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Dear Mark

Low Carbon Networks Fund – amendments to Western Power Distribution’s Sola Bristol project

This letter contains our¹ decision to approve the requested amendments to certain sections of the Project Direction² dated 19 December 2011 for Western Power Distribution’s (WPD’s) Sola Bristol project (the project). The amendments are set out in the amended Project Direction in the schedule to this letter.

Background

On 19 December 2011, we issued a Project Direction to WPD.³ The Project Direction contains the terms to be followed by WPD in relation to the project as a condition of it being funded under the Second Tier and Discretionary Funding Mechanism.⁴

On 11 December 2014, we amended the Project Direction to:

- revise the project deliverable dates due to delays in the installation of equipment, and
- reduce the sample size of schools taking part in the project.⁵

On 6 February 2015 WPD requested further amendments to be made by the Authority to the Project Direction (the change request).⁶ The amendments requested in the change request relate to two areas:

- 1) a reduction in the sample size of domestic properties taking part in the project; and
- 2) re-use and re-deployment of surplus Sola Bristol domestic units.

¹ The terms ‘the Authority’, ‘Ofgem’, ‘we’ and ‘us’ are used interchangeably in this letter. The Authority is the Gas and Electricity Markets Authority. Ofgem is the Office of the Gas and Electricity Markets Authority.

² All capitalised terms not otherwise defined in this letter have the meaning given to them in the Project Direction.

³ The Authority issued a Project Direction to WPD pursuant to the LCN Fund Governance Document issued pursuant to Part E of Charge Restriction Condition 13 (Low Carbon Networks Fund) (CRC13) of the Electricity Distribution Licence setting out the terms to be followed in relation to the project as a condition of it being funded under the Second Tier and Discretionary Funding Mechanism. The Project Direction can be found at: <https://www.ofgem.gov.uk/publications-and-updates/low-carbon-network-fund-project-direction-bristol>

⁴ Second Tier and Discretionary Funding Mechanism has the meaning given in CRC 13.3(b).

⁵ <https://www.ofgem.gov.uk/publications-and-updates/low-carbon-networks-fund-%E2%80%93-amendments-western-power-distribution%E2%80%99s-sola-bristol-project>

⁶ WPD’s change request and associated documents are published alongside this letter and can be found here – <https://www.ofgem.gov.uk/publications-and-updates/low-carbon-networks-fund-amendments-wpd-s-sola-bristol-project-household-sample>

The rest of this letter sets out our analysis of the two areas of proposed change to the project put forward by WPD in the change request, followed by our decision to approve WPD's change request.

Change 1: SDRC 9.3 – reduction in the project's domestic properties sample size

The change request is to reduce the sample size of domestic properties used in the project from 30 to 26. WPD is unable to secure 30 domestic properties to take part in the project which was set out in its original Full Submission and in Successful Delivery Reward Criteria (SDRC) 9.3 of the Project Direction.

The reasons for the proposal for a reduced sample size noted by WPD in its change request include:

- one property being found to have insufficient PV array capacity on the property; and
- households changing their mind about taking part in project (eg because of changes in personal circumstances).

Based on the evidence provided, and further discussions with WPD, we are not fully convinced that WPD took all reasonable steps to manage the risk of the domestic properties sample size falling below 30. There was no planned contingency for this and having one domestic property as backup appears risky. This may be an important area of project learning that WPD should consider when reviewing the project at its conclusion.

Nevertheless, based on the evidence presented in the change request we are satisfied that a reduction in the sample size is not expected to fundamentally alter the project's learning. This is based on evidence in the change request including:

- a letter from the University of Bath – confirming that a reduction in the sample size is not expected to alter the project's learning, and
- feedback from other Distribution Network Operators (DNOs) that the changes are valid.

Schedule 1 below sets out the change to the domestic property sample size in SDRC 9.3.

Change 2: SDRC 9.3 – re-use and re-deployment of surplus Sola Bristol domestic units

The change request is to re-use and re-deploy the surplus domestic units that have not been installed in domestic properties, by using:

- two units for spares (one replacing a water damaged unit; the other for ongoing repairs); and
- two units for testing at the Universities of Bath and Newcastle.

We accept WPD's justification in the change request to use two of the units for spares. This appears to be prudent use of the units to ensure the timely resolution of faults, without extra cost to the project. However, we have some concerns that given the innovative nature of the project, the issue of potential faults to units does not appear to have been adequately considered as part of the project's contingency budget. WPD should reflect on this as part of its project learning.

We are reasonably content with WPD's re-deployment of domestic units to two universities, with the primary benefit being the ability to test, and implement, new equipment settings, minimising disruption to domestic premises. Feedback from other DNOs as part of WPD's change request also indicates support for this change. However, we are not fully convinced that there is no potential additional project learning from the re-deployment of the units. While no specific changes have been made to WPD's SDRCs to reflect any potential project learning, we request that WPD explicitly consider whether there has been any additional

learning as part of the project's remaining six month reports and in the Close-Down Report.⁷

It is currently unclear whether WPD should return any installation and decommissioning costs to consumers because of the reduced sample of domestic premises. For example, it is currently uncertain whether the two domestic units re-deployed to the universities will be decommissioned by WPD after the project ends. As part of the project's Close-Down Report we request that WPD explicitly review its actual installation and decommissioning costs associated with the re-use and re-deployment of the domestic units. If warranted, we would expect some of these costs to be returned to customers.

Schedule 1 below sets out the changes in SDRC 9.3 to reflect the re-use and re-deployment of surplus Sola Bristol domestic units.

Decision

We consider that with WPD's proposed amendments set out in its change request, the project will still deliver the benefits outlined in the original Full Submission and that these amendments are in the interests of customers.

Our assessment in this letter does not in any way fetter our discretion with respect to any future decision on the Second Tier Successful Delivery Reward, should WPD make a submission after the completion of the project. The Second Tier Successful Delivery Reward is intended to incentivise the DNOs to manage their projects well. When change requests are assessed, consideration is given to whether there has been a material change in circumstances and whether any proposed changes are in the interests of customers. By approving this change request, we are not making an evaluation of WPD's management of change.

In accordance with Section 14 of the Project Direction, the Authority hereby amends the Schedule to the Project Direction in the manner set out in Schedule 1 to this letter.

This letter constitutes notice of reasons for the Authority's decision pursuant to section 49A of the Electricity Act 1989.

If you would like to discuss any of the issues raised in this letter, please contact Tom Mackenzie at thomas.mackenzie@ofgem.gov.uk or 020 7901 7406.

Yours sincerely



Dora Guzeleva,
Head of Networks Policy, Local Grids
For and on behalf of the Authority

⁷ A Close-Down Report is required under the Low Carbon Networks Fund Governance Document to provide information for third parties to understand what has been learnt from the Project. See - <https://www.ofgem.gov.uk/ofgem-publications/45703/low-carbon-networks-fund-governance-document-version-6.pdf>

Schedule One

Amendments to the Schedule to the Project Direction

Amend the following section of the Project Direction in the following manner:

11. SUCCESSFUL DELIVERY REWARD CRITERIA

The Project will be judged by the Authority for the purposes of the Second Tier Successful Delivery Reward against the Successful Delivery Reward Criteria set out in Table 2⁸ below (that comply with paragraphs 3.27 and 3.28 of Section Two of the LCN Fund Governance Document).

Table 2. Successful Delivery Reward Criteria

Successful Delivery Reward criterion	Evidence
<p>Successful initial engagement with customers: This criterion corresponds to successfully holding a workshop with Bristol City Council, potential trial participants and interested parties before 30th April 2012. Through the workshop and customer engagement activities for the 30 domestic customers, 10 schools and an office will be recruited before 14th May 2012. Holding the workshop on or before this date will demonstrate the project is on schedule to recruit and select trial participants' in line with the project plan. Prior to the workshop the customer communication plan will have been submitted and accepted by Ofgem. WPD will work with our partner, Bristol City Council and the trial participant recruitment specialist to engage with target domestic audiences and the selected schools from the Solar PV for schools scheme. The workshop will be used to explain the purpose of the project, provide a guide to the installations, detail the project timeline and gather customer feedback. It will be an opportunity for customers to learn more about the project first hand and ask any questions they may have.</p>	<ul style="list-style-type: none"> • The recruitment plan, copies of material used to recruit trial participants and locations targeted will be recorded. • Minutes and notes captured from the customer workshop will be stored for future use during knowledge dissemination outputs. Feedback from the event and recruitment process will be gathered through a post event questionnaire where any outstanding questions can be collated. • The details of customers recruited to the project will be captured; high level information will be included in the first BRISTOL six monthly report. • An overview of the workshop and feedback will be posted on the BRISTOL website for interested parties within a month of the event.
<p>Confirmation of the BRISTOL design: This criterion corresponds to signing off the design of the installations by 30th September 2012 for homes, schools and office after the trial participants and locations have been confirmed. The design will confirm the capability of the equipment being installed; details which equipment will be connected to the DC network, how the equipment will be connected together and the location of equipment in a typical home, school and the selected office.</p>	<ul style="list-style-type: none"> • Regular meetings will be held between WPD, Regular meetings will be held between WPD, Siemens and the University of Bath to develop the BRISTOL design. Summaries of the meetings and design decisions will be captured and recorded. • The results of the surveys, inspections and reviews will be recorded and stored by the University of Bath • The predicted performance and benefits will be recorded and stored. The

⁸ These are the Successful Delivery Reward Criteria set out in the Implementing DNOs Full Submission

<p>The design will be developed with our partners, Siemens and the University of Bath. It will build upon the Technical Overview outlined in Appendix C and use the outputs from the detailed survey and planning, participants wiring and structural reviews. The final design will be published through the BRISTOL website.</p> <p>The designs will be reviewed and modelled to predict the performance of the solution, customer benefits and distribution network benefits of the final design.</p>	<p>predicted performance will be compared against the actual performance.</p> <ul style="list-style-type: none"> The final design will be signed off by WPD senior engineering managers and subsequently shared through the BRISTOL website.
<p>Installation and commissioning of equipment: This criterion corresponds to installing and commissioning equipment in 3026 domestic properties before 30th September 2014, 5 schools, before 30th September 2014 and an office before 30th September 2014. Prior to the installations WPD and our partners will Factory Acceptance Test the BRISTOL solution, provide training for the installation team, form method statements for installation, risk assessments for installation and operation, an appointment booking process, re-booking process, complaints procedure and operation guide. In addition to the 26 domestic installations, 2 units will be installed in Bath University and Newcastle University to enable testing of system updates in a controlled environment prior to updating customer installations. 2 units will also be kept for strategic spares.</p>	<ul style="list-style-type: none"> A test specification will be completed prior to the factory acceptant test and the commissioning of equipment; this will be signed off by the WPD project manager. The results from the factory acceptance tests will be analysed by Siemens and the University of Bath with final acceptance by WPD. Project documents will be peer reviewed by the WPD Project Manager before they are issued. Copies of the project documentation will be stored by the University of Bath. Regular installation progress reports will be posted on the BRISTOL website for interested parties to view. A review of the installation and commissioning activities will be carried out, capturing any lessons learnt. If required, the method statements and other related documentation will be updated and stored.
<p>Early Operational Performance of BRISTOL: This criterion corresponds to successfully operating an integrated DC network with storage in homes, schools and an office. The operational performance from the data captured through the LV Connection Manager will be analysed to provide an early snapshot of the BRISTOL performance since commissioning. We will capture and share the early learning from deploying and running DC networks and battery storage in customer premises. Data will be captured up to 30th November 2014; the learning will be released by 31st December 2014. No customer sensitive data will be released, and any data relating to customers will be completely anonymous.</p> <p>A review of the early learning will be undertaken to determine if any changes are required in the operation of the LV Connection Manager, including the battery use and charging algorithms to improve the</p>	<ul style="list-style-type: none"> An operations report will be produced and shared through the BRISTOL website, Stakeholder Dissemination symposia, and the project advisory board. The actual data will be collected and stored by the University of Bath. The performance data including system availability, battery usage, battery losses and data rates will be analysed and compared to the pre installation predictions. If required, the method statements and other related documentation will be updated and stored. Notes from the project meetings discussing operational performance in homes, schools and the office will be recorded and stored.

future performance of the BRISTOL solution.	
<p>Measured the impact on the LV network: This criterion corresponds to measuring the impact of the BRISTOL solution on the trial distribution substations operation, compared to the operation prior to the installation and commissioning of equipment in homes, schools and the office. The long term operation of the distribution network will be captured through the LV Network Manager located in distribution substations, the data recorded will be analysed to monitor any changes in the voltage profile, load profile and power quality of the network as a result of the installation in homes, schools and the office. In substations with BRISTOL installed on one LV feeder, another similar LV feeder will also be monitored and used as a reference. Through this criterion we will be capturing and sharing the early learning, measuring the network benefits of the BRISTOL solution, sharing the analysis before 31st May 2015.</p>	<ul style="list-style-type: none"> • Findings shall be shared through a summary report published through the BRISTOL website by 31st May 2015. • Notes from the project meetings discussing operational performance (changes to the LV voltage profiles, feeder demand profiles and power quality) will be recorded and stored. • The actual data will be collected and stored by the University of Bath. The performance data recorded by the LV Network Manager will be analysed and compared to the pre installation predictions. • If required, the method statements and other related documentation will be updated and stored.
<p>Customer Opinion: This criterion relates to learning about customer acceptance of a BRISTOL solution. We will specifically report on how they feel about virtual asset sharing, taking up space in their home, the energy savings, how disruptive the equipment has been, how easy it is to operate and if there opinion of the BRISTOL solution has changed over time. WPD will work with the trial participant recruitment specialist and the University of Bath to design a process and subsequently capture customers' feelings on the project in line with the customer communication plan. The first assessments will commence before 30th March 2014 to capture customers' opinions before the trial starts, the second assessment will commence before 30th November 2014 to capture customers' opinions during the trial and the third assessment will be completed before 30th November 2015 to capture customers' opinions after the trial. All three surveys will be completed before 30th November 2015.</p>	<ul style="list-style-type: none"> • The Customer Communication Plan, detailing customer contact will be on the website • Knowledge will be captured using a mixture of questionnaires and interviews with results published two months after each assessment is completed. • Any customer complaints will be resolved within 14 days and the responses will be stored. • Analysis will be shared with all trial participants, Bristol City Council and GB DNOs through the BRISTOL website. The learning from the customer opinion will be used to update the customer communication plan.
<p>Keeping the lights on during power outages: This criterion corresponds to testing the domestic BRISTOL solution during an AC power outage. WPD will ask selected domestic customers to test the energy security section provided by the battery storage between 1st June 2014 and 1st June 2015. The performance of the DC network and batteries will be monitored, through the LV Connection Manager. Customers' behaviour</p>	<p>The data from the LV Connection Manager and responses from the domestic questionnaire will be stored by the University of Bath.</p> <p>The power outage test plan and communication methods used will be designed and stored by the University of Bath and will be signed off by the WPD Project Manager.</p> <p>The learning generated by analysing the</p>

<p>and use of energy during the short outage will also be captured through the LV Connection Manager and a survey. This test will inform us of the capability of the BRISTOL system during a power outage and the potential value to customers. The trials will be scheduled at different times of the day with different weather conditions and battery capacities to maximise the learning. Selected customers will be invited to undergo this test only once during the trial.</p>	<p>data will be shared with all stakeholders and interested parties through the end of project report on 15th January 2016. Customers' energy demands during the short power outage test will feed into the battery size review at the end of the project (SDRC 9.8 (5)).</p>
<p>Suitability of solution for mainstream adoption: This criterion corresponds to writing a comprehensive end of project report summarising the project findings. The report will contain sufficient information to advise other UK DNOs: (1)If the BRISTOL trial demonstrates solar PV can be integrated into the distribution network using battery storage and DC networks. (2)How the measured results compared to the predictions made in the set up and development period (SDRC 9.2). (3)How the solution could be used to incorporate other LCTs into the distribution network (4)What customer benefits were recorded throughout the trial. (5)How efficient the batteries operated, the costs of battery procurement for DNO and Customer versus the financial benefits. (6)The significant lessons learnt during the trial, how these would be reflected in a future roll out of the BRISTOL solution if used as an alternative to conventional network reinforcement. (7)Which policies and standards would need to be modified to allow a BRISTOL solution and (8)What impact the inclusion of BRISTOL will have on DNO business plans. The report will also contain an appendix with all the early learning reports from previous milestones and a feasibility study for installing a BRISTOL solution in an office using the learning generated from the trial.</p>	<p>The end of project report will review the detail knowledge generated from the design and operation of the BRISTOL project. The report will include the appendices from the key areas of learning highlighted in the other Successful Delivery Reward Criteria. The report containing the information above will be published by 15th January 2016. The results from this milestone will determine if the solution can be adopted into mainstream. If limiting factors are present, preventing the inclusion into mainstream adoption at the end of the project, the report will recommend areas that need to be monitored (e.g. the future cost of energy storage, deployment of smart meters ...) which may facilitate the future inclusion as a network reinforcement technique.</p>

The maximum amount of the Second Tier Successful Delivery Reward (which will not exceed the DNO Compulsory Contribution) that the Project will be eligible for is £229k.