Low Carbon Network Fund Project Progress Report

December 2012

BRISTOL (Building, Renewables and Integrated Storage, with Tariffs to Overcome network Limitations)

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1. Executive summary

This report details the progress of the Low Carbon Network Fund project focussing on the progress in the last six months, June 2012 to December 2012.

Project Background

BRISTOL is an alternative method to enable high density photo voltaic solar generation to connect to the low voltage network more efficiently through using an in home battery and variable tariffs.
The project aim is to address the technical constraints that DNOs expect to arise on Low Voltage networks as a result of the adoption of solar PV panels. The trial uses in-home battery storage to provide benefits to customers and aid the DNO with network management. Thirty houses, ten schools and an office will have solar PV and a battery installed. The solar PV will be connected directly to the battery using a DC connection. The AC lighting circuits in the premises will also be converted to DC to enable customers to run small appliances on DC directly from the PV/battery. The battery will be "shared" between the customer and the DNO. The customer will be provided with a variable tariff to encourage electricity use at times of high PV generation and to use electricity stored by the battery when the network is heavily loaded. The DNO will be able to communicate with the battery to charge and discharge it to help with network management.
The project will aim to:

• solve the network problems which arise when a number of customers in a local area connect PV solar panels to their house

• investigate how a battery installed in the home can help customers to manage their energy usage and save money on their bills

• test how customers respond when offered different electricity tariffs throughout the day

• explore the benefits of utilising direct current (DC) in the home, rather than the traditional alternating current (AC).

Project Progress Highlights

In the second reporting period (June 2012 – December 2012) SoLa BRISTOL has focused on the design of the DC network with battery storage, Factory Acceptance Testing the domestic unit, procuring & configuring the initial installation equipment and the installation of equipment in the Bristol City Council (BCC) EcoHome. The following is a summary of the key activities and project updates during this reporting period.

- Design of equipment

The design of the equipment has been completed. It contains the Functional Design Specification for the project, component information in both physical and schematic formats and supplementary information to share key operational and design information around the system.

- Selection of delivery method for domestic premises, Schools and Office

The equipment for the SoLa Bristol project has been designed to be installed in homes, schools and the office by qualified electricians. Bristol City Council (BCC) will install the equipment in their domestic properties using their own electricians to conduct the work.

An approved electrical contractor will install the SoLa Bristol solution in schools and the office working with a senior BCC electrician as a liaison to BCC.

- Training of Electricians

The training of six BCC electricians on the equipment and the creation of a detailed installation guide was completed on 8 – 9th October 2012. The training was very successful with WPD, Siemens and BCC all confident in this delivery method.

- Initial Installation

The project has recruited the first initial installation property, the BCC EcoHome. This installation was scheduled to be completed over two days on the 11th and 12th October 2012 following on from the training of the BCC Electricians. The EcoHome installation was completed 12th – 14th December 2012, the delay was due to legal issues in signing the WPD / BCC initial installation contract.

- Dissemination of information

During the last six months of the project, greater exposure has been achieved. Details of the SoLa Bristol project have been shared through conferences, the websites, magazine articles and meetings with interested parties. The SoLa Bristol design information is also accessible through both the www.westernpowerinnovation.co.uk and www.LowCarbonUK.com websites.

Our external website has been updated, to ensure that elements relating to our future networks programme and the BRISTOL project can be easily found by a range of stakeholders. For further details please see www.westernpowerinnovation.co.uk/So-La-Bristol.aspx.

2. Project manager's report

In the first reporting period (December 2011 – June 2012) project progress report detailed:

- The BRISTOL project direction added an additional project requirement in recognition that WPD has not previously installed a DC network within a domestic property. The requirement was for WPD and our partners, to install a DC network with battery storage in between one and three premises before recruiting and signing trial participants up to the project. An initial installation stage was built into the project scheduled between 1st September and 28th September 2012.

- As the project depends on the successful engagement with the local community, it was decided that the project required an alternative name to "BRISTOL" (Building, Renewables and Integrated Storage, with Tariffs to Overcome network Limitations) when communicating with the public. The external name of the project has been changed to "SoLa Bristol".

- To engage with potential participants, a strategy for approaching customers, a leaflet for domestic customers and Frequently Asked Questions document has been written and distributed.

- Considerable design progress has been made on incorporating Solar PV panels into the domestic, schools and office DC network and combining battery storage.

During the first reporting period the project successfully completed the projects first of eight successful delivery reward criteria, **Successful initial engagement with customers.**

During July 2012, the project applied for a derogation to allow the use of DC metering for claiming Feed in Tariff in the thirty homes, ten schools and an office. We proposed that DC metering would help facilitate the efficient use of power as usable DC power without the requirement to convert to AC and back to DC again, reducing losses. DECC considered our request carefully but determined that it would not be appropriate. This decision has resulted in additional design activity in this reporting period.

Project activities during the second reporting period (June 2012 – December 2012) of SoLa BRISTOL have focused on the design of the DC network with battery storage, Factory Acceptance Testing the domestic unit, procuring & configuring the initial installation equipment and the installation of equipment in the EcoHome. The following are the key activities and project updates during this reporting period June – December 2012.

2.1. Equipment design

The design for the SoLa Bristol project started during the bid stage with an Overall Technical Solution submitted as an appendix to the project bid. This Technical Solution, at the bid stage, was a high level design intended to validate how the system could operate and the types of equipment that would be considered. This high level document has been developed since the project award to

create a detailed SoLa Bristol solution that will be installed in homes, offices, schools and substations.

The second SoLa Bristol project milestone was associated with the finalising, collating and sharing of the project design before the 30th September 2012. This was successfully achieved by 28th September 2012. The design information is accessible through both the www.westernpowerinnovation.co.uk and www.LowCarbonUK.com websites as two separate documents. The two documents are "Confirmation of the SoLa Bristol design.pdf" and "SoLa Bristol Supplier Documentation.pdf".

- Confirmation of the SoLa Bristol design

This document provides a detailed overview of the technical solution for the SoLa Bristol project and the detailed design of equipment used in the system. It has been compiled from information provided by the projects partners: Siemens, University of Bath and Western Power Distribution. It contains the Functional Design Specification for the project, component information in both physical and schematic formats and supplementary information to share key operational and design information around the system.

The SoLa Bristol design contains three key elements; these are the LV Connections Manager (installed in homes, schools and offices), LV Network Manager (installed in substations) and the Data Concentrator (installed at the University of Bath). The three of which provide the intelligence allowing the network to operate flexibly, to overcome potential network limitations. The remaining components, while key to delivering the solution, respond to the instructions of these elements.

- SoLa Bristol Supplier Documentation

This document compiles a list of the equipment specifications and data sheets for the key components being used in the SoLa Bristol project.

2.2. Factory Acceptance Testing

The build of the first SoLa Bristol solution was completed during August. The functionality of the equipment was tested individually and as a system within a lab environment during September 2012.

The DC/DC converter and battery system was designed by Siemens in collaboration with PE systems. The system was tested at PE systems before being shipped to the Siemens factory for final inspection. During August and September, the system's Studer Battery Inverter was programmed and tested as per the Functional Design Specification requirements by the University of Bath. The full system was then connected together and tested within the Siemens laboratory. The testing of the system took a staged approach. Each phase consisted of testing of the following; DC/DC converter (input/output), Inverter (import/export) and battery (charging/discharging). At each individual stage the voltages and performances were recorded and were in line with the expected results. The whole system was then tested together in accordance with the projects requirements. The tests

proved the system was performing as expected. This is the system that will be installed in the BCC EcoHome.

2.3. SoLa Bristol – How to install

The equipment for the SoLa Bristol project has been designed to be installed in homes, schools and the office by qualified electricians. Bristol City Council has its own maintenance and engineering department. BCC electricians will be used for installation work on the homes, an approved electrical contractor will be used for installation work on the schools and offices.

2.3.1 Domestic Installations – Contractual and Legal Issues

Bristol City Council indicated they were interested in delivering the SoLa Bristol solution into the 30 domestic properties. Discussions rapidly moved to a stage where the Council's legal team became involved. The BCC delivery team were initially unable to make firm commitment to the domestic installations. Due to this WPD decided to conduct a tender exercise with Bristol City Council approved electrical sub-contractors for the installation of the equipment as contingency for BCC deciding it was not able to do the work. This allowed either option to be subsequently mobilised without delaying the installations. Of the twenty seven companies contacted six responses were received and four were compliant.

Shortly before the tender was completed Bristol City Council was able to confirm that they would be able to carry out the domestic installations using their own internal electricians. This has several advantages over the use of sub-contractors. BCC electricians not only have the internal skills to deliver innovative solutions but will now have knowledge of the system in the event of faults occurring during the operation stage of the project.

A contract for the initial installation of the SoLa Bristol solution in the first three properties was agreed as a sensible way to reduce the risk to both the City Council and the SoLa Bristol project before committing to the full 30 domestic properties. This agreement was signed and preparations were made with BCC to deliver the first three properties. On the point of BCC signing the agreement a supplementary check by the BCC legal team led to the terms and conditions of the agreement being amended. This prevented both parties from signing the new agreement in time for the scheduled initial installation date.

Running an innovative project like the SoLa Bristol project for the first time can (and has) resulted in delays occurring due to contractual requests and higher than normal liability limits. For example there were issues with insurance provisions that are not required for other more conventional projects. Following more detailed exchanges between legal teams, both parties were able sign the agreement in November 2012.

The installation at the EcoHome, the first of the initial installation properties was completed 12th – 14th December 2012. The details of the installations will be contained in the Initial installation report and the next six month report.

As the installations will involve electricians working with brand new equipment, a decision was taken to provide specific training on the operation, connection and installation of equipment. The training of six BCC electricians on the equipment and the creation of a detailed installation guide was conducted 8 – 9th October 2012.

2.3.2 Schools and Offices

Bristol City Council has requested the project be delivered by any of their 27 approved external sub-contractors. The selected external contractor will work with a senior BCC electrician as a liaison point for the installations. WPD have selected a preferred electrical contractor for the schools and office installations following a tender process. We have agreed terms and conditions and will confirm the contract with the electrical contractor after the approval of the initial installation report by Ofgem.

The Initial Installations and the associated report, due to the delays in the initial installations, will now be completed during February 2013.

2.3.3 Substations

The LV Network Manager (installed within substations) has been designed to be installed by Western Power Distribution trade staff with no additional training. A lead Technician within the South Bristol team has been tasked with leading the distribution substation installations. Each location has already been visited to determine the most appropriate way of installing the equipment. Lessons learnt from the LV Network Templates project where over 900 substations were monitored are being applied to this section of the project.

The exact substations where the equipment will be installed will depend on the final recruitment of homes, schools and office from the customers who expressed an interest in the project in April 2012.

2.4. Trial property Recruitment & Initial installations

The project has recruited the first initial installation property, the BCC EcoHome. This is a purpose built dwelling that has been constructed to demonstrate sustainable building design and lifestyles. It has already been populated with technology and information on eco-friendly construction and living. This property is open to the public with information on the building and energy efficiency being provided by BCC volunteers.

The BCC EcoHome, was scheduled to be completed over two days on the 11th and 12th October 2012 following on from the training of the BCC Electricians. Following the contractual delays detailed in section 2.3, the EcoHome installation has been rescheduled and completed during 12th – 14th December 2012.

The subsequent two initial installation properties will be confirmed after the successful demonstration of the system in the EcoHome. The EcoHome will be used as a recruitment tool allowing the further two participants to view the SoLa Bristol equipment before signing up to the project and having the solution installed within their home.

2.5. Variable Tariff & Battery Charging Envelopes

- Variable Tariff

Domestic customers will be offered a variable tariff (a shadow tariff not affecting their current supply arrangements) to provide specific learning on the benefits this could bring if implemented by energy retailers in the future. The Variable Tariff is designed to reward customers for varying their electricity demand profile using the installed battery storage and PV generation. The University of Bath have researched a number of potential tariffs. The tariff has been designed to be as simple as possible for the customer to understand, whilst also ensuring it is socially acceptable. This has required a tariff which is complex to design but simple for the customer to understand.

Research has shown that the best way to change customers' behaviours and modify their demand profile could result from a tariff with either a regular change (i.e. ½ hourly changing financial values) or large step changes between peak and off peak periods reflecting the changing cost of energy. However these are complex and the social acceptance of tariffs with punitive cost periods is beyond the objectives for this project.

The University of Bath has therefore created a Dynamic fixed tariff. This will offer a scaling factor on customers' existing flat tariff based on supply and DNO savings. The scaling factor takes into account the reduction in importing energy during peak high energy cost periods and the DNO savings from solving network constraints through innovative means (ie: deferring network reinforcement.)

Customers can reduce their demand during peak periods in three ways:

1. By using the energy from their own PV panels, especially when their generation is at or near peak outputs.
2. By storing excess generation in their batteries for use within the home for use at a later time, often between 5-7pm.
3. By reducing the amount of energy used at peak times, turning off appliances and lights when not being used.

The greater use of the installed PV generation, battery storage and reduction in demand during peak periods will result in a payment to customers based on a reduced price per kWh.

- Battery Charging Envelopes

The project provides learning on the value of battery storage to both customer and DNOs. The method of sharing battery storage between customers and DNOs has been researched through this project.

Battery storage is predominantly of greatest value to DNOs as an alternative to traditional network reinforcement during two scenarios; firstly at times of peak solar irradiance and a minimum network demand where networks have a significant volume of PV installations. Secondly during peak network demand, especially if a network has an elongated peak through the connection of large loads such as heat pumps or electric vehicles.

The battery storage has several benefits to customers, storing excess PV generation output, purchasing and storing of off peak electricity, discharging stored energy during peak periods and maintaining a power supply for lighting and DC equipment during a power outage.

Batteries require a level of control to ensure they operate safely within their design limits. This ensures they are not over charged, fully discharged and charged too rapidly. Through the SoLa Bristol project the battery control, benefits to both customers and DNOs will be combined in Battery Charging envelopes. The creation of battery charging envelopes by the University of Bath will provide upper and lower limits for the batteries charge levels, these limits will vary every 30 minutes.

Each property's batteries will be charging and discharging intelligently, optimising their use within the battery charging envelopes. The use of energy for each property will be different; therefore the LV connection manager will optimise the battery charging and discharging for each customer. Spare capacity will be reserved for unplanned DNO contributions in the event of an intervention to a measured event at a substation. The University of Bath will create eight charging profiles for the batteries, one for week days and one for weekends for each season. This complexity will be contained within the LV Connection Manager and the customer will not be aware of the changes being made to optimise their battery storage.

2.6. DC Metering

Energy generated from most intermittent renewable generation sources like Solar PV is currently subsidised through government incentive schemes. This is necessary because high capital costs of the equipment mean the return on investment would otherwise be too long to make it commercially viable. Solar PV is subsidised per kWh generated using an approved AC meter under the Feed-In Tariff scheme. An assumption is made that 50% of the energy generated is used within the property and 50% exported, the deemed exported energy receives a further small subsidy that encourages use within the property.

The SoLa Bristol aims to demonstrate an improved end to end efficiency between the generation of energy from Solar PV and the use of energy at DC. This use of batteries within a property will also create the provision to store excess generation, improving the utilisation of Solar PV within a property, reducing the properties reliance on the network, especially at peak periods.

The use of DC metering was a requirement to facilitate the efficient use of power as usable DC power. This negated the requirement to convert to AC and back to DC again just to fiscally meter the energy. Thus eliminating further electrical losses through inefficiencies in the conversion.

WPD engaged with an RWE npower before submitting the Sola BRISTOL bid to discuss the use of a Direct Current (DC) meter. RWE npower advised WPD that permission would need to be sought from DECC. With the help of industry colleagues from nPower this issue was raised with DECC, Ofgem, the LCNF expert panels and consultants during the bid stage. All parties were of the view that it was undesirable to transform the PV output from DC to AC and back to DC again just to be able to claim the Feed In Tariff (FITs) payment. WPD were therefore confident that a pragmatic solution could be found due to the small number of properties involved in the trial.

When the SoLa BRISTOL design was significantly advanced, and able to provide detailed information on the system and its components, a meeting was scheduled by RWE npower, WPD and the head of the DECC Feed in Tariff Team. The meeting objective was to explore special dispensation to enable DC meters to be used in this project. These meters would have the same or greater level of accuracy then the standard AC FITs meter. DECC considered the request carefully, but decided not to support an exemption. They concluded that the FIT scheme is not intended to support innovation and therefore a derogation was inappropriate.

As a result of the decision, WPD has evaluated the following options:

1) Maintain the output of the PV as DC and forgo any FIT payments for the duration of the trial.
2) Transform the PV generation from DC to AC, metering using an approved FIT AC meter and transform back to DC to store excess generation and distribution around a property.

<u>Domestic properties</u>

For the domestic properties we concluded that the output of the PV will be metered as DC and FIT payments will not be claimed. We will install a 1% accurate non approved meter and use project contingency funds to pay Bristol City Council the FIT equivalent payments.

The estimated cost for the duration of the trial is expected to be approximately £15,470.

<u>Schools and offices</u>

For schools and offices have concluded it is necessary to transform the existing PV generation from DC to AC using the existing PV converter and meter using the installed FITs approved AC meter. The project system will then transform this output back to DC to power lighting and computing, storing excess generation in batteries. This is unfortunate, but adopting the same approach as for the domestic properties would have resulted in Fit equivalent payments of £85,000.

Using a combination of the two options available to the project in the domestic and commercial buildings will still maintain the original project learning, and provide additional insights into the pros and cons of each option.

Future Developments

DECC are looking at future changes to the FIT including the inclusion of DC metering as there is increasing interest in combing energy storage with DC generation sources. However any changes to the FIT arrangements will not be completed in time for use on the SoLa Bristol project.

2.7. Notable Milestones

During this reporting period the project has successfully completed the projects second of eight successful delivery reward criteria. **Confirmation of the BRISTOL design:** This criterion corresponded to successfully signing off the design by a senior engineering manager of the installations by 30th September 2012 for homes, schools and office and subsequently shared through the SoLa Bristol website. As detailed in the last six monthly report, due to restrictions in the project direction aimed at reducing the inconvenience to customers, the design will be for generic properties. We expect that the generic design will need to be revised once actual premises are identified and surveyed.

2.8. Dissemination activities

During the last six months of the project, greater exposure for the project has been achieved. Details of the SoLa Bristol project have been shared through conferences, the websites, magazine articles and meetings with interested parties. This information has included the project aims, scope, recruitment methods, design and expected learning. Where possible every effort has been made to share early learning as soon as it is available.

During July, early learning from SoLa Bristol was disseminated at a WPD workshop hosted at the University of Bath, approximately 120 people from different sectors including DNOs, Academia and industry attended the dissemination event and took part in workshops, one of which aimed to share good working practice regarding domestic recruitment.

At a Low Carbon South West smart grid event, WPD and BCC jointly presented to an audience of interested parties across the South West on the project, and the learning both organisations expect to gain from SoLa Bristol

Other dissemination events include the LCNF Annual Conference where the project generated a high level of interest. The SoLa Bristol was the main project detailed in an article in the PV's magazine article on Changing Energy Habits, a monthly magazine with a print run of over 25,000 copies. At a TSB event on DC networks – the learning generated by the SoLa Bristol project around DC metering was disseminated by a leading SME looking into this area.

2.9. Key issues

Project Delays

Due to delays in securing legal agreement for the initial installation in the first three properties, the project has fallen behind the original Gantt chart. There is a significant risk of not meeting with the

Installation Phase Successful Delivery Reward Criteria. Full details are in the Progress against plan section.

Generator protection

Bristol City Council installed 1.5kWe and 2kWe solar PV panels on their domestic properties. These connections are all less than 16 Amps per phase and have been connected using an approved G83 inverter. The selected inverters have inbuilt G83 protection against Over voltage, Under Voltage, Over Frequency, Under Frequency and a Loss of Mains protection meaning no further protection relays or commissioning was required.

The SoLa Bristol project is using a four quadrant battery inverter to facilitate the maximum utilisation of the batteries and solar PV. This "Studer" inverter is not a G83 approved device. The inverter does have the required programmable registers for Over voltage, Under Voltage, Over Frequency, Under Frequency. However due to the inverter being designed for off grid connections, the loss of mains protection could not be guaranteed. The system is therefore being protected as a non G83 connection using an approved G59 protection relay and commissioned by an external company.

Lighting circuit – Power Distribution

Within domestic properties the upstairs and downstairs lighting circuits will be converted to operate with DC powering LED light bulbs. The initial design included using the lighting circuit to allow customers to power DC devices like mobile phones and tablet computers at 5V and larger devices like laptops at their required voltage ≈18-20V depending on the device a using the existing lighting circuit.

1. The existing lighting circuits in the properties being retrofitted have a $1mm^2$ twin and earth conductor, rated for both AC and DC at 10A, protected for 6A using MCB's. Whilst most DC equipment is significantly more efficient then their AC equivalent, these devices have a higher current. This limits the capacity of the lighting circuit for providing additional charging of DC gadgets and Laptops.
2. 2. Within each room only the positive wire is switched and often this is the only wire connected to the light switch. Providing DC power to each room for DC sockets requires both the existing positive and neutral conductors being accessible within each room for the connection of sockets. For the EcoHome installation we will be installing a new DC circuit in surface mounted trunking to distribute power to each room, allowing customer to charge appliances directly at DC. Surveys of all properties will confirm if this approach will be required to allow DC sockets to be installed.

2.10. Outlook onto the next reporting period June 2013

In the next reporting period (December 2012 to June 2013) the project will concentrate on the following activities:

- The initial installations and report submitted to Ofgem, detailing the lessons learnt from the three initial installations, how these lessons will be applied to the remaining 27 domestic properties, schools and office.
- Writing and submitting to Ofgem a customer engagement plan to allow the full recruitment of homes, schools and an office and the subsequent customer engagement.
- Continuing to progress site visits to all properties and establishing the effect this has on the generic project design.
- Installing equipment in Homes and the office under the full roll out of equipment and the lessons learnt from the main installations.

3. Business case update

Within the last six months an increasing number of organisations have approached Western Power Distribution to discuss their developments in domestic battery storage solutions and how they could be used to benefit the distribution network. Companies are also approaching customers offering a simple battery solution that can be retrofitted into existing solar PV installations. These systems do not have anywhere near the same functionality of the SoLa Bristol system but show a development in the domestic battery storage that the SoLa Bristol project could further advance through the knowledge generation in the homes schools and office installations. Learning will be shared when available and on completion of the project in January 2015. Current systems are retailing for approximately £5,000 + VAT for approximately 5kWh of battery storage installed in customers lofts.

Since the change in the FIT there has been a noticeable reduction in the number of FITs eligible generation connected at a domestic level. However a significant number of new connections continue to be made, with one Local Authority looking at rolling out PV on a potential of 10,000 of their domestic homes within a city.

The learning generated from the installation of the SoLa Bristol solution remains very relevant; the project will provide learning for both the installation of generation and large DC loads. Early modelling shows that battery storage will be appropriate to all properties, however the DC network may be most applicable for large DC electricity users, especially where there are a large number of ICT equipment.

In domestic properties a DC network could possibly be better suited to a new build property where the most applicable infrastructure could be installed during construction. For example to accommodate a larger number DC light bulbs and a higher capacity DC lighting circuit. The installation of additional DC circuits during the build stage could be significantly cheaper and less

disruptive than a retrofit solution. A more detailed assessment of the suitability of retrofitting DC wiring to homes will be completed after the initial three installations.

The substation and remote storage components continue to provide valuable learning, and is to our knowledge unique to this project.

4. Progress against plan

The project plan was re-forecast due to restrictions in the project direction aimed at protecting customers from unnecessary inconvenience. It introduced additional activities including the completion of initial installations and approval by Ofgem of a Customer Engagement Plan. WPD and our project partners are able to visit and sign up customers to participate in the project, one month after the initial installation is completed.

This change resulted in the Factory Acceptance Testing and the installation of the first three properties being brought forward from the original plan by approximately 3 months. This would allow the authority to approve the initial installation report, the remaining customers to be recruited, surveyed and installed ahead of the successful delivery reward criteria. This included 4 weeks contingency to allow for any initial installation issues.

The progress of mobilisation, design and customer engagement were all been carried out in line with the revised project plan. However the project is currently running approximately 12 weeks behind the revised plan due to an illness of a key sub-contractor and to the previously discussed contractual issues with the installation of the SoLa Bristol equipment in the EcoHome.

Due to the Christmas and New Year period, the second and third properties will be recruited in the January 2013 with the installations occurring shortly after.

The delivery report for the initial installations will be sent to Ofgem for approval in February 2012.

5. Progress against budget

BRISTOL remains on target to be delivered within the available project budget, the payments schedules detailed in the collaboration agreements have not all reflected the expected spend during the first year. The actual spend will be closer to the expected spend after the completion of the initial installation due to milestone payments dependent on the completion. Project outturn is not expected to exceed the 5% set out in the LCNF Governance document.

	Total Budget £k	Expected spend to end November 2012 £k	Actual Spend to November 2012	Variance £k over period	Variance % over period
BCC Project Management	£60.00	£16.7	**£16.70**	**£0.00**	0%
Detailed Installation Survey and Planning	£57.00	£33.27	**-**	**£33.27**	-
Training and Installations	£203.00	£7	**26.99**	**-£19.99**	385.54[1]
Trial Property Recruitment, Equipment Maintenance & Ongoing Support	£177.00	19.6	**35.05**	**-£15.45**	178.83[2]
Equipment Decommissioning (including battery disposal)	£198.00	-	-	-	-
Scope change Contingency (Survey results)	£49.00	22.2	**11.00**	**£11.20**	49.55
Data Communications (LV Connection Manager & LV Network Manager)	£20.00	1.2	-	**£1.20**	-
Distribution Sensing Equipment	£11.00	6.4	-	**£6.40**	-
Customer Sensors Equipment	£2.00	-	-	-	-
Overall Project Manager	£151.20	66.7	**35.41**	**£31.29**	53.09[3]
Substation installation (including any civil modifications)	£29.00	16.92	-	**£16.92**	-
Battery Charging Costs	£9.00	-	-	-	-
Variable Tariffs - Payments to users for changes in behaviour	£9.00	-	-	-	-
DC Meters	£5.00	-	-	-	-
SIEMENS	**£1,295.81**	**-**	-	-	
System Design and Engineering	£173.19	87.94	**42.61**	**£45.33**	48.46
Domestic premises equipment (supply)	£358.37	179.2	**88.18**	**£91.02**	49.21
School equipment (supply)	£302.02	155.6	**74.31**	**£81.29**	47.76
Office equipment (supply)	£31.33	16.15	**7.71**	**£8.44**	47.73
Substation equipment (supply)	£161.09	75.78	**39.64**	**£36.14**	52.31
Data archiving and access equipment (supply)	£98.17	44.03	**24.16**	**£19.87**	54.86
Installation, commissioning and operation support	£141.64	52.57	**34.85**	**£17.72**	66.30
Smart Appliances & ICT Equipment	£30.00	-	-	-	
University of Bath	**£507.55**				
Input to smart tariffing	£122.91	27.4	**30.30**	**-£2.90**	110.60[2]
Input to network design	£230.39	70.9	**56.80**	**£14.10**	80.12[2]
Dissemination planning	£118.25	16.6	**29.16**	**-£12.56**	175.64[2]
Workshops	£12.00	2.3	**2.96**	**-£0.66**	128.64[2]
School engagement	£24.00	4.7	**5.92**	**-£1.22**	125.90[2]

[1] Some equipment has been purchased ahead of the plan to allow for the initial installation ahead of January 2013.
[2] The payments schedules are as detailed in the collaboration agreements
[3] Aditional PM Resource will be used for on-going installations, this will be reflected in the next six monthly report

6. Bank account

Please see appendix 1 for a full copy of the bank accounts.

7. Successful delivery reward criteria (SDCR)

Due to delays in the programme, there is a high risk that one of the Successful Delivery Reward Criteria (SDRC) may not be met. , All other SDRC remain on target.

Successful initial engagement with customers – KWMC is leading the domestic engagement; they visited customers identified from desk top analysis as suitable for solar PV and the BRISTOL solution. Interested households where left with the project leaflet (Appendix 1) and Frequently asked Questions (Appendix 2). All customers were invited to the drop in sessions to speak to the project team and answer any questions. Two drop in sessions where run on 26th April 2012, hosted by KWMC and supported by BCC Siemens and WPD. Two, two hour sessions where held between 11am – 1pm and between 6pm – 8pm. 22 people attended from 11 homes.

60 homes registered an interest in the project before 12th May 2012.

Bristol City Council is leading the schools and office engagement; project details were sent to the head teachers of schools with solar PV already installed and a suitable office.

12 schools and an office registered interest in the project before 12th May 2012.

Initial Installation – We are scheduled to install the SoLa Bristol solution in the EcoHome on 12th - 14th December and the second and third property in January 2013.

Confirmation of the BRISTOL design – The SoLa Bristol design was approved by Paul Jewell (WPD Policy Manager) on 28th September 2012. The design information is accessible through both the www.westernpowerinnovation.co.uk and www.LowCarbonUK.com websites as two separate documents.

Installation and commissioning of equipment – the project is currently unlikely to have installed a DC network and battery in 30 homes, an office and 10 schools by 30th April 2013 and 31st August 2013 due to the delays in the initial installation.

Early Operational Performance of BRISTOL, the project is on track to meet this successful delivery reward criteria by 31st December 2013.

Measured the impact on the LV network, the project is on track to meet this successful delivery reward criteria by 31st May 2014.

Customer Opinion, the project is on track to meet this successful delivery reward criteria by 15th January 2015.

Keeping the lights on during power outages, the project is on track to meet this successful delivery reward criteria by 15th January 2015.

Suitability of solution for mainstream adoption, the project is on track to meet this successful delivery reward criteria by 15th January 2015.

8. Learning outcomes

Delays when working with project Partners

Bristol City Council is a critical project partner for SoLa Bristol. There has been good engagement with all levels at the council and significant management effort has been employed, especially when solving issues when they have occurred.

However some of the day to day departments within Local Authorities are not set up to deal with requests of the SoLa Bristol nature and are unable to respond to abnormal requests at the same speed as would be expected with a smaller or more commercially focused organisation. This is especially the case when it requires the cooperation of multiple departments in different office locations. In hindsight, a project like this with multiple different project partners, all of whom are key to the project delivery, requires the project plan to reflect more pessimistic estimates over timescales. Taking account of "engineering optimism bias" is standard practice in some external organisations and agencies.

Derogations for the FITs scheme

DECC were not able to offer a special dispensation for the project to allow DC metering. There was sufficient evidence and therefore optimism that the issue could be overcome. In the event it transpired that significant effort would have been required to implement changes even for a small number of sites. The learning here is that a project should be planned on the basis of known outcomes, and opportunities for savings or shortcuts explored in parallel.

Potential other locations for a SoLa Bristol Solution

We are continuing to review the possibility of installing a BRISTOL type solution into schools that have temporary class rooms with PV panels, increasing the number of eligible schools.

9. Intellectual Property Rights (IPR)

No Intellectual Property Rights have been generated or registered during this period.

10. Risk management

Risks are continuing to be managed using the same risk register template included in Appendix D of the Proforma.

The updated risks raised in the bid stage are as follows:

	Risk	Update
R002	Energy efficient smart appliances used for demand response are not available in the UK when required or appliances cannot be retrofitted (making them smarter)	Due to the limited development of smart appliances in Europe, there is no viable product we can offer domestic properties, further analysis will be completed to understand if smart appliances can be used in the schools and office.
R004	When surveying properties, the BRISTOL scope of works must change, resulting in unanticipated cost variations.	The condition placed on the project through the project direction prevents the project from visiting participants' properties. This has required a more generic design, with increased risk of variations in the project delivery. This risk now has an increased probability and impact. The scope of works has increased to include a G59 relay and commissioning for the project as detailed above.
R006	Thirty homes do not volunteer to participate in BRISTOL in one area, connected to one distribution substation.	30 domestic customers have had solar PV fitted to their homes in Knowle West. When these customers had their solar PV fitted by BCC it stated that having solar PV installed would allow them to be considered for the SoLa solutions (but did not commit them to it) The risk participants drop out or do not commit to the project after the initial installation is still live.
R007	Ten schools do not volunteer to take part in the project.	We have engaged with 26 schools that have had solar panels connected, 12 have registered interest as well as KWMC. We are continuing to review the possibility of installing a BRISTOL type solution into schools that have temporary class rooms with PV panels, increasing the number of eligible schools. Schools' applying for academy status has placed an increased risk on the project as an increasing number of schools no longer use Bristol City Council for maintenance and IT.
R009	Bristol City Councils M&E teams or normal qualified electrical contractors are unable to install and maintain the premises BRISTOL equipment	Bristol City Council will install the DC network and batteries in homes, six BCC electricians have been successfully trained on the installation of the SoLa Bristol equipment. The electricians picked up the installation process very quickly and had no issues with the equipment assembly and

		installation during training. Electrical contractors will install the equipment in schools and offices. An electrical contractor will be contracted for the schools and office installation after the initial installation report has been approved.
R013	The equipment is too heavy to be stored in the roof space.	BCC have reviewed the risk for domestic properties, surveying empty properties of the same construction. The equipment must be spread over a minimum of 3 roof trusses by boarding out the loft. The project will spread the 5 loft trusses; this will be confirmed by a structural engineer for the initial installation properties. The risk of the equipment being too heavy to be stored in the roof space has been decreased.
R014	There is no suitable location to store the equipment in homes, schools and an office.	This risk is on-going as we are unable visit sites until February 2013, a month after the initial installations in January 2013.
R023	Bristol City Council are unable to support the customer engagement and installations	WPD and BCC are ready to start the domestic properties installations. The arrangements for the schools and office installations will be started immediately after the first initial installation to reduce the chance of further delays occurring.

11. Accuracy assurance statement

This report has been recommended by Philip Bale (Project Manager of the BRISTOL project), reviewed by Roger Hey (Future Networks Manager), recommended by Paul Jewell (Policy Manager) and approved by Nigel Turvey (Design and Development Manager). All efforts have been made to ensure the information contained within this report is accurate.

WPD confirms that processes in place and steps taken to prepare the Project Progress Report are sufficiently robust and that the information provided is accurate and complete.

12. Appendix

Bank statements – South West for the last six months

HSBC

Acc name	WPD SW PLC LCNF 12 13
Account number	401413-82619199
Bank name	HSBC Bank plc
Currency	GBP
Country	Great Britain
BIC	MIDLGB22
IBAN	GB68MIDL40141382619199
Closing ledger balance brought forward From 11/06/2012	409,021.22
Closing available balance brought forward From 11/06/2012	409,021.22
Current ledger balance as at 12/06/2012 16:12	409,021.22
Current available as at 12/06/2012 16:12	409,021.22
Specified date range	30/03/2012 to 31/05/2012

Bank reference	Customer reference	Value date (dd/mm/yyyy)	Credit amount	Debit amount	Post date
Balance brought forward 24/04/2012			0.00		
GBC240420LAKC96O ADVICE CONFIRMS GBC240420LAKC96O SCOTTISH HYDRO-ELE	SCOTTISH HYDRO-E	24/04/2012	5,000.00		24/04/2012
Balance as at close 24/04/2012			5,000.00		
Balance brought forward 25/04/2012			5,000.00		
HNET27853H100R3V LCNF transfer HNET27853H100R3V	NONREF	25/04/2012	137,833.37		25/04/2012
Balance as at close 25/04/2012			142,833.37		
Balance brought forward 27/04/2012			142,833.37		
SOUTH EASTERN PO LOW CARB NETWORKS SOUTH EASTERN POWE	NONREF	27/04/2012	14,166.63		27/04/2012
LONDON POWER NET LOW CARB NETWORKS LONDON POWER NETWO	NONREF	27/04/2012	14,166.63		27/04/2012

HSBC

Bank reference	Customer reference	Value date (dd/mm/yyyy)	Credit amount	Debit amount	Post date
NONREF R B S-SP MANWEB	NONREF	27/04/2012	9,166.63		27/04/2012
NORTHERN ELECTRI LCNF NORTHERN ELECTRIC	NONREF	27/04/2012	14,166.63		27/04/2012
NORTHERN ELECTRI LCNF NORTHERN ELECTRIC	NONREF	27/04/2012	10,000.00		27/04/2012
Balance as at close 27/04/2012			204,499.89		
Balance brought forward 28/04/2012			204,499.89		
TO 27APR2012 GROSS INTEREST TO 27APR2012	NONREF	28/04/2012	0.95		28/04/2012
Balance as at close 28/04/2012			204,500.84		
Balance brought forward 24/05/2012			204,500.84		
GBC2405293DAC5VK ADVICE CONFIRMS GBC2405293DAC5VK SCOTTISH HYDRO-ELE	SCOTTISH HYDRO-E	24/05/2012	5,000.00		24/05/2012
Balance as at close 24/05/2012			209,500.84		
Balance brought forward 25/05/2012			209,500.84		
HNET48793I0003JU LCNF Payment HNET48793I0003JU	NONREF	25/05/2012	137,833.33		25/05/2012
Balance as at close 25/05/2012			347,334.17		
Balance brought forward 28/05/2012			347,334.17		
SOUTH EASTERN PO LOW CARB NETWORKS SOUTH EASTERN POWE	NONREF	28/05/2012	14,166.67		28/05/2012
NORTHERN ELECTRI LCNF NORTHERN ELECTRIC	NONREF	28/05/2012	10,000.00		28/05/2012
LONDON POWER NET LOW CARB NETWORKS LONDON POWER NETWO	NONREF	28/05/2012	14,166.67		28/05/2012
NORTHERN ELECTRI LCNF NORTHERN ELECTRIC	NONREF	28/05/2012	14,166.67		28/05/2012

HSBC

Bank reference	Customer reference	Value date (dd/mm/yyyy)	Credit amount	Debit amount	Post date
TO 27MAY2012 GROSS INTEREST TO 27MAY2012	NONREF	28/05/2012	20.37		28/05/2012
Balance as at close 28/05/2012			399,854.55		
Balance brought forward 30/05/2012			399,854.55		
GBC300520RDUU88W ADVICE CONFIRMS GBC300520RDUU88W SP MANWEB PLC	SP MANWEB PLC	30/05/2012	9,166.67		30/05/2012
Balance as at close 30/05/2012			409,021.22		

HSBC

Acc name	WPD SW PLC LCNF 12 13
Account number	401413-82619199
Bank name	HSBC Bank plc
Currency	GBP
Country	Great Britain
BIC	MIDLGB22
IBAN	GB68MIDL40141382619199
Closing ledger balance brought forward From 03/07/2012	613,567.90
Closing available balance brought forward From 03/07/2012	613,567.90
Current ledger balance as at 04/07/2012 10:21	613,567.90
Current available as at 04/07/2012 10:21	613,567.90

Bank reference	Customer reference	Value date (dd/mm/yyyy)	Credit amount	Debit amount	Post date
Balance brought forward 22/06/2012			409,021.22		
GBC220620PFXT620 ADVICE CONFIRMS GBC220620PFXT620 SCOTTISH HYDRO-ELE	SCOTTISH HYDRO-E	22/06/2012	5,000.00		22/06/2012
Balance as at close 22/06/2012			414,021.22		
Balance brought forward 25/06/2012			414,021.22		
HNET5667IIVHTOE2 LCNF HNET5667IIVHTOE2 /RFB/LCNF	NONREF	25/06/2012	137,833.33		25/06/2012
Balance as at close 25/06/2012			551,854.55		
Balance brought forward 28/06/2012			551,854.55		
SOUTH EASTERN PO LOW CARB NETWORKS SOUTH EASTERN POWE	NONREF	28/06/2012	14,166.67		28/06/2012
LONDON POWER NET LOW CARB NETWORKS LONDON POWER NETWO	NONREF	28/06/2012	14,166.67		28/06/2012

HSBC

Bank reference	Customer reference	Value date (dd/mm/yyyy)	Credit amount	Debit amount	Post date
NORTHERN ELECTRI LCNF NORTHERN ELECTRIC	NONREF	28/06/2012	14,166.67		28/06/2012
NORTHERN ELECTRI LCNF NORTHERN ELECTRIC	NONREF	28/06/2012	10,000.00		28/06/2012
TO 27JUN2012 GROSS INTEREST TO 27JUN2012	NONREF	28/06/2012	46.67		28/06/2012
GBC280620QGI2Q9S ADVICE CONFIRMS GBC280620QGI2Q9S SP MANWEB PLC	SP MANWEB PLC	28/06/2012	9,166.67		28/06/2012
Balance as at close 28/06/2012			613,567.90		

HSBC

Acc name	WPD SW PLC LCNF 12 13
Account number	401413-82619199
Bank name	HSBC Bank plc
Currency	GBP
Country	Great Britain
BIC	MIDLGB22
IBAN	GB68MIDL40141382619199
Closing ledger balance brought forward From 02/08/2012	743,467.78
Closing available balance brought forward From 02/08/2012	743,467.78
Current ledger balance as at 03/08/2012 15:29	743,467.78
Current available as at 03/08/2012 15:29	743,467.78

Bank reference	Customer reference	Value date (dd/mm/yyyy)	Credit amount	Debit amount	Post date
Balance brought forward 24/07/2012			613,567.90		
GBC24072HCIV5TXD ADVICE CONFIRMS GBC24072HCIV5TXD SCOTTISH HYDRO-ELE	SCOTTISH HYDRO-E	24/07/2012	5,000.00		24/07/2012
Balance as at close 24/07/2012			618,567.90		
Balance brought forward 25/07/2012			618,567.90		
HNET02173IZ00406 LCNF TRF HNET02173IZ00406 /RFB/LCNF	NONREF	25/07/2012	63,166.67		25/07/2012
Balance as at close 25/07/2012			681,734.57		
Balance brought forward 27/07/2012			681,734.57		
SOUTH EASTERN PO LOW CARB NETWORKS SOUTH EASTERN POWE	NONREF	27/07/2012	14,166.67		27/07/2012
LONDON POWER NET LOW CARB NETWORKS LONDON POWER NETWO	NONREF	27/07/2012	14,166.67		27/07/2012

HSBC

Bank reference	Customer reference	Value date (dd/mm/yyyy)	Credit amount	Debit amount	Post date
NONREF R B S-SP MANWEB	NONREF	27/07/2012	9,166.67		27/07/2012
NORTHERN ELECTRI LCNF NORTHERN ELECTRIC	NONREF	27/07/2012	14,166.67		27/07/2012
NORTHERN ELECTRI LCNF NORTHERN ELECTRIC	NONREF	27/07/2012	10,000.00		27/07/2012
Balance as at close 27/07/2012			743,401.25		
Balance brought forward 28/07/2012			743,401.25		
TO 27JUL2012 GROSS INTEREST TO 27JUL2012	NONREF	28/07/2012	66.53		28/07/2012
Balance as at close 28/07/2012			743,467.78		

HSBC

Acc name	WPD SW PLC LCNF 12 13
Account number	401413-82619199
Bank name	HSBC Bank plc
Currency	GBP
Country	Great Britain
BIC	MIDLGB22
IBAN	GB68MIDL40141382619199
Closing ledger balance brought forward From 05/09/2012	929,383.29
Closing available balance brought forward From 05/09/2012	929,383.29
Current ledger balance as at 06/09/2012 15:57	929,383.29
Current available as at 06/09/2012 15:57	929,383.29

Bank reference	Customer reference	Value date (dd/mm/yyyy)	Credit amount	Debit amount	Post date
Balance brought forward 24/08/2012			743,467.78		
GBC240828XLP7SN4 ADVICE CONFIRMS GBC240828XLP7SN4 SCOTTISH HYDRO-ELE	SCOTTISH HYDRO-E	24/08/2012	5,000.00		24/08/2012
Balance as at close 24/08/2012			748,467.78		
Balance brought forward 28/08/2012			748,467.78		
NORTHERN ELECTRI LCNF NORTHERN ELECTRIC	NONREF	28/08/2012	10,000.00		28/08/2012
SOUTH EASTERN PO LOW CARB NETWORKS SOUTH EASTERN POWE	NONREF	28/08/2012	14,166.67		28/08/2012
LONDON POWER NET LOW CARB NETWORKS LONDON POWER NETWO	NONREF	28/08/2012	14,166.67		28/08/2012
NORTHERN ELECTRI LCNF NORTHERN ELECTRIC	NONREF	28/08/2012	14,166.67		28/08/2012

HSBC

Bank reference	Customer reference	Value date (dd/mm/yyyy)	Credit amount	Debit amount	Post date
HNET1261KKTCVVDA LCNF TRF HNET1261KKTCVVDA /RFB/LCNF	NONREF	28/08/2012	119,166.67		28/08/2012
TO 27AUG2012 GROSS INTEREST TO 27AUG2012	NONREF	28/08/2012	82.16		28/08/2012
GBC2808290M36M2O ADVICE CONFIRMS GBC2808290M36M2O SP MANWEB PLC	SP MANWEB PLC	28/08/2012	9,166.67		28/08/2012
Balance as at close 28/08/2012			929,383.29		

HSBC

Acc name	WPD SW PLC LCNF 12 13
Account number	401413-82619199
Bank name	HSBC Bank plc
Currency	GBP
Country	Great Britain
BIC	MIDLGB22
IBAN	GB68MIDL40141382619199
Closing ledger balance brought forward From 04/10/2012	1,115,322.33
Closing available balance brought forward From 04/10/2012	1,115,322.33
Current ledger balance as at 05/10/2012 11:09	1,115,322.33
Current available as at 05/10/2012 11:09	1,115,322.33

Bank reference	Customer reference	Value date (dd/mm/yyyy)	Credit amount	Debit amount	Post date
Balance brought forward 24/09/2012			929,383.29		
GBC24092HAOJ9TXD ADVICE CONFIRMS GBC24092HAOJ9TXD SCOTTISH HYDRO-ELE	SCOTTISH HYDRO-E	24/09/2012	5,000.00		24/09/2012
Balance as at close 24/09/2012			934,383.29		
Balance brought forward 25/09/2012			934,383.29		
HNET3427LLZCAV8X LCNF TRF HNET3427LLZCAV8X /RFB/LCNF	NONREF	25/09/2012	119,166.67		25/09/2012
Balance as at close 25/09/2012			1,053,549.96		
Balance brought forward 28/09/2012			1,053,549.96		
SOUTH EASTERN PO LOW CARB NETWORKS SOUTH EASTERN POWE	NONREF	28/09/2012	14,166.67		28/09/2012
LONDON POWER NET LOW CARB NETWORKS LONDON POWER NETWO	NONREF	28/09/2012	14,166.67		28/09/2012

HSBC

Bank reference	Customer reference	Value date (dd/mm/yyyy)	Credit amount	Debit amount	Post date
NORTHERN ELECTRI LCNF NORTHERN ELECTRIC	NONREF	28/09/2012	14,166.67		28/09/2012
NORTHERN ELECTRI LCNF NORTHERN ELECTRIC	NONREF	28/09/2012	10,000.00		28/09/2012
NONREF R B S-SP MANWEB	NONREF	28/09/2012	9,166.67		28/09/2012
TO 27SEP2012 GROSS INTEREST TO 27SEP2012	NONREF	28/09/2012	105.69		28/09/2012
Balance as at close 28/09/2012			1,115,322.33		

HSBC

Acc name	WPD SW PLC LCNF 12 13
Account number	401413-82619199
Bank name	HSBC Bank plc
Currency	GBP
Country	Great Britain
BIC	MIDLGB22
IBAN	GB68MIDL40141382619199
Closing ledger balance brought forward From 01/11/2012	1,301,295.28
Closing available balance brought forward From 01/11/2012	1,301,295.28
Current ledger balance as at 02/11/2012 15:38	1,301,295.28
Current available as at 02/11/2012 15:38	1,301,295.28

Bank reference	Customer reference	Value date (dd/mm/yyyy)	Credit amount	Debit amount	Post date
Balance brought forward 24/10/2012			1,115,322.33		
GBC241028YRA1AKG ADVICE CONFIRMS GBC241028YRA1AKG SCOTTISH HYDRO-ELE	SCOTTISH HYDRO-E	24/10/2012	5,000.00		24/10/2012
Balance as at close 24/10/2012			1,120,322.33		
Balance brought forward 25/10/2012			1,120,322.33		
NONREF R B S-SP MANWEB	NONREF	25/10/2012	9,166.67		25/10/2012
HNET1220MMSULB35 LCNF TRF HNET1220MMSULB35 /RFB/LCNF	NONREF	25/10/2012	119,166.67		25/10/2012
Balance as at close 25/10/2012			1,248,655.67		
Balance brought forward 26/10/2012			1,248,655.67		
SOUTH EASTERN PO LOW CARB NETWORKS SOUTH EASTERN POWE	NONREF	26/10/2012	14,166.67		26/10/2012

HSBC

Bank reference	Customer reference	Value date (dd/mm/yyyy)	Credit amount	Debit amount	Post date
LONDON POWER NET LOW CARB NETWORKS LONDON POWER NETWO	NONREF	26/10/2012	14,166.67		26/10/2012
NORTHERN ELECTRI LCNF NORTHERN ELECTRIC	NONREF	26/10/2012	14,166.67		26/10/2012
NORTHERN ELECTRI LCNF NORTHERN ELECTRIC	NONREF	26/10/2012	10,000.00		26/10/2012
Balance as at close 26/10/2012			1,301,155.68		
Balance brought forward 28/10/2012			1,301,155.68		
TO 27OCT2012 GROSS INTEREST TO 27OCT2012	NONREF	28/10/2012	139.60		28/10/2012
Balance as at close 28/10/2012			1,301,295.28		

HSBC

Acc name	WPD SW PLC LCNF 12 13
Account number	401413-82619199
Bank name	HSBC Bank plc
Currency	GBP
Country	Great Britain
BIC	MIDLGB22
IBAN	GB68MIDL40141382619199
Closing ledger balance brought forward From 03/12/2012	1,487,295.49
Closing available balance brought forward From 03/12/2012	1,487,295.49
Current ledger balance as at 04/12/2012 09:53	1,487,295.49
Current available as at 04/12/2012 09:53	1,487,295.49

Bank reference	Customer reference	Value date (dd/mm/yyyy)	Credit amount	Debit amount	Post date
Balance brought forward 23/11/2012			1,301,295.28		
GBC23112HDU0XVEO ADVICE CONFIRMS GBC23112HDU0XVEO SCOTTISH HYDRO-ELE	SCOTTISH HYDRO-E	23/11/2012	5,000.00		23/11/2012
Balance as at close 23/11/2012			1,306,295.28		
Balance brought forward 26/11/2012			1,306,295.28		
HNET7586NNY08IV2 LCNF TRF HNET7586NNY08IV2 /RFB/LCNF	NONREF	26/11/2012	119,166.67		26/11/2012
Balance as at close 26/11/2012			1,425,461.95		
Balance brought forward 28/11/2012			1,425,461.95		
SOUTH EASTERN PO LOW CARB NETWORKS SOUTH EASTERN POWE	NONREF	28/11/2012	14,166.67		28/11/2012
LONDON POWER NET LOW CARB NETWORKS LONDON POWER NETWO	NONREF	28/11/2012	14,166.67		28/11/2012

HSBC

Bank reference	Customer reference	Value date (dd/mm/yyyy)	Credit amount	Debit amount	Post date
NORTHERN ELECTRI LCNF NORTHERN ELECTRIC	NONREF	28/11/2012	14,166.67		28/11/2012
NORTHERN ELECTRI LCNF NORTHERN ELECTRIC	NONREF	28/11/2012	10,000.00		28/11/2012
NONREF R B S-SP MANWEB	NONREF	28/11/2012	9,166.67		28/11/2012
TO 27NOV2012 GROSS INTEREST TO 27NOV2012	NONREF	28/11/2012	166.86		28/11/2012
Balance as at close 28/11/2012			1,487,295.49		