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Company Secretary
SP Transmission Limited
1 Atlantic Quay
Robertson Street
Glasgow
G2 8SP

Direct Dial: 020 7901 2782
Email: Judith.Ross@ofgem.gov.uk

Date: 9 December 2015

Dear Company Secretary,

Project Direction ref: SPT / Future Intelligent Transmission Network Substation / 9 December 2015

SP Transmission plc (SPT) submitted the project Future Intelligent Transmission Network Substation (the Project[1]) on 31 July 2015 to be considered for funding through the Electricity Network Innovation Competition (NIC). In this year's decision[2], we[3] selected the project for funding.

We have issued this Project Direction to SPT. It contains the terms to be followed by SPT as a condition of the Project receiving funding through the Electricity NIC. SPT must comply with these terms, which can be found in the Schedule to this Project Direction.

Project Direction

Paragraph 5.66 of the Electricity NIC Governance Document states that a Project Direction will:

- set out the Project-specific conditions that the Network Licensee is committing to in accepting funding;
- require the Network Licensee to undertake the Project in accordance with the commitments it has made in the Full Submission. Where appropriate, the Project Direction may therefore include extracts from the Full Submission or refer to specific sections of the Full Submission;
- set out the Approved Amount for the Project, that will form part of the calculation contained in the Funding Direction issued by the Authority under chapter 7 of the Electricity NIC Governance Document;
- set out the Project budget that the Network Licensee must report against and how variances against the Project budget will be reported and approved; and

[1] Unless otherwise specified, defined terms in this Project Direction have the meaning given to them in Appendix 1 of the Electricity NIC Governance Document.
[2] https://www.ofgem.gov.uk/publications-and-updates/electricity-network-innovation-competition-2015-funding-decision.
[3] 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 Authority.

- set out the mechanism for the Network Licensee receiving the Approved Amount is set out in the Funding Direction.

These are described for the Project in the Schedule to this Project Direction.

Decision

Provided SPT complies with the Electricity NIC Governance Document and with the Schedule to this Project Direction, Future Intelligent Transmission Network Substation is deemed to be an Eligible NIC Project.[4]

This Project Direction constitutes notice pursuant to section 49A (Reasons for decisions) of the Electricity Act 1989.

Judith Ross
Head of Network Regulation Policy
For and on behalf of the Authority

[4] Eligible NIC Project has the meaning given in definitions of the Electricity Transmission licence.

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Schedule to Project Direction

1. TITLE

Project Direction ref: SPT / Future Intelligent Transmission Network Substation / 9 December 2015.

2. PREAMBLE

This Project Direction is issued by the Gas and Electricity Markets Authority (the "Authority") to SP Transmission plc (the "Funding Licensee") pursuant to the Electricity NIC Governance Document issued pursuant to Part E of Special Condition 3I (Network Innovation Competition) of the Electricity Transmission Licence (the "Licence". It) sets out the terms to be followed in relation to Future Intelligent Transmission Network Substation (the "Project") as a condition of it being funded under the Network Innovation Competition ("NIC") and the Funding Return Mechanisms.[5]

Unless otherwise specified, defined terms in this Project Direction are defined in Appendix 1 of the Electricity NIC Governance Document.

References to specific sections of the Funding Licensee's Full Submission in this Project Direction are, for ease of reference, made by referring to the section number in the Funding Licensee's Full Submission pro-forma.

3. CONDITION PRECEDENT

The Funding Licensee will not access any funds from the Project Bank Account until it has signed contracts with the Project Partners named in Table 1.

Table 1 Project Partners

GE Grid Solutions
ABB
The University of Manchester
Synaptec

4. COMPLIANCE

The Funding Licensee must comply with Special Condition 3I of the Licence and with the NIC Governance Document (as may be modified from time to time in accordance with Special Condition 3I and as modified and/or augmented in respect of the Project by this Project Direction) and with this Project Direction.

Any part of the Approved Amounts that the Authority determines not to have been spent in accordance with this Project Direction (or with the Electricity NIC Governance Document) is deemed to be Disallowed Expenditure.

Pursuant to Special Condition 3I.12 of the Licence, Disallowed Expenditure is revenue received (whether by the Funding Licensee or by another Licensee) under the NIC and Funding Return Mechanisms that the Authority determines not to have been spent in accordance with the provisions of the Electricity NIC Governance Document or with those of the relevant Project Direction.

Pursuant to paragraph 8.48 of the Electricity NIC Governance Document, Disallowed Expenditure includes any funds that must be returned if the Project is halted without

[5] The Funding Return Mechanism is defined in part C of Special Condition 3I.

Ofgem's[6] permission, any funds that have not been spent in compliance with the approved Project Budget contained within the Project Direction, and any unspent funds on the completion of the Project.

5. APPROVED AMOUNT FOR THE PROJECT

The Approved Amount is £8,335,609.20.

6. PROJECT BUDGET

The Project Budget is set out in Annex 1. The Funding Licensee must not spend more than 110% of any category total (eg "Labour") in Annex 1 without the Authority's prior written consent (such consent is not to be unreasonably withheld).

The Funding Licensee will report on expenditure against each line under the category total in the Project Budget, and explain any projected variance against each line total in excess of 5% as part of its detailed report which will be provided at least every six months, in accordance with paragraph 8.17 of the Electricity NIC Governance Document. Ofgem will use the reported expenditure and explanation to assess whether the funding has been spent in accordance with the Electricity NIC Governance Document and in accordance with this Project Direction.

For the avoidance of doubt this reporting requirement does not change or remove any obligations on the Funding Licensee with respect to reporting that are set out in the Electricity NIC Governance Document.

7. PROJECT IMPLEMENTATION

The Funding Licensee must undertake the Project in accordance with the commitments it has made in the Full Submission approved by the Authority pursuant to the Electricity NIC Governance Document and with 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 Network Licensee Compulsory Contribution of £945,327.97;
(iii) complete the Project on or before the Project completion date of 31 March 2020; and
(iv) disseminate the learning from the Project at least to the level described in Section 5 (Knowledge Dissemination).

8. REPORTING

Ofgem will issue guidance (as amended from time to time) about the structure and content of the reports required by paragraph 8.17 of the Electricity NIC Governance Document. The Funding Licensee must follow this guidance in preparing the reports required by paragraph 8.17 of the Electricity NIC Governance Document.

As required by paragraph 8.22 of the Electricity NIC Governance Document, the Funding Licensee must inform the Authority promptly in writing of any event or circumstance likely to affect its ability to deliver the Project as set out in its Full Submission.

9. COST OVERRUNS

The maximum amount of Contingency Funding that the Funding Licensee can request as additional funding for cost overruns on the Project is 5%.[7]

[6] Ofgem is the Office of the Gas and Electricity Markets Authority. The terms 'Ofgem' and 'Authority', 'we' and 'us' are used interchangeably in this Project Direction.

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10. INTELLECTUAL PROPERTY RIGHTS (IPR)

In Section 5 (Knowledge Dissemination) the Funding Licensee has stated that the Project conforms to the default IPR arrangements set out in Section Five of the Electricity NIC Governance Document. The Funding Licensee must therefore undertake the Project in accordance with the default IPR arrangements.

11. SUCCESSFUL DELIVERY REWARD CRITERIA

The Project will be judged by the Authority for the purposes of the NIC Successful Delivery Reward against the Successful Delivery Reward Criteria ("SDRCs") set out in Table 2 below (that comply with paragraphs 5.26 – 5.29 of the Electricity NIC Governance Document).[8]

Table 2. Successful Delivery Reward Criteria

Successful Delivery Reward criteria	Evidence
1) Architecture, Design and Availability	
• Contractual agreements between SP Transmission and project partners on project payment milestones and deliverables. • Design of substation architecture based on IEC 61850 9-2 process bus architecture suitable for measurement, protection, monitoring and control, with analysis of its expected reliability and availability. • Methodology for site survey, selecting the physical layout, verifying communications and equipment connections and performing analysis of protection availability; as well as figures to compare expectation for conventional and non-conventional design.	• Contracts with project partners (June 2016). • Report on architecture & design of substation secondary system (August 2016). • Report on reliability/availability analysis (November 2016). • Report on bay selection, site survey, engineering feasibility (August 2016). • Engineering design for NCIT & MU installation (July 2016). • Letter confirming agreement with contractors/subcontractors for site works (December 2016).
2) Lab functionality and interoperability testing of protection and monitoring	
• Design and implementation of test environment environments for a) HV primary plant interface and b) LV secondary system demo and trial. • Protection and monitoring functionality and interoperability test plans defined and carried out in laboratory environment. • Tests aim at proving interoperability between different manufacturers' measurement equipment, protection IEDs and breaker controllers.	• Report on Functionality & Interoperability Tests (Lab tests), including description of (April 2017) a. Test Plan b. Test Environment. • Report on Low voltage secondary systems testing results (November 2017). • Report on Functionality & Interoperability Tests (High Voltage tests), including description of (November 2017). a. Test Plan b. Test Environment • Report on High voltage secondary systems testing results (January 2018). • Report on diagnosis of outstanding issues, and plan for resolution (March 2018).

[7] This is the amount requested by the Funding Licensee in its Full Submission.
[8] These are the Successful Delivery Reward Criteria set out in the Funding Licensee's Full Submission

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3) Integrating information with SCADA/EMS/WAMS (central system) monitoring applications	
• Prove that digital substation measurements can provide improved data quality for disturbance, harmonics and synchrophasor measurements. A full measurement chain will be tested in different paths between primary plant and secondary monitoring equipment (conventional hardwire, NCIT, conventional-MU, Distributed Sensors), with known inputs created for testing. • Topology checking and measurement validation at substation, prior to communication to central WAMS/EMS.	• Report on implementing and testing NCIT/MU to PMU/DFR/harmonics measurement chain (including data quality) (March 2017). • Report on topology and measurement validation of substation-to-system information (May 2017). • Report on central information infrastructure integration and enhancement (August 2017): a. Standard EMS/WAMS integration b. New WAMS data types c. Applying CIM to data referencing. • Report on applications exercising data quality (October 2017): a. Fault information mgt b. Harmonics management . Include experience from Bay #1 and Bay #2 performance trials, once available (Revise report twice, first by November 2018, second by November 2019).
4) Wide Area Control Infrastructure	
• Demonstrate that the digital substation can include wide area control infrastructure, and that latency and flexibility are sufficient for the control applications foreseen. • Demonstrate specific use cases to enable innovation rollout (EFCC) and adaptive protection. • Study feasibility of voltage stability control.	• Report on flexible phasor-based control platform and interfaces (March 2018). • Report on EFCC use case and associated substation-to-system interaction (May 2018). • Report on feasibility of wide area voltage stability (July 2018). • Report on adaptive protection central logic and substation-to-system interaction (October 2018).
5) Substation Installation and Commissioning	
• Commissioning of the full digital substation installation on two bays, proving implementation and interoperability in the live substation. • Integration and test of distributed optical sensors over IEC 61850 9-2LE and consistency with conventional measurement.	• Bay #1 Site Test Report (June 2018). • Bay #1 Installation & commissioning Report (November 2018). • Bay #1 Distributed Optical Sensor integration and test (July 2018). • Bay #2 Site Test Report (June 2019). • Bay #2 Installation and commissioning Report (November 2019). • Bay #2 Distributed Optical Sensor integration and test (July 2019).

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6) Extended live operation trial	
• Live operation period starting with piggy-back trial, leading to period of live closed-loop trial. • Experience reported.	• Report on Bay #1 piggy-back trial phase (February 2019). • Report on Bay #1 live operation trial phase (July 2019). • Report on Bay #2 live operation trial phase (November 2019). • Report on Extended Live Performance Trials (March 2020).
7) Cyber security	
• Development of risk assessment strategy and tools to test security levels at substations and between substations and central systems.	• Report on cyber security measures in the substation (December 2016). • Risk assessment for the FITNESS substation (May 2019). • Demo remote access, data transfer and security measures (March 2018). • Demo remote access, data transfer and security measures (March 2019). • Investigate/compare IEEE C37.118 and IEC 61850 90-5 with respect to cyber security (August 2019). • Report on cyber security for Wide Area Control infrastructure (November 2019).
8) Knowledge capture and dissemination	
• Knowledge capture and dissemination amongst Transmission & Distribution Owners, and industrial and academic community.	• Training and Workshop plan for TOs and DNOs (December 2016). • Report on on-going training and workshop sessions delivered (June 2017, December 2017, June 2018, December 2018, June 2019, December 2019, March 2020). • Report on Cigre B5 working group participation and contributions to standards bodies (August 2017, March 2018, July 2018, November 2018, March 2019, July 2019, November 2019). • GB Stakeholder and Dissemination Events organised (August 2017, 2018, 2019). • Annual Innovation conference participation (November 2017, 2018, 2019).

The maximum amount of the NIC Successful Delivery Reward (which will not exceed the Licensee Compulsory Contribution) that the Project will be eligible for is £945,327.97.

12. USE OF LOGO

The Funding Licensee and Project Partners, External Funders and Project Supporters may use the NIC logo for purposes associated with the Project but not use the Ofgem or Ofgem E-Serve logos in any circumstances.[9]

[9] As listed in Box 1.6 in Section 1 of the Full Submission pro-forma.

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13. AMENDMENT OR REVOCATION

As set out in the Electricity NIC Governance Document and this Project Direction, this Project Direction may be amended or revoked under the following circumstances:

(i) if the Funding Licensee considers that there has been a material change in circumstance that requires a change to the Project Direction, and the Authority agrees (paragraph 8.23 of the Electricity NIC Governance Document); or

(ii) if Ofgem agrees to provide Contingency Funding, which requires the re-issue of the Project Direction (paragraph 8.42 of the Electricity NIC Governance Document); or

(iii) if the Funding Licensee applies for Contingency Funding to cover a decrease in Direct Benefits and the Authority decides it would be in the best interest of customers to make changes to the Project Direction before the Contingency Funding would be awarded (paragraph 8.42 of the Electricity NIC Governance Document).

14. HALTING OF PROJECTS

This Project Direction is subject to the provisions contained in paragraphs 8.30 to 8.34 of the Electricity NIC Governance Document relating to the halting of projects. By extension, this Project Direction is subject to any decision by the Authority to halt the Project to which this Project Direction relates and to any subsequent relevant Funding Direction issued by the Authority pursuant to Special Condition 3I.

In the event of the Authority deciding to halt the Project to which this Project Direction relates, the Authority may issue a statement to the Funding Licensee clarifying the effect of that halting decision as regards the status and legal force of the conditions contained in this Direction.

NOW THEREFORE:

In accordance with the powers contained in the Electricity NIC Governance Document issued pursuant to Part E of Special Condition 3I of the Licence the Authority hereby issues this Project Direction to the Funding Licensee in relation to the Project.

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

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ANNEX 1: PROJECT BUDGET

Cost Category	Cost (£)
Labour	1,614,661.89
Equipment	1,327,679.27
Contractors	5,608,274.47
IT	179,767.01
IPR Costs	0
Travel & Expenses	310,559.68
Payments to users	0
Contingency	412,337.43
Decommissioning	0
Other	0
Total	**9,453,279.74**

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