amongst their employees, thereby addressing a significant element of the working population.

The Domestic/SME Community Low Carbon Energy Advice Centre to be opened in Q3.2011 will be at a convenient location in Bracknell town centre - accessible on a walk-in basis and with event promotions to local businesses and schools. This will provide a community focussed education of the Low Carbon Network project – its issues and challenges – and promote existing Government schemes to advance low carbon solutions.

The inclusion of council led initiatives will allow Bracknell Forest Council to communicate successful models through the **Local Government Association publications and conferences**. A similar approach will be taken to educating **UK Housing Associations**, through sector specific promotion by Bracknell Forest Homes Housing Association, and through **National Chambers of Commerce Bodies** by the Thames Valley and Bracknell Chambers.

Our Project will develop an interactive **TVV Web Portal** to demonstrate the issues and approaches that are being investigated. This will allow technical and non-technical audiences to appreciate the purpose of our Project and allow questions to be asked and responded to. This will be made available at all facilities promoting our Project.

With the agreement of other members we will publish (or provide links to) relevant materials and studies on the **Energy Network Association** website; in addition to SEPD’s own website and any websites dedicated to our Project.

SEPD and Partner/Collaborator staff will take opportunities to present and exhibit at UK based (or significant UK attended) industry conferences.

Box 19: Outline the arrangements for Intellectual Property Rights (IPR)

Does the Project conform to the default arrangements for IPR? Yes/No

We confirm the default IPR arrangements will apply to this project.

Involvement of External Collaborators and external funding

Does the Project involve External Collaborators and/or external funding?

Yes/No

Box 20: If you have been unsuccessful in attracting External Collaborators and/or external funding to the Project, please detail your endeavours to do so

We attracted significant attention to the TVV Project, and have already engaged in substantial discussions with a range of communication provider companies. However, we decided to develop requirements, after completing the detailed scoping of our Project, rather than attempting to select a partner with an early, draft specification. We will be issuing a tender for the communication elements of our Project, shortly after the Bid Submission, so that vendor selection can be completed immediately upon Project Award, so no delay to Project implementation occurs.

The funding amounts from our partners and collaborators have still to be finalised and therefore the amounts shown are conservative estimates at the moment.

Due to the very strong interest in our Project, we would hope to establish a collaborator relationship during the procurement process rather than merely a customer/supplier arrangement; and be able to choose a provider who is able to add value to the learning and dissemination process.

During the period after Bid Submission and prior to Project Award, it is intended to continue discussions with other potential partners, including approaching the **Energy Savings Trust** and the **Carbon Trust** - for input to Low Carbon Energy Advice Centre and Consumer Consortia respectively.

We will also approach the **Building Services Research and Information Association** (BSRIA) and the **Building Research Establishment** (BRE) for input to the retrofit Smarter Building in Community and I&C BMS controls; the suitability for PV installation locations; and consideration of the PV/heat store balancing mechanisms.

Box 21: Where funding is provided by a third party that is not an External Collaborator, DNOs should provide details of the funder. If there is more than one External Funder, details of others can be included as an appendix:

Organisation name	Thames Valley Consumer Consortium
Type of organisation	Association of interested customer parties
Amount of funding	£100,000 over 5 years
Funding arrangements	Time attending Bi-Monthly Focus Groups, discussing new energy agreements and designing new low carbon systems within individual businesses
When funds will be provided	Spread over the 5 years, still subject to further negotiation
Conditions of funding	Subject to winning the bid
Risks/uncertainties	Subject to winning the bid
Details of contract or agreement	Majority working under NDA and Letter of Intent - working toward MOU or similar contract
Organisation name	Bracknell Forest Homes
Type of organisation	Charitable Organisation
Amount of funding	£50,000 over 5 years. (Still subject to negotiation)
Funding arrangements	Working with SEPD and their collaborators and partners to develop the low carbon world, with a focus on the Social Housing and Fuel Poor.
When funds will be provided	Spread over the 5 years, still subject to negotiation
Conditions of funding	Subject to winning the bid
Risks/uncertainties	Subject to winning the bid
Details of contract or agreement	Working with SEPD under NDA and LOI - working toward contract
Organisation name	Other Energy Suppliers - npower, SSE, Scottish Power, Good Energy
Type of organisation	Energy Supply Businesses
Amount of funding	£50,000 over 5 years. Still subject to negotiation
Funding arrangements	Working with SEPD and their collaborators and partners to develop the low carbon world, in the Business, SME and also with a focus on the Social Housing and Fuel Poor.
When funds will be provided	Spread over the 5 years
Conditions of funding	Subject to winning the bid
Risks/uncertainties	Subject to winning the bid
Details of contract or agreement	Working with SEPD under NDA and working toward MOU or similar contract

Box 22: Details of External Collaborators

DNOs should provide details of the 6 main parties who are collaborating with them on a Project. Details of any further External Collaborators should be included as an appendix.

Organisation Name	GE Energy trading as IGE Energy Services (UK) limited
Relationship to DNO (if any)	Lead Technology and Solution Provider, Application System Integrator
Type of Organisation	<p>Type of business: Producer and service provider for power generation and energy delivery technology, solution. Including applications, research, design and engineering, consulting, supply and financing.</p> <p>Reason for partnership: GE's energy technology, solution and drive for innovation will enable SEPD's LCNF project technical and business benefits.</p>
Role in Project	<p>GE Energy will perform the following role:</p> <ul style="list-style-type: none"> • Provide technologies and solutions (GE and 3rd party) to enable SEPD LCNF's project technical and business benefits • System integrator for GE and 3rd party technologies and solutions (within GE's architecture). • Provide technical advice/direction during implementation/deployment phase of the project for non-GE's related technologies and solutions (outside of GE's architecture).
Prior experience brought to Project	<ul style="list-style-type: none"> • Energy Management System: over 100 utilities, servicing 1.3B consumers, including National Grid UK TSO. • Distribution and Outage Management systems: real-time data to improve reliability: 69 utilities in 16 countries, including global top 3 utilities and 13/14 GB DNOs. • Geographic Information System: visualization for network design: more than 1,000 utilities, in 40 countries. • Smart Meters: 4 million smart meters shipped in 2009; SSE Customers Business EDRP project partner. • Pre-engineered solutions: over 350 digitized substations Earlier successful IFEI projects at other DNOs
Funding	GE will provide the following contribution in kind to the project: £1,585,000
Contractual relationship	<ul style="list-style-type: none"> • Long-term business agreement/relationship for the existing technologies/solutions/applications • Mutual relationship agreement established for LCNF project
External Collaborator benefits from the Project	<ul style="list-style-type: none"> • Continued support of small UK based "cleantech" companies • Providing technologies and solutions to deliver SEPD's LCNF project benefits. • Access to project lessons learned from technologies / solutions deployment and operations. • Strengthening the business relationship with SEPD and other project stakeholders. • Establish a UK-based flagship demonstration of a scalable enterprise wide low carbon network.

Organisation Name	KEMA CONSULTANTS
Relationship to DNO (if any)	No relationship with DNO
Type of Organisation	KEMA is a global company specializing in strategic & technical energy consulting, operational support, measurements & inspection, and testing & certification. Keeping a close eye on innovation and industry trends, KEMA is actively involved in helping clients address climate change issues through innovative technologies, strategies and solutions.
Role in Project	<p>KEMA will provide the key role of independent technical assurance of the vendor-provided solutions to be utilised in the project. KEMA will also provide technical assistance to the consideration of the deployment of new technologies in clusters and volumes not previously conducted on the network. KEMA will also provide strategic insight and knowledge of technical developments from around the world to inform the project; and utilise their global networks to disseminate the learning from the project. KEMA will co-fund and partner in the development of a Low Carbon Smarter Networks Centre.</p> <p>Appendix 22.1 provides a letter of support for our Project from KEMA.</p>
Prior experience brought to Project	KEMA is actively engaged in smart grid technology development and deployment projects around the world. Recent examples include The Power Matching City project in The Netherlands, The EU ADDRESS project, and smart grid analysis and development for New York Smart Grid Consortium. KEMA has already partnered in the USA with Duke Power to establish a smart grids “Envision” Centre in Cincinnati.
Funding	KEMA is providing a financial commitment to the project in the order of £250,000
Contractual relationship	Yes. NDA signed and draft MOU in existence which will be formalised into the necessary Agreements prior to Project Award.
External Collaborator benefits from the Project	KEMA expects to take learning from the project which KEMA will be able to utilise and promote to other KEMA clients – both in the UK (where we are engaged on national developments) and across Europe and internationally where KEMA is also active.

Organisation Name	UNIVERSITY OF READING
Relationship to DNO (if any)	Occasional contractor and collaborator with SSE. Work covers analysis of massive data sets derived from smart meter trials, methods, analytics and consumer focus.
Type of Organisation	University
Role in Project	University of Reading, Centre for Smart World Analytics (CSWA), Department of mathematics will supply all modelling and analysis of the large smart meter data sets. The dynamical conditional simulations, the smart (Hamiltonian) control algorithms, the ABM analysis, the incorporation of the scenario for uptake of home and LV network assets, the behaviour based segmentation, the buddying for planning purposes. UoR will also hold an annual workshop of modelling and predictions for demand behaviour and control on LV networks.
Prior experience brought to Project	Mathematical analysis of vast data sets for retail sector, consumer goods sector, telecoms sector and online marketing sectors. Mathematical analysis of smart meter data from the EDRP trials. Behaviour based consumer segmentation (unsupervised discrimination). ABM modelling expertise for retail and supply businesses (Counting Lab is a UoR Spin out from the Dept of Maths, deploying ABM technology for various consumer facing sectors, working with Carrefour). The University of Reading is a world class (SJTU's top 200) university.
Funding	UoR is investing £250k along side of the project to provide technology transfer function (outreach), project management and administrative support to the project team. This is an internal investment in real terms.
Contractual relationship	Yes - MOU currently being worked on between SEPD and UoR.
External Collaborator benefits from the Project	The University wishes to build strong relationships with locally based companies, and will benefit reputationally from the Project. The UoR benefits directly from the R&D carried out for the project and the growth of its new CSWA, which will be a world class centre of excellence for large data analysis across consumer facing sectors. The publications and scientific discoveries will contribute to the University's standing. The UoR also has a low carbon initiative, and a doctoral training centre (Technology for a Sustainable Built Environment) that will benefit from a halo of activity around the LCNF activities.

Organisation Name	BRACKNELL FOREST COUNCIL
Relationship to DNO (if any)	There are no ownership relationships between BFC and SSE
Type of Organisation	Local Government Authority responsible for the delivery of the vast majority of public services for the borough of Bracknell Forest.
Role in Project	<p>The Council will champion the merits of the project in its role as a community leader to businesses, residents and voluntary organisations within the borough. It will also act as a facilitator to ensure constructive dialogue between the DNO and key stakeholders.</p> <p>The Council also directly operates and commissions services which consume large quantities of energy and there is the potential for it to lead by example in how it generates and manages its energy consumption</p>
Prior experience brought to Project	<p>The Council has significant and proven experience in communicating with the various communities within Bracknell Forest and as the recognised community leader is able to influence the actions of significant stakeholders. The Council is required to report to Central Government on various indicators relating to a low carbon economy and is expected to take action to create a low carbon community. Consequently, it can be expected to put measures in place which encourage a change in consumer behaviour as well as developing appropriate regulation which could support the project objectives.</p> <p>As a major consumer of energy, any relevant changes to the Council's own behaviour will serve to promote the projects objectives.</p>
Funding	The project will benefit from the intellectual and practical contribution from Council senior officers and elected Members. These include the Director of Environment, Culture and Communities, the Mayor of the Borough of Bracknell Forest and the Executive Member for the Environment. A nominal value would be approximately £10,000/annum.
Contractual relationship	<p>There is currently a confidentiality agreement between BFC and SSE and a Memorandum of Understanding is currently in draft form and will be signed in September.</p> <p>As a Local Authority, BFC has the legal duty to act with integrity and only within powers expressly given to it.</p>
External Collaborator benefits from the Project	<p>Inclusion in the project enables the Council to further its own objectives, for itself as an organisation and its community, described in its climate change action plan which include objectives relating to reducing CO2 emissions, fuel poverty, engagement with stakeholders and community leadership.</p> <p>It is anticipated that participating in the project will inform the Council about how best to plan for its future energy production and consumption with real material benefits in CO2 emissions and costs.</p> <p>Cllr Ian Leake, Mayor of the Borough of Bracknell Forest said at the project's launch event on 12th August 2010:</p> <p>"The Low Carbon Network Fund signals a very different approach to the supply and consumption of electricity in the future and I hope that the Borough of Bracknell Forest, in the guise of businesses and the Community, can be at the forefront of this very positive opportunity</p>

Organisation Name	HONEYWELL CONTROL SYSTEMS
Relationship to DNO (if any)	Not related to DNO. Ultimate owner is Honeywell Inc.
Type of Organisation	A \$31bn turnover, 122,000 employee, Fortune 100 company that invents & manufactures technologies & delivers related services to address tough energy challenges across the globe. An expert in improving energy efficiency in buildings, servicing electricity network operators by its unique DR & BMS technologies to design and implement programmes to support them with their peak load reduction efforts across all customer segments: industrial, commercial and residential.
Role in Project	<p>This capability will be a key element in the TVV project by providing the technology link between the network operator and the commercial buildings to enable load shedding to take place.</p> <p>To defer network reinforcement investment and manage capacity Honeywell will tie the building management systems across a range of commercial buildings connected to the network, to demand response technology. On notification that the network is approaching peak (an 'event') Honeywell's technology will dynamically reduce electricity demand by adjusting settings on equipment in the buildings such as air conditioning & lighting. Honeywell will also work with the building owners to devise suitable shedding strategies that will not impact productivity.</p>
Prior experience brought to Project	Honeywell has designed and implemented demand response programmes with US Network operators to support them with their peak load reduction efforts. Recently the U.S. Department of Energy selected only one company, Honeywell, to implement Automated Demand Response as part of the highly competitive Smart Grid Investment Grant evaluation in 2009. This programme is running with Southern California Edison (SCE).
Funding	£708,000. To include sales support (labour) to encourage customers to connect their buildings to the smart grid, technical support to audit buildings & devise suitable load shedding strategies and provision of DR software to control and manage the DR programme. Also Honeywell will provide the labour to implement, test and pilot the system.
Contractual relationship	<p>Yes</p> <p>Signed mutual non-disclosure agreement</p>
External Collaborator benefits from the Project	The Project will enable Honeywell to establish an operating demand response reference from which to expand its business in the UK and Europe.

Organisation Name	Smarter Grid Solutions Ltd
Relationship to DNO (if any)	There is no common ownership between SEPD and Smarter Grid Solutions Ltd (SGS). (SSE have a minority shareholding in SGS)
Type of Organisation	SGS provide a range of products and services to help electricity network operators to avoid or defer network reinforcement costs through the active management of network constraints.
Role in Project	<p>SGS have unique knowledge in the application and implementation of active network management products and will bring their expertise in managing HV constraints and apply the same technology and solutions to LV networks.</p> <p>SGS will provide automated real-time control solutions, interoperating with the systems of the other project partners, to manage network connected devices (energy storage, distributed generation and industrial / commercial demand customers) at both HV and LV levels.</p>
Prior experience brought to Project	SGS have unique understanding of the technical and commercial issues involved in the deployment of Active Network Management (ANM) solutions to manage grid constraints. The project will be significantly enhanced by applying the lessons learned by SGS in planning, designing and delivering ANM solutions to avoid network reinforcement. SGS will build upon the success of the world's first multiple generator / multiple constraint ANM scheme commercially deployed in collaboration with SSE in November 2009 as part of the previous Ofgem RPZ initiative to stimulate new technical and commercial practises.
Funding	Estimated to be £460k in direct funding relating to the supply of certain products at no cost to the project and the assistance of SGS in learning and dissemination of results.
Contractual relationship	A commercial delivery contract will be put in place with SGS to deliver the Products and Services as necessary per the Work Breakdown structure.
External Collaborator benefits from the Project	SGS will benefit from a greater understanding of how their ANM products can be applied to LV networks; allowing them to continue to develop and deliver solutions in line with the emerging needs of the DNO community. SGS would expect the successful funding of this project to lead to job / value creation in the UK as a direct result of this project and also through the export potential of SGS products. SGS has already proven to be successful in attracting valuable skill sets to the electricity industry from other sectors and expect this project to further increase the attraction of skilled engineers.

Box 23: Other partners

CORPORATE CUSTOMER CONSORTIUM:

THAMES VALLEY CHAMBER OF COMMERCE – *Lead our Communication Program*
BRACKNELL CHAMBER OF COMMERCE – *Support our Communication Program*
BRACKNELL & WOKINGHAM COLLEGE – *Source of Technology Study & Skills Courses*

LARGE DEMAND & USER (incl SME) & PROJECT PARTICIPANTS:

JOHN LEWIS & WAITROSE , BT, CABLE & WIRELESS, DELL, HONEYWELL CONTROL SYSTEMS, REGUS, BMW, SYGENTA, BOERINGER INGELHEIM, MWB BUSINESS EXCHANGE SERVICES, ENVIRONMENTAL AGENCY

DOMESTIC CUSTOMER CONSORTIUM:

BRACKNELL FOREST COUNCIL – *Community Advice and Management*
BRACKNELL FOREST HOMES – *Large Housing Stock Manager*
BRACKNELL RESIDENTS ASSOCIATION – *Community Engagement Advice*
BRACKNELL EDUCATIONAL PARTNERSHIP – *Schools Programme Advice*

ENERGY SUPPLIERS

NPOWER – *Provide Information on Bracknell Customers & Discuss Future Agts*
GOOD ENERGY - *Provide Information on Bracknell Customers & Discuss Future Comm Agreements*
SCOTTISH POWER - *Provide Information on Bracknell Customers & Discuss Future Comm Agreements*
SOUTHERN ELECTRIC - *Provide Information on Bracknell Customers & Discuss Future Comm Agreements. Have also agreed to provide up to 1000 smart meters and associated comms.*

OTHER SUPPORT PARTNERS:

DAVIS LANGDON – *Consultancy, Funding Advise and Provision*
ERGON ENERGY, Australian Energy/Network Company – *Support/ Advisory Role*
SEEDA – *Advisory Role, contacts, land and Funding*

KNOWLEDGE TRANSFER PARTNER:

IET – *Institution of Engineering and Technology*

TECHNOLOGY PARTNERS:

NORTECH – *Data Management Systems Supplier*
SENTEC – *CTs and Monitoring Equipment Supplier*
S&C – *Active Network Management Equipment Supplier*
DIGSILENT – *Analysis and Planning Systems Supplier*
CURRENT GROUP – *CTs and Monitoring Equipment Supplier*
PASSIV SYSTEMS – *Home Control and Monitoring Systems Supplier*
COOLPOWER – *Demand Matching Management Systems*
SOLARCENTURY – *Supplier of Solar Panels*
GEOTHERMAL INT – *Supplier of Ground Source and Air Source Heat Pumps*
HONEYWELL CONTROL SYSTEMS – *Building Management Systems*

Relevance & Timing of Project

Box 24: Please outline why the learning from the Project is relevant to Network Operators

The TVV project is highly relevant to the immediate needs of Distribution Network Operators since it is addressing the very real fact that low carbon technologies will not be applied in a uniformly dispersed geographic manner.

A recent Imperial College/ENA report recognised the following:

- “...that optimal demand response is highly time and location specific and if future demand is to be integrated efficiently into networks an appropriate infrastructure is required to facilitate real time and location specific Demand Response (DR)”, and
- “Not recognising the specific conditions on individual LV feeder sections driven by actual locations of loads could compromise the potential for avoided network reinforcement costs.”

Our Project is specifically designed to test and inform these observations; and intends to fill the gap between the monitor and manage infrastructure suggested, by providing the modelling mechanism required to inform and respond to such eventualities.

Modelling demand forecasts are necessary to deploy network or customer response techniques to avoid network violations. New technologies will be adopted by customers according to socio-economic; geographic and building type characteristics, that will present very real and imminent localised network constraints and quality of supply issues. Our Project will deliver the tools needed to identify why, how and where these issues will arise, and allow the necessary targeted investment - in either traditional network re-enforcement, alternative network technology solutions, or appropriate and cost effective demand side response applications.

It is therefore essential to understand demand accuracy and response applicability as soon as possible. In the longer term, all LV exit points will be intensively metered, so our prediction will provide an accurate view for how LV networks could be monitored and managed in the future. The TVV Project will determine the level, type and frequency of network **monitoring** required to provide the ongoing **modelling** application and resultant **management** solutions. As such it will provide valuable insight and input to the progress of smart meter deployment and functionality requirements of the meter and DCC.

It is intended that the resultant Method from our Project will provide the basis for SEPD's long term and operational planning activities. As such, we expect this to feed directly into the DPCR6 submissions. It is the intention that the findings of the TVV Project will determine whether or not the currently predicted network re-enforcement of the Bracknell network will be necessary under DPCR6, or whether the resultant technology and commercial solutions will defer/avoid such re-enforcement.

Our Project is therefore not merely a short-term evaluation of particular network technologies, or customer response to technology or incentives – although those are key elements - but a significant step towards the redesign (systems, processes and culture) of the company and the industry required to facilitate the low carbon economy.

Our Project also establishes basis for evolution rather than revolution – basing the solution on an extension and adaptation of legacy systems – thereby reducing the potential for significant investment and substantial changes to business familiarity.

The findings will **contribute to SEPD's DPCR6 submissions** and will therefore have an enduring impact on SEPD's operations. Any such learning taken by Ofgem from our Project may also be utilised in other DNO DPCR6 negotiations.

Demonstration of a robust methodology and that the Project is ready to implement (answers should be detailed in boxes 25 to 27)

Box 25: Please demonstrate that the Project has a robust methodology and can start in a timely manner

Management of the TVV Project will be conducted in accordance with **SSE's Large Capital Project Governance Framework Manual (MA-COR-LCP-001)** and its associated documentation and templates. The manual has been prepared to ensure the delivery of projects "...safely on time and with the level of returns committed to...". The manual has been prepared to assist in the delivery of £6.4bn of investment over the period 2000-2013.

The SSE Manual and its associated documentation can be made available upon request.

Project Governance is referenced in "Appendix C – Project Organogram and Roles & Responsibilities" and the senior sponsorship and engagement of senior management reflects the profile and level of support afforded to this project.

SEPD's preparation for this Bid Submission has comprised the completion of **detailed Work Packages** reflecting a significant level of project readiness against which to implement our Project. The Work Packages can be made available upon request however - see Appendix 1.1 Work Pack Summary Diagram.

SEPD has established **significant full-time resource**, along with **collaborator resource** in the preparation of the necessary project materials.

Following Bid Submission, the existing resources will remain engaged on the TVV Project on further detailed preparations in order to be active and ready to commence work immediately on Project Award (30th November). There will therefore, be an established, and "up to speed" core team with which to initiate the necessary activities on Day One, and this is reflected in our Project Plan detailed in Appendix D.

The Project Costs and Benefits have been reasonably estimated through the detailed Work Package preparation, and with reference to available public source information, international comparisons, and academic input.

Uncertainties in the Costs and Benefits may prevail due to certain assumptions made:

- availability of technical installation resources,
- assumed prices for equipment provision still subject to tender response, and
- the prevailing exchange rate for equipment purchases.

Box 26: Please provide details of the risks associated with the Project

Each of the detailed Work Packages has identified associated risks and developed mitigating actions to form the basis of the contingency plans.

Risk Management will be conducted under the auspices of the SSE LCPGF Manual – “Project Risk Management Plan – WI-COR-LCP-501” , a copy of which can be made available upon request.

[Extract: “An updated register of risks, containing as a minimum, SEPD, commercial, reputation, intellectual property, development, construction and operational risks shall be compiled, complete with costed mitigation and planned responses.”]

Our Project has been constructed as an integrated whole, and any scope changes (if required) by Ofgem prior to Project Award will require a period of re-planning and possible re-negotiation with Collaborators/Suppliers which would delay commencement, and possibly impact on some critical path elements.

RISK	MITIGATION
Single large Partner core to delivery of bid (GE)	Shared reputation risk, engagement at high level to maintain healthy relationship. Escalation routes to intercept early any drift.
Large Partner perceived threat to smaller suppliers and partners who are vulnerable to IP loss.	Put project structure in place that defines boundaries and allows SEPD to manage specific suppliers directly.
Failure to include Smart Metering in evaluation area	Invitation to broad range of Suppliers, contingency of “Smart fuse” or Cut out mounted meter to create sensor source.
Advanced analytics fail to deliver sufficiently accurate modelling/forecasts	High profile engagement with UoR (more than a research project); independent close monitoring and support by KEMA.
Various initiatives within the industry generally may put a strain on available engineering technical and ICT resources (eg: smart meter implementation)	SEPD have engaged appropriate collaborators and recognised the potential need to use external contractors, and associated cost consequences.

Work Pack Leaders have identified technical/engineering risks, and will continually review progress on a regular basis. Following the reporting and escalation process already in place.

See Appendix 26.1 for a TVV Project High Level Risk Register.

Box 27: Please provide details of the risk monitoring procedures you will put in place for the Project

Our **Project Management Office** (PMO) will be responsible for the co-ordination of relevant project materials i.e.risk/issue registers; planning; document control; finance control and project status reporting.

Work Package (WP) Leaders and **Project Manager (PM)** will be responsible for preparing weekly progress control reports, and the PM will be responsible for preparing materials for the monthly **Project Review Board** and quarterly **Steering Group** meetings.

Risk monitoring procedures will be in accordance with SSE's Large Capital Project Governance Framework – a copy is available upon request.

Our Project's risk monitoring procedures will be supported by the establishment of a **Project Assurance Board** for quality management purposes. Also, given the nature of our Project and the challenges, a **Technical Assurance Board**. This is reflected in the organogram in Appendix C. The Boards will be drawn from relevant SEPD personnel and the key partners (GE, Bracknell Forest Council, Honeywell, Universities of Reading and Strathclyde and SGS) whose credentials in this area are vital to the status of our Project. In addition, KEMA Consultants will provide a vendor-independent view of the technical proposals and solutions.

We have also included a **Community Advisory Board** to provide input and advice on approaches to customer and community engagement.

The TVV Project and Technical Assurance Boards will meet on a quarterly basis, ahead of the Steering Group – which will be convened at a suitable time prior to the required quarterly Ofgem reports. The Steering Group will also meet on an emergency basis, as required by any risk/issue escalation actions.

An initial **Project Risk Register** has been prepared and this will be maintained following the Bid Submission. See Appendix 26.1 and see also Box 26.

Risk and issue identification will be the responsibility of all participants in our Project. These may be raised as a Work Package (WP) risk, which the WP Leader will notify to our Project Manager for possible inclusion as a Project risk/issue.

Our **Project Risk/Issue Registers** will be reviewed by the Monthly Project Review Board – including our **Project Director**; and risks/issues categorised as “High” (impact/likelihood) will be tabled at the Quarterly Steering Group – unless a Risk/Issue warrants an exceptional meeting of the Steering Group – for example for significant cost over-run or project suspension.

Our Project Manager and the WP Leaders are responsible on a daily basis for monitoring the status of the risks/issues on their registers, and reporting any changes. They are also responsible for identifying and agreeing with the next level of seniority, any mitigating actions and contingency plans.

Section D: Appendices

Please list all the appendices you have attached to this pro-forma and outline the information which they provide. Where these appendices support any information provided in the pro-forma, that information should be adequately referenced

Appendix A	Full Submission Spreadsheet
Appendix B	Maps and network diagrams
Appendix C	Organogram
Appendix D	Project plan
Appendix E	Information sources referenced in Box 15
Summary	Full Submission Appendix Summary
Appendix 1.1	TVV 3Ms Smarter Operations Diagram
Appendix 1.2	TVV Work Package Schematic
Appendix 1.3	GE LCNF Technical Proposal
Appendix 2.1	Summary of Network Monitoring Devices and locations
Appendix 2.2	UoS LV Network Measurements and State Estimation
Appendix 2.3	Business Systems Architecture (before/after)
Appendix 2.4	Smarter Building/DSR Proposal
Appendix 14.1	SEPD Microgeneration Installations
Appendix 14.2	Net Benefit Analysis for TVV Project
Appendix 14.3	Consumer Consortia Overview
Appendix 14.4	Thames Valley Chamber of Commerce Business Insight (I&C and SME audience) – video presentation http://www.youtube.com/watch?v=0KXkDOPBVOE
Appendix 14.5	TVV Promotional Brochure for Stakeholders and Customers
Appendix 16.1	University of Reading Active Demand Modelling Report
Appendix 16.2	UoR Modelling – Questions & Answers
Appendix 16.3	Effect of Low Carbon Technologies on LV Network Load Factors
Appendix 17.1	SEPD Outline Planning Flow Diagrams (before/after)
Appendix 18.1	Learning Matrix
Appendix 18.2	Smart Energy “Envision” Demo Center (Duke Energy) – KEMA Brochure
Appendix 18.3	DUKE Energy Smart Grid “Envision” Centre – video presentation http://www.youtube.com/watch?v=LhRAMT9AluE
Appendix 22.1	KEMA Letter of Support
Appendix 26.1	Risk Register