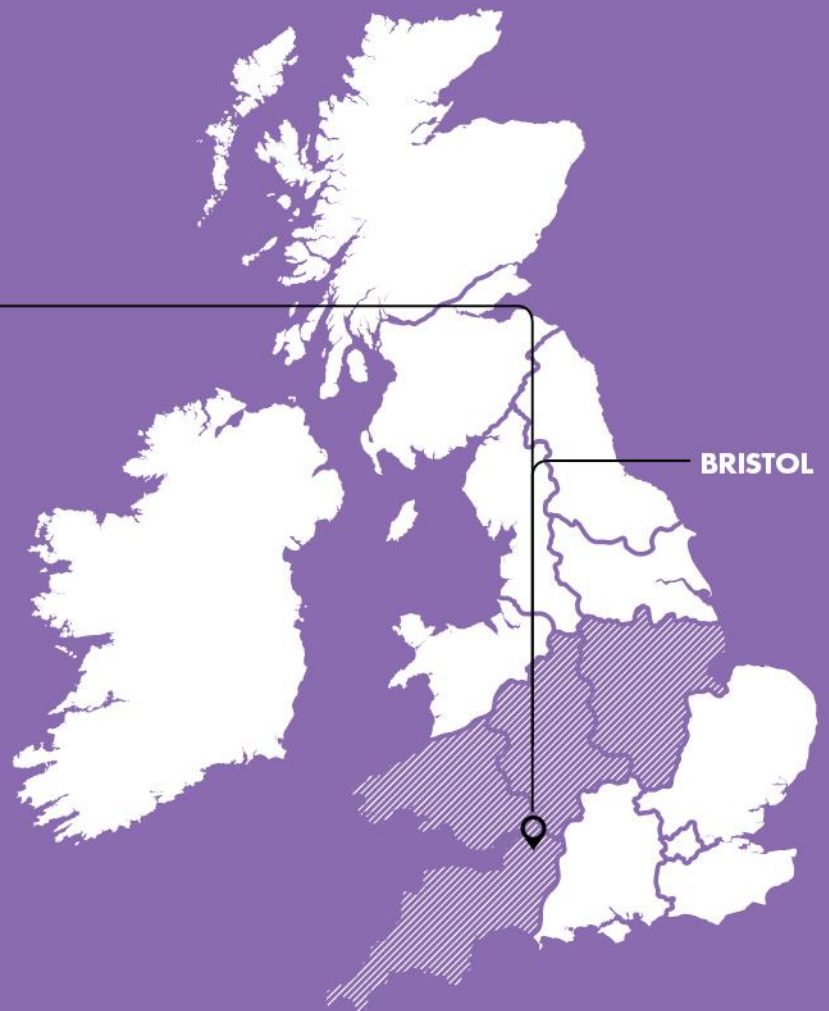


**PROJECT SOLA
BRISTOL**

**PROJECT PROGRESS REPORT
REPORTING PERIOD:
DECEMBER 2013 – MAY 2014**



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	Name	Date
Prepared by:	Mark Dale	02.06.2014
Reviewed by:	Roger Hey	13.06.2014
Recommended by:	Paul Jewell	13.06.2014
Approved (WPD):	Philip Swift	13.06.2014

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Contents

1	Executive Summary.....	5
1.1	Business Case	5
1.2	Project Progress.....	5
1.3	Project Delivery Structure	6
1.3.1	Project Review Group	6
1.3.2	Resourcing.....	6
1.3.3	Collaboration Partners	6
1.4	Procurement.....	6
1.5	Installation.....	6
1.6	Project Risks	7
1.7	Project learning and dissemination.....	7
2	Project Managers Report.....	7
2.1	Project Background	7
2.2	Project Progress.....	8
2.2.1	Domestic Installation Progress	9
2.2.2	Commercial Installation Progress	12
2.2.3	Sub Station Installation Progress	13
3	Business Case Update	13
4	Progress against Budget	14
5	Successful Delivery Reward Criteria (SDRC)	15
5.1	SDRC 9.3 Installation and Commissioning of equipment.....	15
5.2	SDRC 9.4 Early Operational performance	15
5.3	SDRC 9.5 Measured Impact on the LV Network.....	15
5.4	Future SDRCs	16
6	Learning Outcomes.....	16
6.1	Following battery discharge issue	16
6.2	Customer Surveys.....	17
7	Intellectual Property Rights	21
8	Risk Management	21
8.1	Current Risks.....	22
8.2	Update for risks previously identified	22
9	Consistency with Full Submission	24
10	Accuracy Assurance Statement	24

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Glossary

Term	Definition
BCC	Bristol City Council
KWMC	Knowle West Media Centre
UoB	University of Bath
WPD	Western Power Distribution
SOC	State of Charge
AC	Alternating Current
DC	Direct Current
LED	Light Emitting Diode
HV	High Voltage
LV	Low Voltage
PV	Photo Voltaic
SDRC	Successful Delivery Reward Criteria

1 Executive Summary

“Solar Energy when you need it.”

SoLa BRISTOL is funded through Ofgem’s Low Carbon networks Second Tier funding mechanism. SoLa BRISTOL commenced in October 2011 and was originally planned to complete in Jan 2015.

This report details the progress of SoLa BRISTOL, focusing on the last six months, December 2013 to May 2014.

1.1 Business Case

The Low Voltage distribution network is designed to operate passively. We use an After Diversity Maximum Demand (ADMD) of connected customers to design the network to operate within statutory limits and technical capabilities regardless of time of day or season.

The traditional network designs and operating practices have to date been an efficient method to supply customers. However in the future with much higher distribution peaks and customers exporting generation into the network, it may no longer be the most efficient way to design and operate more complex networks. Innovation may provide improved methods.

The joint Energy Networks Association and Imperial College summary report “Benefits of Advanced Smart Metering for Demand Response based Control of Distribution Networks -version 2.0”, April 2010 predicts the reinforcement of GB distribution networks with a like for like replacement strategy using conventional reinforcement will be significantly higher than using smarter network reinforcement techniques. The report highlighted the greatest potential impact of smart appliances is at HV/LV substations and on the LV feeder. With a 50% penetration of electric vehicles and heat pumps by 2030 the predicted the scale of the LV reinforcement will be £21.8bn, compared to £9.3bn using smart grid techniques.

It is therefore appropriate to look at improving voltage profiles, reducing peaks and improving the power quality of the LV network using innovative techniques that allow the connection of significantly more micro generation and other LCTs to the distribution network without the need for conventional reinforcement

1.2 Project Progress

In the last six monthly report, 2 domestic installations and the EcoHouse were complete along with one substation.

The Customer Engagement and Data Protection Plans were pending approval.

During this reporting period (December 2013 – May 2014) The Customer Engagement and Data protection plans have been approved BY Ofgem. SoLa BRISTOL has continued with the domestic installations and now has 11 domestic installations complete and one commercial premise. All the associated substations are also complete with the comms links operational.

A new installation agreement has been agreed with Bristol City Council for the remainder of the domestic installations, and the Schools engagement process is under way.

A change request is pending approval by Ofgem that recognises the delays experienced and extends the timeline of the project to allow the required analysis and learning to be captured.

More detail on these and other project highlights can be found in the Project Managers report below.

1.3 Project Delivery Structure

1.3.1 Project Review Group

The SoLa BRISTOL Project Review Group met once during this reporting period. Installation and Operational performance were discussed, and in general it was agreed that the project was now moving towards installation completion by 1st September 2014.

1.3.2 Resourcing

No changes to resourcing have been made in this reporting period, although if the submitted Change request is approved then contracts will need extending to match.

1.3.3 Collaboration Partners

All collaboration partners remain committed to the project, and are working well towards the common goals. A key personnel change at BCC has been implemented, and the incoming representative has been briefed on the project.

1.4 Procurement

An updated Installation agreement is now in place to cover the remaining domestic properties.

1.5 Installation

Following on from an issue in one of the properties that resulted in the battery being discharged, it has been agreed with BCC that the installation schedule will be phased with regular operational reviews. This enables any issues and additional learning to be addressed as the project progresses, to ensure that customers are not unduly inconvenienced.

At present 11 domestic and 1 commercial installations are complete, with the remainder scheduled to be complete before 1st September 2014.

1.6 Project Risks

The Project Manager takes a proactive role in ensuring effective risk management for SoLa BRISTOL. They ensure that processes have been put in place to review whether risks still exist, whether new risks have arisen, whether the likelihood and impact of risks has changed, and report significant changes which adjust risk priorities and deliver assurance of the effectiveness of control.

Contained within Section 8.1 of this report are the current top risks associated with successfully delivering SoLa BRISTOL as captured in our Risk Register along with an update on the risks captured in our last six monthly project report. Section 8.2 provides an update on the most prominent risks identified at the project bid phase.

1.7 Project learning and dissemination

Project lessons learned and what worked well are captured throughout the project lifecycle. These are captured through a series of on-going reviews with stakeholders and project team members, and will be shared in lessons learned workshops at the end of the project. These are reported in Section 6 of this report.

During this reporting period we have shared our learning from SoLa BRISTOL through events we have spoken at.

In addition to this we have shared our learning (where applicable), through discussions and networking at a number of knowledge sharing events hosted by other organisations.

Event Title	Date	Host	Contribution
Energy Storage Operators Forum	20/03/2014	ESOF Group	Presenter
Energy Storage World Forum	04/04/2014	Dufrense Ltd	Presenter
KTN & IET Forum, DC Systems	22/05/2014	IET	Presenter

Table 1-1 - Contribution to knowledge sharing events hosted by other organisations

2 Project Managers Report

2.1 Project Background

SoLa 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).

2.2 Project Progress

On the 16th January 2014, In accordance with the Governance Document section 3.100, It was reported to Ofgem’s LCNF liaison team that delays, and the technical issue within one of the trial homes, would impact on the project timeline and subsequent SDRC’s.

Following on from the approval of the Customer Engagement and Data Protection plans, and the proposed complete schedule of installations, an assessment of the new project timeline has been made and a change request (CCR004) has been submitted, that reflects this. The new timeline and its impact on the project milestones and SDRC’s have been incorporated in the Project Managers report below.

Due Date	Type	Description	Status
15/12/2012	Report	Initial Installation Report R2	Received 23/09/13
02/09/2013	Document	Data Protection Plan	Approved 17/12/13
02/09/2013	Document	Customer Engagement Plan	Approved 17/12/13
30/09/2012	Report	Combined domestic FAT report M3	Received 14/2/14
30/09/2012	Report	Commercial FAT report M3	Received 10/4/14

Table 2-1 - Progress to date - Key Outputs and Milestones

2.2.1 Domestic Installation Progress

In the last reporting period December 2013 to May 2014, significant progress has been made with the domestic installations. Key points and issues are discussed below:

Battery discharge Issue at property 04 and resulting modifications

On the 8th November 2014 the customer in one of the properties fitted with the SoLa system experienced a fault within their iron that tripped the kitchen ring main AC circuit breaker. No other protection device operated. This fault created a surge around the house causing damage to the SoLa Bristol equipment.

The result of this damage was that the inverter failed to charge the batteries via the mains, so the only charging was from the PV Panels. The AC supply to the inverter is fed from a separate circuit breaker housed in the same consumer unit as the kitchen circuit breaker, but is a separate circuit. This consumer unit is not part of the Sola Bristol equipment, but was part of the original domestic installation. The AC feed to the inverter is also the existing wiring, (It was re-used when the original SunnyBoy Inverter used for the pre-existing PV system was replaced).

On the 29th November the customers DC lighting failed as there was no charge left in the battery.

WPD and Siemens have carried out a thorough investigation and review of the SoLa system. BCC have carried out tests on the internal wiring and electrical earthing at the property, but no reason could be found for damage. WPD have assisted BCC and carried out on-site diagnostic checks of the SoLa equipment. Unfortunately before the failed unit could be recovered there was also a roof leak in early December that has caused water damage to the SoLa equipment. This has therefore prevented any further investigation under laboratory conditions.

The battery maintained a suitable charge to supply the DC lighting circuit for 21 days, only supported by the PV panels, before it was exhausted. No failure alarms or indications were received by WPD or the customer. With this in mind, Siemens have since designed an early warning LED fault alarm to alert the tenant of such a problem, to avoid a repeat occurrence of main lighting failure. There will also be a digital voltmeter fitted to the front of the Sola Bristol distribution board to give the customer visibility of the battery output.

In addition, BCC are planning to fit a “RCBO protection device” to the circuit which is faster and more sensitive to earth faults. This will give the Sola Bristol equipment a greater level of protection should a similar fault occur in the future, and will be fitted to all future installations.

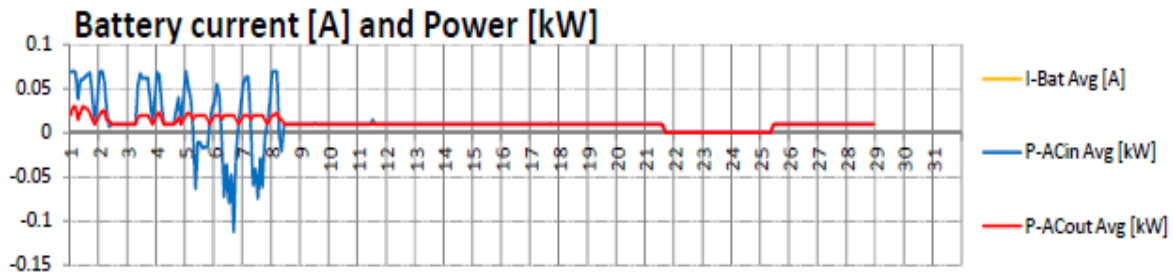


Figure 1 - Battery current and power showing 8th Nov event

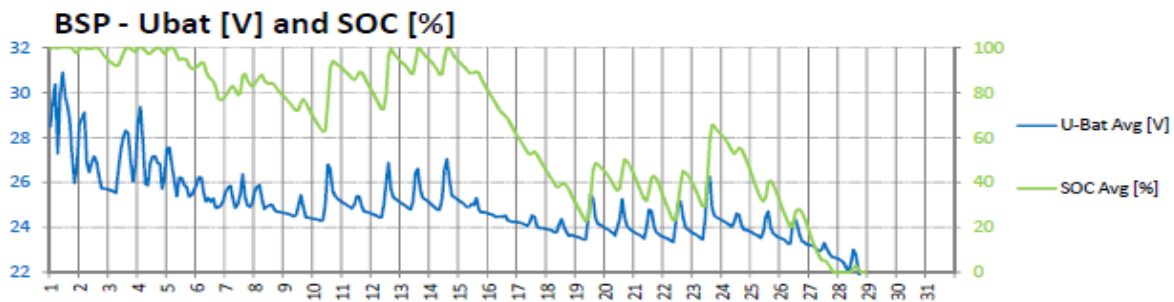


Figure 2 - Battery voltage and State of charge decline after 8th Nov event

As the investigation into the system failure was inconclusive we are planning a phased roll-out of future installations. These commenced in March 2014, and will complete in August. All installations will be completed by 1st Sept 2014. Each batch of home installations will include periodic reviews by the project Steering Group (which includes BCC and Siemens) to assess operational performance and provide a “go/no-go” to the next phase.

The full Siemens report on site visits from 15th November 2013 through to 18th December 2013 is included as **Appendix 1**.

Installation agreement with BCC

The existing installation agreement with BCC was to cover the initial 3 trial homes. Once the Customer Engagement and Data Protection plans were approved, negotiations into a new agreement to cover the remaining 27 homes commenced. Following several iterations the final agreement was signed on 7th March 2014, and is attached as **Appendix 2**.

The main area of change is that BCC have requested the installations be phased between March and September, with regular review periods to agree any action arising from issues.

Comms link and Data capture

All domestic sub station monitors have been installed and commissioned. Data is being captured from the installed homes and the associated LV Network.

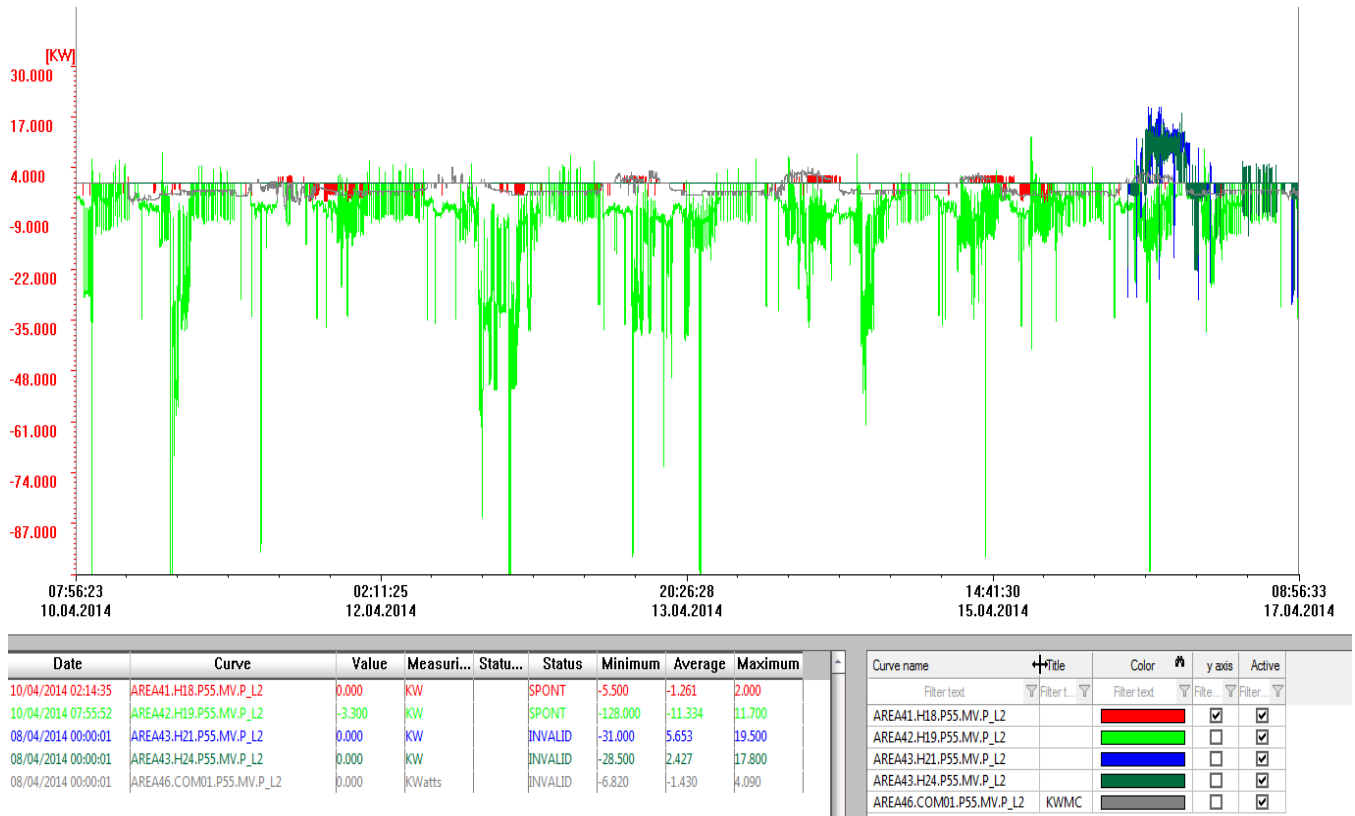


Figure 3 - Domestic property Data extract

Loft boarding and specialist lifting

Following on from the lessons learned with the initial trial homes, which were reported in the previous 6 monthly report, loft boarding and the specialist lifting of the battery were carried out as a separate task to the installation.

As specified in the approved Customer Engagement Plan, KWMC led the customer engagement and made all the appointments with the customer, they then liaised with the boarding and lifting contractors to ensure all parties were aware of the agreed dates.

All lofts have now been boarded with equipment lifted into the properties ready for installation.

11 installations are now complete and all others are scheduled to be completed before 1st September 2014.

2.2.2 Commercial Installation Progress

The first commercial installation has been installed and commissioned using the training room of KWMC. This will be included as one of the educational establishments as the load profile closely represents a typical school during term times.

The KWMC installation has been completed and was commissioned on 31st March 2014. 8 LED light fittings have been installed in the training room along with charging facilities for 20 tablet PC's.

Communications paths between KWMC, the associated sub station and the Data storage PC are established with data being reliably received.

Fig 4 is an extract of the KWMC data.

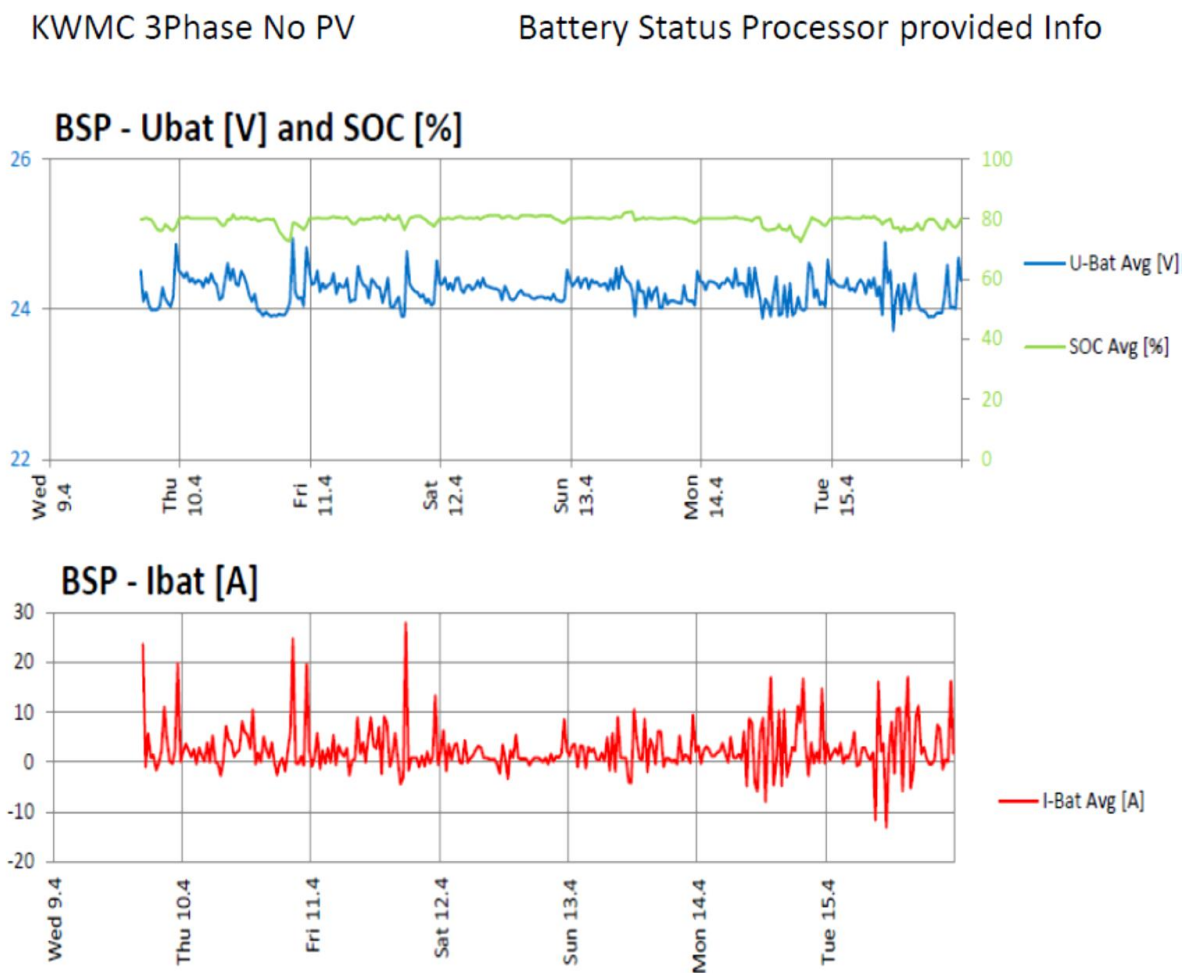
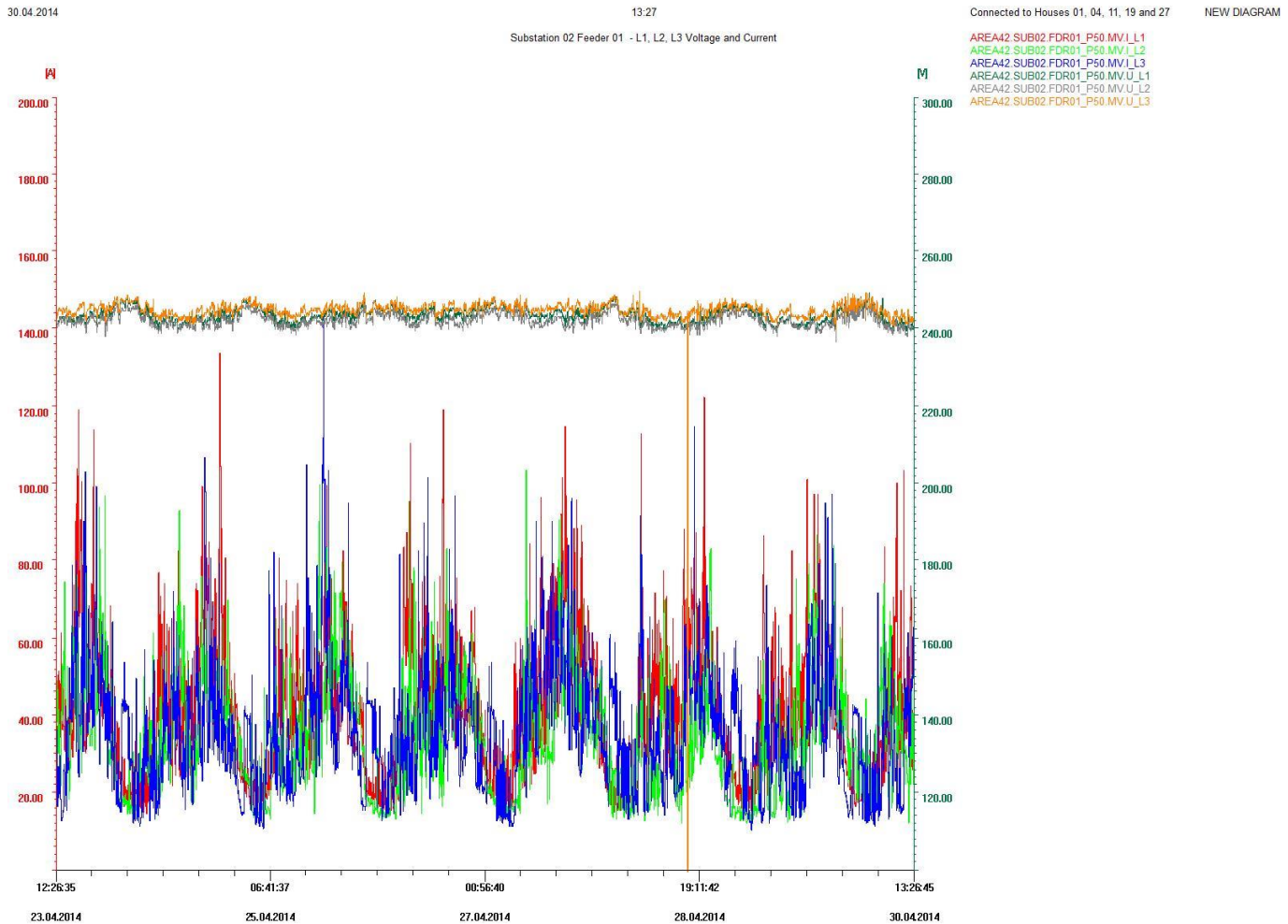


Figure 4 - KWMC Data extract

2.2.3 Sub Station Installation Progress

During this reporting period all sub stations associated with the domestic installations and the one associated with KWMC have been installed and commissioned. The monitoring equipment is on line and data is being captured and sent to UoB.

Fig 5 shows an example of the sub station Data.



1
Figure 5 - Substation Data extract

3 Business Case Update

No changes to the business case have been forecast at this stage. However, the increasing interest in energy storage beyond the meter has led to the IET investigating the requirement for standards / guides. This will significantly help the adoption of energy storage beyond the meter.

4 Progress against Budget

	Total Budget	Expected spend May 2014	Actual Spend May 2014	Variance over period	Variance over period	Notes
1 BCC Project Management	60.00	20.00	30.53	- 10.53	53%	see Note 1
2 Detailed Installation Survey and Planning	57.00	57.00	1.38	55.63	-98%	see Note 2
3 Training and Installations	203.00	196.21	80.62	115.59	-59%	see Note 3
4 Trial Property Recruitment, equip, maintenance and ongoing support	177.00	145.59	80.69	64.90	-45%	see Note 3
5 Equipment Decommissioning	198.00	-	-	-	0%	
6 Scope Change Contingency	49.00	49.00	20.90	28.10	-57%	see Note 4
7 Data Communications Manager and LV Network Manager	20.00	14.91	9.90	5.01	-34%	see Note 3
8 Distribution Sensing Equipment	11.00	11.00	12.15	- 1.15	10%	
9 Customer Sensors Equipment	2.00	2.00	2.14	- 0.14	7%	
10 Overall Project Manager	151.20	130.50	107.37	23.12	-18%	see Note 1
11 Substation Installation	29.00	29.00	8.86	20.14	-69%	see Note 3
12 Battery Charging Costs	9.00	6.45	-	6.45	-100%	see Note 3
13 Variable Tarriffs	9.00	6.45	-	6.45	-100%	see Note 3
14 DC Meters	5.00	4.00	4.00	- 0.00	0%	
15 System Design and Engineering	173.19	165.67	139.66	26.02	-16%	see Note 3
16 Domestic Premises Equipment	358.37	354.42	304.89	49.53	-14%	see Note 3
17 School Equipment	302.02	300.70	243.54	57.16	-19%	see Note 5
18 Office Equipment	31.33	31.19	25.26	5.93	-19%	see Note 3
19 Substation Equipment	161.09	159.50	129.90	29.60	-19%	see Note 3
20 Data archiving and Access equipment	98.17	98.04	79.16	18.88	-19%	see Note 3
21 Installation, comissioning and operation support	141.64	127.01	124.82	2.18	-2%	
22 Smart Appliances ICT Equipment	30.00	30.00	-	30.00	-100%	see Note 3
23 Input to smart tarrif	122.91	81.91	47.62	34.28	-42%	see Note 6
24 input to network design	230.39	175.80	89.26	86.54	-49%	see Note 6
25 Dissemination planning	118.25	90.39	45.82	44.58	-49%	see Note 6
26 Workshops	12.00	8.60	4.65	3.96	-46%	see Note 6
27 School engagement	24.00	17.21	9.30	7.91	-46%	see Note 3
Total	2,783.56	2,312.56	1,601.07	711.49	-31%	

Table 4-1 - Progress against budget

Note 1- PM costs. Due to design, installation and contractual Delays, PM time has been higher than estimated. Once installations are complete, this is expected to reduce.

Note 2- Installation Surveys and Planning. BCC have only invoiced for the initial trial homes. They intend to invoice for all installations at the end of the phased rollout in September 2014

Note 3- Due to the delays and phased rollout spend is behind schedule, it is expected to be back on schedule by the end of 2014.

Note 4- Contingency costs. There have been extra design costs associated with early warning LVD relays and voltmeter displays, and external cabinet design for commercial properties.

Note 5- Due to the proposed reduction of schools from 10 to 5 costs are lower than predicted. These costs will not be drawn from the LCNF account.

Note 6 - Due to the delays and phased rollout Analysis of real time data has been limited. Payment schedule to Bath University has been delayed.

5 Successful Delivery Reward Criteria (SDRC)

In the previous 6 monthly report, it was expected the SDRC's 9.4 onwards could still be completed in line with the original pro forma.

With the approval of the Customer engagement and Data protection plans being agreed on 17th December 2013 and the technical issue experienced in property 04, that have resulted in a phased roll out schedule. This is no longer possible. In the section below both the original due dates and the proposed new dates have been included.

5.1 SDRC 9.3 Installation and Commissioning of equipment

The original due date from the full submission was 30th April 2013 for the domestic and office properties and the 31st August 2013 for the schools. The new proposed due date, subject to the change request is 1st September 2014 for all properties.

5.2 SDRC 9.4 Early Operational performance

The original due date from the full submission was 31st December 2013. The new proposed due date, subject to the change request is 31st December 2014.

5.3 SDRC 9.5 Measured Impact on the LV Network

The original due date from the full submission was 31st May 2014. The new proposed due date, subject to the change request is 31st May 2015.

5.4 Future SDRCs

Table 5-1 captures the remaining SDRCs for completion during the project life cycle.

SDRC	Status	Due Date	Comments
9.6 Customer Opinions	Red	30/11/2014	Change request proposed new due date 30/11/2015
9.7 Power Outages	Red	31/01/2015	Change request proposed new due date 01/06/2015
9.8 Final Report	Red	31/01/2015	Change request proposed new due date 15/01/2016

Table 5-1 - SDRCs to be completed

Status Key:	
Red	<Major issues – unlikely to be completed by due date>
Amber	<Minor issues – expected to be completed by due date >
Green	<On track – expected to be completed by due date>

6 Learning Outcomes

6.1 Following battery discharge issue

Following on from the issues mentioned in 2.2.1, several early warning systems have been incorporated in the future installations:

A Low Volts disconnected relay has been installed that will automatically disconnect the DC load if the battery voltage should fall below 21v. It will reconnect once 24v is maintained for a continuous 90 seconds. This will prevent a total discharge of the battery, should the charging mechanism fail.

A warning LED has been fitted to the front panel of the Sola Bristol DC Distribution board, that gives a visual warning to the customer, should mains charging fail. This will enable the customer to contact the relevant people before the battery discharges (this took 3 weeks in the case of property 04).

A visual DC Voltage display has been incorporated into the front panel of the Sola Bristol Distribution Board. This gives the customer confidence that the 24v is being maintained.

Emergency power supply units have been issued to BCC that can easily and quickly be installed should the battery fail in any way. This unit will provide 24v DC from an existing 230v mains supply.

6.2 Customer Surveys

In line with the Ofgem approved customer engagement plan, the UoB in conjunction with KWMC have commenced the customer surveys.

In order to understand the impact of the SoLa system on the householders it has been important to gain an insight into their experiences with the PV panels prior to the install of the battery packs. To date, 18 householders have been interviewed. The interviews were analysed by a researcher, from UoB, to identify key recurrent themes that might be useful for future learning. The following section details a number of these key themes.

Reasons to take part

Most people were keen to take part in the project with the motive of saving money. As social housing tenants, the majority of our householders are on a prepayment system, which can (with some energy tariffs) result in tenants spending a large proportion of their income on energy. A secondary motive was to save energy more generally (i.e., reduce carbon emissions) and to be involved in a project led by the trusted body that is Knowle West Media Centre (KWMC).

It was clear that a number of the householders had heard about the project through KWMC and were keen to be part of a community-based project. A number of the householders reported that this project was a good way to have solar PV installed on their roof (which they could not afford to do otherwise) while one householder noted that they were really keen to learn more about the system and how PV worked, and saw this project as an opportunity to learn more.

Experiences with contractors and project partners

The householders were asked to provide feedback about the experiences they have had with the contractors and project partners so far. The general consensus was that the contractors have all been friendly, considerate and tidy. It was noted by a number of the householders that the use of local contractors had been helpful as often the contractors had grown up in the Knowle West area and so knew the householders.

The method of using KWMC as a gateway point between contractors and householders has worked well, with all the contractors arranging appointments via KWMC. This has meant that the householders are informed in advance of each installation and are able to negotiate a suitable time and date. Overall, then, it is clear that using KWMC, as a go-between has been a highly successful strategy.

However, the identity of the project has become confused for some of the householders. In particular, the overlap between this project and existing Bristol City Council (BCC) processes seems to have caused some problems. A number of the householders reported that BCC has sent people around to read the PV meter who have then stated the meter is broken (it is not broken, but as part of the SoLa project the FiT meter has been disconnected). This confusion has concerned some householders.

In addition to this, as the houses are council owned, tenants are sometimes confused when BCC wants access to their lofts for other activities (e.g. insulation and ventilation). They presume the visit is related to SoLa and consequently ask KWMC about when contractors will be visiting. Within the project KWMC are working closely with BCC to share information and reduce confusion, but it seems more might be done in future to reduce confusion about who is doing what, and what tasks are and are not related to the research project.

A number of the householders commented on the level of communication from KWMC, noting that in between the two phases they still felt involved in the project and aware of the progress.

Installations:

While there has been a little concern from some householders about having their light fittings changed, these concerns were removed when it was made clear the fittings would all be returned to normal after the trial. Householders commented that the installers had worked hard to keep householders requests in mind, discussing where the USB plug would be positioned, and ensuring the distribution box is in an out of the way location.

Clearly ensuring that householders feel involved in decision-making, and do not feel as though they are having interventions imposed upon them, is important for their satisfaction with such a project.

Are the Panels working?

A number of the householders were unsure if their PV panels were working, as they felt they had not saved any money. Details of these houses have been provided to BCC to establish if there are any issues. University of Bath (UoB) is also working alongside KWMC to develop more guidance for the tenants about their systems.

This, combined with the introduction of the energy interface on the tablet, should help the tenants to understand their own energy systems better and maintain better expectations about the likely outcomes of the project.

Drop out

One household has decided to leave the project, as they were unhappy with the extent to which their house would need to be changed. This was primarily due to the householder having an unusual lighting arrangement, and the tenant being unwilling to locate the meter in a living space rather than the hallway (the hallway did not provide enough space for the meter to be located). There are no signs so far that these issues are anything other than an isolated case.

Financial Savings

As a key reason for taking part in the project for the householders was often to save money, it is reassuring to know that the majority of people in the project have saved money – often a substantial amount. The householders' awareness of their spending varied considerably, and manifested itself in different ways. For example, some were able to tell us that they had halved their energy costs, while others had noticed that they no longer had to use emergency credit. One family was using the prepayment meter as form of saving, by continuing to add the same amount each month but using less, she was looking forward to a period in the summer months when she did not need to add money to the meter and could use her monthly energy money for something else.

Most of the householders had noticed the largest saving during the summer months, and many were hopeful that the battery would allow them to save further money. A couple commented that they knew the first two test homes were already saving more money from their battery installs at the end of 2013. Together, this all suggests that the visible impact of SoLa will vary from person to person, as will the way people make use of the project's benefits – points which might be borne in mind when providing information to householders.

Interviewing the householders about their financial savings has highlighted the range in costs for the houses. One householder reported spending £5 a week on electricity while others are spending £20-£25. This difference in prices and the difference in the number of tenants in each house will be useful for providing a broad range of data for the project, representing a range of households.

Behaviour Changes

Talking to the householders about their energy attitudes and behaviours further highlighted the diversity of the participants, with some participants reporting high energy conservation awareness – turning lights off and disconnecting televisions at the plug – while others reported leaving lamps on all night and children falling asleep with the TV on.

It was also clear that everyday habits differ greatly between the householders, with some householders reporting that they are able to shift their behaviour to do their laundry when the weather is nice and take advantage of the PV, but others commenting that they were doing washing everyday (sometimes more than once) and so did not have the luxury of shifting their behaviour to suit the weather. One of the householders commented that when it was sunny they tried to get everything done, using washing machine, tumble drier and dishwasher simultaneously.

These discussions also reveal something about householders' understandings of the SoLa system – clearly many assume that PV energy is used immediately when it is plentiful, obviating the need to draw energy from the mains supply. If this is not correct, it might be useful to educate householders of this.

General Understanding:

A number of the householders commented that they really liked having the solar PV but felt that they did not fully understand it. Some mentioned they had flashing lights on their equipment and did not know if this was good or bad. These comments combined with the feedback about their behaviours mentioned above, highlights how householders might benefit from clearer guidance about their energy systems and the best methods for using their energy efficiently and effectively. With the recent introduction of the tablets and energy interface, the householders should find it easier to understand their energy usage provided they are helped to do so. The learning team are working with the UoB engineers to develop guidance to help householders use the system effectively.

Tablets:

The energy interface is now complete and as each battery installation is commissioned the householders are receiving their tablets. So far 11 householders have received tablets and have been shown the system. There are still developments pending, but the tenants are engaged and interested in how the tablets display their energy use; future interviews will provide more insight into the extent to which householders are looking at their energy data and into how the presentation of energy-related data might be optimised to influence energy consumption behaviours.

Hopes for the future

The householders were all looking forward to having their batteries installed and being able to view their energy usage on the tablet PC. A couple of the householders were interested to know about plans for the batteries at the end of the project, and one householder commented that it would be good to have the batteries for longer as considering all the work involved in installing them, it makes sense to have them for longer than a year.

Key Learning Points:

- KWMC acting as a gateway point has helped the project run smoothly, minimising disruption to the householders.
- Householders have joined the project for a range of reasons. Exploring this further might provide guidance about the best methods for using the battery system efficiently and might be useful for informing future recruitment or marketing.
- Providing details to the households about the anticipated length of the install and the provisional dates has been appreciated.
- To reduce the risk of further dropouts, each of the householders is being reminded that they will need to change their lighting during the project.
- The extent to which householders are aware of their energy consumption varies.
- Using local contractors has helped the project run smoothly.
- Increased communication within different sections of BCC and with SoLa Project partners would help KWMC in their ability to offer guidance to tenants and differentiate between the project and BCC activities that occur outside of the project.

7 Intellectual Property Rights

No relevant foreground IP has been identified and recorded in this reporting period

8 Risk Management

Our risk management objectives are to:

- ensure that risk management is clearly and consistently integrated into the project management activities and evidenced through the project documentation;
- comply with WPDs risk management processes and any governance requirements as specified by Ofgem; and
- anticipate and respond to changing project requirements.

These objectives will be achieved by:

- ✓ defining the roles, responsibilities and reporting lines within the team for risk management
- ✓ including risk management issues when writing reports and considering decisions
- ✓ maintaining a risk register
- ✓ communicating risks and ensuring suitable training and supervision is provided
- ✓ preparing mitigation action plans
- ✓ preparing contingency action plans
- ✓ regular monitoring and updating of risks and the risk controls

8.1 Current Risks

The SoLa BRISTOL risk register is a live document and is updated regularly. There are currently 17 live project related risks. Mitigation action plans are identified when raising a risk and the appropriate steps then taken to ensure risks do not become issues wherever possible.

In Table 8-1, we give details of our top five current risks by category. For each of these risks, a mitigation action plan has been identified and the progress of these are tracked and reported.

Risk	Risk Rating	Mitigation Action Plan	Progress
R007. Ten schools do not volunteer to take part in the project	Severe	Although 12 schools have volunteered, it is only practical to install the solution in 5. Customer engagement meetings are underway with these	Bath university have assessed the impact of this and the report is attached as Appendix 3
R027 Schools do not allow modifications to their IT Equipment	Severe	If modifying existing equipment is not agreeable to the schools the new DC machines will be purchased and supplied	A specialist DC Computer supplier has been engaged and is liaising with schools
R025 Customers chose not to take part in the project after receiving PV	Major	Alternative Customers will be sought using KWMC as engagement specialists	One customer has pulled out, but a replacement has been found. Ongoing risk as installations are still underway
R018 Over 25% of customer/s wish to terminate the trial before 18 months	Major	Engagement specialists KWMC will keep customers interested throughout the project	Ongoing risk as project develops. No indication of this becoming an issue
R008 A suitable BCC office cannot be found to take part in the project	Major	All BCC will be considered if the originally planned one is not to go ahead.	The original office is to remain in BCC ownership, so should be available to the project

Table 8-1 - Top five current risks (by rating)

8.2 Update for risks previously identified

Descriptions of the most significant risks, identified in the previous six monthly progress report, are provided in Table 8-2 with updates on their current risk status.

Risk	Previous Risk Rating	Current Risk Rating	Comments
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).	Moderate	Minor	Limited effect on the project. Smart appliances for DSR will have limited affect.
R004 When surveying properties, the BRISTOL scope of works must change, resulting in unanticipated cost variations.	Moderate	Moderate	A contingency allowance has been built into the project scope.
R006 Thirty homes do not volunteer to participate in BRISTOL in one area, connected to one distribution substation.	Moderate	Moderate	30 homes originally volunteered. One has dropped out and another has had a tenancy change. An alternative is being sought, along with attempts to engage the new tenant.
R007 Ten schools do not volunteer to take part in the project.	Severe	Severe	Of the 12 schools surveyed, it is only practical to install in 5. These 5 have been engaged and all are positive about the project. UoB are analysing the effect this reduction will have on the project.
R009 Bristol City Councils M&E teams or normal qualified electrical contractors are unable to install and maintain the premises BRISTOL equipment.	Moderate	Moderate	11 installations are now complete. BCC teams gain experience and confidence with each installation.

Table 8-2 - Top five risks identified in previous six monthly report

Descriptions of the most prominent risks, identified at the project bid phase, are provided in Table 8-3 with updates on their current risk status.

Risk	Previous Risk Rating	Current Risk Rating	Comments
R014 There is no suitable location to store the equipment in homes, schools and an office.	Major	Minor	Risk closed. All properties surveyed and suitable locations found. External cabinet designed for commercial properties.
R015 The AC wiring in homes, schools and the office are cannot be converted to DC operation	Major	Minor	Risk closed. ERA report commissioned and AC wiring deemed suitable for DC.

Table 8-3 - Top risks identified at the project bid phase in addition to those mentioned above

9 Consistency with Full Submission

A formal Change Request has been drafted (CCR 04) to extend the time line of the project and all the relevant SDRC's, following delays encountered. This will be subject to DNO review and Ofgem approval.

10 Accuracy Assurance Statement

This report has been prepared by the SoLa BRISTOL Project Manager (Mark Dale), reviewed by the Future Networks Team Manager (Roger Hey), recommended by the Policy Manager (Paul Jewell) and approved by the Operations Director (Philip Swift).

All efforts have been made to ensure that the information contained within this report is accurate. WPD confirms that this report has been produced, reviewed and approved following our quality assurance process for external documents and reports.

