Company Secretary
Western Power Distribution (West Midlands) Plc
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Direct Dial: 020 3263 7159
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Date: 16 March 2017

Dear Company Secretary,

Low Carbon Networks Fund (LCNF) – amendments to Western Power Distribution (West Midlands) plc's (WPD WMID) FLEXDGRID project

The LCNF funds innovation projects and was set up to encourage network companies to innovate in the design, development, and operation of their networks.

The purpose of the FLEXDGRID project (the Project) is to develop new fault level[1] assessment processes, real-time monitoring of fault levels at ten substations and deployment of alternative mitigation solutions at five substations to reduce the cost and time necessary to connect distributed generation.

WPD WMID has requested the Authority to amend the Project Direction to facilitate the following:

1. Reducing the number of Fault Level Mitigation Technologies (FLMTs) from five to three.
2. Transferring budget between budget categories.
3. Correcting several mistakes that were included in the budget section of the original Project Direction.

This letter contains our decision to approve the amendments you have requested to certain sections of the Project Direction[2] dated 21 December 2012. The amendments we are approving are set out in the amended Project Direction in the schedule to this letter.

Background

On 21 December 2012, we issued a Project Direction to you.[3] The Project Direction contains 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.[4]

[1] Fault level is a measure of electrical stress when faults occur within networks. Fault levels must be maintained within equipment ratings. The current approach to electricity distribution network fault level calculations results in conservative fault level assessments and conventional solutions to manage them – largely capital investment.
[2] All capitalised terms not otherwise defined in this letter have the meaning given to them in the Project Direction.
[3] This was 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/ofgem-publications/46079/flexdgrid-project-direction.pdf
[4] Second Tier and Discretionary Funding Mechanism have the meaning given in CRC 13.3(b).

On 12 September 2016 you asked us to make changes to the Project Direction (the Change Request). We asked you for further explanation of the amendments requested in the Change Request and received the final details in January 2017.

The letter contains a summary of the proposed changes and our decision to approve the changes requested by the Change Request.

Change 1: Reducing the number of FLMTs from five to three

The Project intended to install five FLMTs. A FLMT is a device that ensures that fault currents remain within switchgear and network equipment ratings. The five FLMTs covered three different technology types (resistive superconductor, pre-saturated core and power electronic technologies).

Issues incurred

To date, three FLMTs have been successfully installed (one pre-saturated core FLMT and two resistive superconductor FLMTs). However, the development of the final two FLMTs is significantly delayed (these are both power electronic FLMTs). You state that this is due to the innovative nature of the technology being developed (eg you state that the power electronic FLMT had the lowest technology readiness level of any of the FLMTs being trialled as part of this Project). In addition, you state that you have incurred issues with the power electronic FLMT manufacturer that have affected your Project timelines. For example, you state that the manufacturer consistently failed to meet agreed milestones, failed to provide an adequate final design for the FLMT and failed to ensure that appropriate technical experts were appointed. As a consequence you have lost confidence that the manufacturer is able to produce the FLMTs to the required quality.

You have provided evidence to demonstrate that a robust procurement process was followed to appoint the manufacturer. Indeed, in April 2013 (before you issued an Invitation to Tender for the FLMTs), we reviewed your procurement processes and determined that it was satisfactory.[5]

Once issues were identified with the development of the product, the Change Request highlights that you took steps to seek to resolve the issue (eg organising regular meetings with the manufacturer and escalating issues to the manufacturer's management). However this has not been successful in resolving the issues incurred.

Proposed changes to the Project

You consider that it is in consumers' best interests to cancel the procurement for the final two FLMTs and reduce the number of FLMTs installed as part of the Project from five to three. You consider that this will ensure that no more money is spent on a product that you consider is unlikely to be produced to the required quality.

You state that the Project has already gathered valuable learning about the development and build requirements of power electronic technologies. However, you recognise that cancelling the procurement of the final two FLMTs will result in a loss in learning about the installation and operation of power electronic FLMTs.

You paid the manufacturer £924k for completing the initial design of the FLMT. Following contractual discussions, you state that the manufacturer has agreed to return £300k to the Project in recognition of the issues encountered. You consider that this amount is appropriate as it recognises the risky, innovative nature of the technology being developed and that learning was produced. However, it also recognises that the issues associated with the manufacturer stopped the Project from gaining any learning on the operation of this

[5] https://www.westernpower.co.uk/docs/About-us/Stakeholder-information/Our-future-business-plan/Supporting-Business-Efficiency-information/Ofgem-approval-of-WPD-FlexDGrid-procurement.aspx

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specific FLMT (a third of the learning). You have committed to return the £300k to the Project Bank Account, so that it can be returned to customers.

To ensure that the Project remains good value for money, you propose to reduce the Project budget by £1731.33k, to take account of the reduction in the number of FLMTs installed. This reduction in the Project budget is mainly a result of buying less equipment and a consequential reduction in equipment installation costs.

You state that you have considered several alternatives to reducing the number of FLMTs. For example, you state that you considered continuing to use the same manufacturer and extending the Project timescales and budget, installing additional pre-saturated core or resistive superconductive technology FLMTs and procuring a different power-electronic FLMT from a different manufacturer. However, you state that you dismissed these options because they did not deliver good value for money for consumers.

You contacted all of the other distribution network operators (DNOs) to seek their views on your proposed way forward. All the DNOs agreed that reducing the number of FLMTs from five to three was the most appropriate way forward.

Our views

Having considered the evidence submitted as part of this Change Request (eg the feedback from the DNOs) and the potential options for addressing the issues, we agree that reducing the number of FLMTs from five to three is a reasonable way forward. This option will ensure that no more money is spent on developing a product that, based on the evidence provided, appears unlikely to be delivered to the required quality without considerable additional expense. This decision will reduce the Project budget and return a significant amount of money to consumers. The schedule to this decision states the revised budget in the Project Direction.

Change 2: Transferring budget between budget categories

You propose to amend the structure of the Project budget to:

1. remove the budget allocated for procuring and installing Voltage Conditioning Units (VCUs), and
2. increase the budget for installing FLMTs.

During the procurement of the FLMTs, you state that you required manufacturers to design the FLMTs to reduce the need for separate VCUs. This has been successful and you confirm that, to date, no VCUs have been required or installed. None of the budget for VCUs has therefore been spent (£1,296.34k).

However, you state that have incurred a number of issues installing the three FLMTs on your network. These issues have significantly increased your FLMT installation costs. For example, you state that you incurred additional civil constructions costs as a result of one the FLMTs increasing in weight by 70 tonnes. You note that this Project is trialling innovative equipment and consider that these issues not could have been identified before Project initiation. In total you would like to increase the budget for the installation of the three FLMTs by £415.08k.

The Change Request proposes using £415k of the £1.3m saved as a result of not requiring the VCUs, to fund the increased FLMT installation costs. As a consequence, the total Project budget would reduce by £881k, with the saving returned to consumers.

Our views

We note that the proposed amendments ultimately result in a re-allocation of funds between categories and return a significant amount of money to customers.

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We are satisfied that the changes are necessary and will not change Project learning or benefits. We consider that the proposed changes will improve transparency and provide greater clarity on the cost of installing FLMTs, which will aid dissemination of Project learning. We therefore approve transferring the budget between these budget categories. The schedule to this decision sets out the necessary changes to the Project Direction.

Change 3: Corrections to the Project budget

The Change Request has identified several minor errors in Annex 1 of the Project Direction which should be corrected. These are:

- The 'Installation of VCU Technologies' budget line (£148.11k) was omitted from the Labour category of the Project Direction.
- The 'Procurement and Installation Support' budget line (£78.69k) was omitted from the Contractors category of the Project Direction.
- The total cost of the budget was incorrectly identified in the Project Budget of Annex 1 of the Direction as £14,620.57k, rather than £15,477.37k.[6]

You have confirmed that the proposed corrections do not alter the actual cost of the Project or the amount of money provided by the consumers under the LCNF. We consider that the proposed changes will improve transparency and ensure that the detailed budget is accurate, which will aid dissemination of Project learning. The changes are set out in the schedule to this decision.

Decision

We consider that with the proposed amendments contained in your Change Request, the Project will still deliver the benefits outlined in the 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 SDR, should you make a submission after the completion of the Project.

In accordance with Section 13 of the Project Direction, we hereby amend the schedule to the Project Direction in the manner set out in the schedule to this letter. This letter constitutes notice of reasons for our 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 Stephen Perry at stephen.perry@ofgem.gov.uk or 020 7901 1806.

Yours sincerely

G Randall

Geoffrey Randall,
Associate Partner, RIIO Networks
For and on behalf of the Authority

[6] The original budget consisted of £13,513.76k of LCN Fund project funding, a compulsory DNO contribution of £1,548.22 and the projected interest earned on the project funding through its lifetime of £415.42k. In total this is £15,477.37k, not £14,620.57k.

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Schedule – Project Direction changes

This Change Request proposes and the Authority approves that the following changes be made to the Project Direction:

5. APPROVED AMOUNT FOR THE PROJECT

The Approved Amount is £11,153.88~~13513.76~~k

7. PROJECT IMPLEMENTATION

The Funding DNO must undertake the Project in accordance with the commitments it has made in the Full Submission approved by the Authority pursuant to the LCN Fund Governance Document and the terms of this Project Direction. These include (but are not limited to) the following:

(i) undertake the Project in accordance with the description set out in Section 2 (Project Description);
(ii) provide a DNO Compulsory Contribution of £1,285.48~~1,548.22~~k
(iii) complete the Project on or before the Project completion date of 31 March 2017; and
(iv) disseminate the learning from the Project at least to the level described in Section 5 (Knowledge Dissemination).

11. SUCCESSFUL DELIVERY REWARD CRITERIA

Specific: Installation and open-loop (non-network controlling) tests of Fault Level mitigation equipment. **Measurable:** Installation of equipment in ~~five~~three Primary Substation sites with open-loop testing results being disseminated. **Achievable:** Positioning to deliver Fault Level mitigation technologies through successful testing in previous IFI, ETI and Tier-1 projects. Identification of alternative mitigation options through thorough design phase. **Relevant:** This criterion corresponds to the delivery of Method Gamma (Fault Level Mitigation Technologies). **Timely:** Installation and trialling of equipment by 31 December 2016.	1. Installation of equipment in ~~five~~three Primary Substation sites. 2. Dissemination of open-loop (non-network controlling) test results and system-level learning.

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 £1,285.48~~1,548.22~~k.

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ANNEX 1: PROJECT BUDGET

Cost Category	Cost (£k)
Labour	**~~1809.49~~1480.68**
WPD Project Management	320.00
Detailed Investigation of Substations for Technology Inclusion	71.26
Detailed Investigation of Technologies	71.14
Detailed design of Substation Modifications for Technology Inclusion	72.43
Determine Enhanced Assessment Processes	71.88
Create Advanced Network Model	72.32
Installation of Fault Level Monitoring and Measurement Technology	302.4
Installation of Fault Level Mitigation Technology	~~445.10~~313.38
Installation of VCU Technologies	0.00
Capture, Analyse Data and performance	~~234.85~~185.87
Equipment	**~~9779.63~~7862.65**
Procurement of Fault Level Measurement Technology	117.01
Procurement of Fault Level Monitoring Technology	1554.99
Installation of Fault Level Monitoring Technology	494.52
Procurement of Fault Level Mitigation Technologies	~~5830.144~~914.14
Installation of Fault Level Mitigation Technology	~~741.84~~765.57
Procurement of VCU Technologies	~~777.86~~0.00
Installation of VCU Technology	~~246.850~~0.00
Equipment to enable modelling and technology installation	16.42
Contractors	**1927.39**
PB Project Support	340.94
Detailed Investigation of Substations for Technology Inclusion	96.14
Detailed Investigation of Technologies	102.89
Detailed design of Substation Modifications for Technology Inclusion	48.85
Determine Enhanced Assessment Processes	64.85
Create Advanced Network Model	51.38
Implementation of Real-time Modelling	350.94
Capture Monitored & Measured Data	49.61
Analyse Monitored & Measured Data	157.49
Verify & Modify Advanced Network Models	253.89
Gather Performance of Mitigation Technologies	50.07
Knowledge Capture and Learning Dissemination	281.62
Procurement and Installation Support	78.69
IT	**57.73**
IT costs	57.73
IPR Costs	**3.29**
IPR costs	3.29
Travel & Expenses	**465.62**
Travel and expenses	465.62
Contingency	**~~1407.05~~1030.25**
WPD Project Management	40.00
PB Project Support	37.50
Detailed Investigation of Substations for Technology Inclusion	18.42
Detailed Investigation of Technologies	19.18

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Detailed design of Substation Modifications for Technology Inclusion	13.35
Determine Enhanced Assessment Processes	15.27
Create Advanced Network Model	13.68
Procurement of Fault Level Measurement Technology	12.56
Installation of Fault Level Measurement Technology	2.63
Procurement of Fault Level Monitoring Technology	156.35
Installation of Fault Level Monitoring Technology	87.60
Implementation of Real-time Modelling	38.61
Procurement of Fault Level Mitigation Technologies	~~584.19~~350.51
Installation of Fault Level Mitigation Technology	~~131.27~~117.05
Procurement of VCU Technologies	~~78.95~~0.00
Installation of VCU Technology	~~44.57~~0.00
Capture Monitored & Measured Data	10.72
Analyse Monitored & Measured Data	19.82
Verify & Modify Advanced Network Models	32.97
Gather Performance of Mitigation Technologies	~~13.48~~8.09
Knowledge Capture and Learning Dissemination	35.93
Other	**27.20**
Other	27.20
Total	**~~14,571.00~~12,854.78**

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