

Company Secretary
National Grid Electricity
Transmission plc
National Grid House
Warwick Technology Park
Gallows Hill
Warwick
CV34 6DA

Direct Dial: 0141 354 5416

Email: Steven.McMahon@ofgem.gov.uk

Date: 11 March 2021

Dear Company Secretary,

Network Innovation Competition (NIC) – amendments to National Grid Electricity Transmission plc (NGET) Offgrid Substation Environment for the Acceleration of Innovative Technologies (OSEAIT) project (the Project)

The NIC funds a number of large-scale 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 Project¹ is to modify the existing Deeside 400kV substation into an easily reconfigurable field trial facility to replicate a live substation environment. The aim of the Project is to overcome the operational barriers associated with the implementation of innovative methods and technologies on the electricity network.

This letter contains our² decision to approve or reject requested amendments to numerous Successful Delivery Reward Criteria (SDRC) in the Project Direction, and where specified, the conditions of our acceptance. The amended Project Direction is set out in Schedule 1 to

¹ All capitalised terms not otherwise defined in this letter have the meaning given to them in the Project Direction.

² References to "Ofgem", "the Authority", "we", "us" and "our" are used interchangeably in this letter. The Authority is the Gas and Electricity Markets Authority. Ofgem is the Office of the Authority.

this letter, and supersedes all previous versions of the OSEAIT Project Direction. Schedule 2 sets out proposed changes to the innovation programme trials.

Background

On 11 December 2015, we issued the OSEAIT Project Direction³. The Project Direction contains the terms to be complied with by the Project as a condition of it being funded under the NIC.

On 15 January 2018, NGET asked us to change the deadline of SDRC 'Completion of stage 1 construction works' from June 2017 to April 2019. This delay arose as a result of the Project having greater interaction with the Connah's Quay project⁴ than previously anticipated. On 6 November 2018, we approved this request⁵.

Following discussions with us, on 27 August 2020 NGET submitted a further change request, outlined in the section below. Since then, we have engaged with NGET to review the requested changes including the updated innovation trials to ensure they comply with the NIC Requirements and their implications on the benefits of the Project. We have also conducted an audit of the Project to assess its compliance to the Project Direction, and review the Projects progress thus far. Our views are outlined in the sections below.

Change request

NGET's change request on 27 August 2020 was in relation to:

- the deadline and SDRC description and evidence for numerous SDRCs (all SDRCs related to the design and development of the facility with delivery dates from 2017, and all SDRCs related to the innovation programme);
- the Project budget (increasing by circa. £1.5m, covered by NGET contributions); and
- the Project end date (delay from 31 October 2020 to 31 October 2021).

NGET informed us that the changes were driven by the same reason as its 2018 request: the Project having a greater level of interaction with the Connah's Quay project than originally anticipated. In the 2018 request, NGET noted that it expected the Connah's Quay project to be complete in summer 2018. Delays to the Connah's Quay project required Deeside substation to remain operational and occupied until March 2020. This resulted in delays to the construction and innovation programme of the Project.

³ The OSEAIT Project Direction issued 11 December 2015 can be found here:

<https://www.ofgem.gov.uk/publications-and-updates/network-innovation-competition-project-direction-oseait>

⁴ The Connah's Quay project is a newly built 400kV substation surrounding the Deeside substation used in this Project.

⁵ Our decision to approve NGET's January 2018 change request can be found on our website:

<https://www.ofgem.gov.uk/publications-and-updates/network-innovation-competition-amended-project-direction-oseait>

Proposed changes to the innovation programme trials are outlined in Schedule 2 of this letter. NGET advised that the proposed portfolio of innovation trials has been designed to ensure that the Project's further delays do not impact consumer benefits realisation. NGET advised that the total consumer benefits from the trials have risen from £138m at the time of the Project's original submission to £288.5m. We note that this is mostly a result of the broadening of project scope for "Architecture for substation secondary systems" (innovation trial 12) to deliver fully digital replacement solutions including operation, maintenance and refurbishment techniques when integrated into the conventional protection and control system.

Our views

Project management

Whilst NGET advises that the Project is still expected to deliver benefits to consumers, we have concerns regarding the management of the project. From 3 December 2018, when we accepted the 2018 change request, to 6 February 2020, when NGET first informed us about further delays, we received no communication from NGET regarding the Project. This falls below the requirement in the NIC Governance that, at minimum, annual Project Progress Reports (PPRs) should be submitted to Ofgem.

In addition, by 6 February 2020, a number of SDRCs had already passed their delivery date and at that time constituted material changes, as defined in the NIC Governance. We do not therefore consider that NGET have identified project delivery risks in a timely manner. Material changes require approval from Ofgem in order to proceed. Accordingly, it is expected that Ofgem is approached prior to the occurrence of material changes.

Change requests

Requested amendments to SDRCs and deadlines

NGET requested deadline changes to all SDRCs related to the design and development of the facility with delivery dates from 2017 (SDRC 1.5 to 1.10, and 1.12), and all SDRCs related to the innovation programme. Where deadlines for SDRCs had already passed by the time NGET first informed us of the change request, and where the deliverable has already been completed, we do not consider it appropriate to retrospectively change these SDRCs. We have accordingly rejected requests where this has been the case, and provide details below.

Our decisions on each of the requested SDRC changes are as follows.

- SDRC 1.5 "completion of stage 1 construction works". NGET requested the delivery of this SDRC be changed from April 2019 to October 2019, and for the securing of

the overhead line enclosure to be removed from its criteria. We note that NGET completed the refurbishment of the Innovation Centre Building, constituting a large part of this SDRC, in October 2019. We consider that as the majority of this SDRC was met in October 2019 (the securing of the overhead line enclosure was not completed as Deeside substation remained operational and occupied until March 2020), within 1 year of the current SDRC deadline and prior to NGET's submission of this change request, there is little benefit in retrospectively changing this SDRC. We therefore reject NGET's request to change this SDRC.

- SDRC 1.6 "scope of work for the phase 2 innovation programmes approved". NGET requested the delivery of this SDRC be changed from March 2018 to March 2020. We note that the Technical Advisory Board ("TAB") approved the majority of phase 2 innovation trials at the April 2018 TAB meeting, however the Project's delays resulted in NGET seeking to change the innovation programme trials, details of which were not provided to us until September 2020. We acknowledge that the requested change constitutes a material change as defined in the NIC Governance document⁶, however we consider that changing this SDRC retrospectively will not have any bearing on the completion of the Project beyond this stage. This is because the majority of phase 2 innovation trials were approved within 1 year of the existing SDRC deadline, and we are approving the proposed changes to the SDRCs related to the innovation programme trials, therefore in effect approving the scope of work for the phase 2 innovation programmes approved. We therefore reject NGET's request to change this SDRC.
- SDRC 1.7 "completion of stage 2 construction works". NGET requested the delivery of this SDRC be changed from May 2018 to January 2021. We note that the completion of the construction of the Overhead Line area is a large part of this SDRC, and that further delays mean this SDRC had not been met on the requested changed date of January 2021. We nevertheless approve NGET's request to change this SDRC as it represents a major milestone in the Project, is the reason for the delays in commencing many of the innovation trials, and is considered a material change, as defined in the NIC Governance Document. Further, we consider this change to be in the interest of consumers as it is key in enabling delivery of the innovation trials, and thus consumer benefits of the Project.
- SDRC 1.8 "scope of works for the phase 3 innovation programme approved". NGET requested the delivery of this SDRC be changed from March 2019 to December 2020. We acknowledge that the requested change constitutes a material change as defined in the NIC Governance document, however we consider that changing this

⁶ See paragraph 8.23 of the NIC Governance Document:
https://www.ofgem.gov.uk/system/files/docs/2017/07/electricity_network_innovation_competition_governance_document_version_3.0.pdf

SDRC retrospectively will not have any bearing on the completion of the Project beyond this stage. This is because we are approving the proposed changes to the SDRCs related to the innovation programme trials, therefore in effect approving the scope of works for the phase 3 innovation programme. We therefore reject NGET's request to change this SDRC.

- SDRC 1.9 "commencement of phase 3 innovation programme". NGET requested the delivery of this SDRC be changed from April 2019 to September 2021. We note that phase 3 innovation trials rely on the availability of the Overhead Line and substation areas of the facility, and that the delays in construction prevented the trials commencing as originally planned. We therefore consider it appropriate to approve NGET's request to change this SDRC, and note that the change is considered a material change in accordance with the NIC Governance Document. Further, we consider this change to be in the interest of consumers as it is key in enabling delivery of the innovation trials, and thus consumer benefits of the Project.
- SDRC 1.10 "completion of stage 3 construction works". NGET requested the delivery of this SDRC be changed from May 2019 to June 2021, and for the SDRC criteria to refer to the completion of the construction of the substation area to enable HV equipment testing (as opposed to referring to completion of the Gas Insulated Switchgear enclosure). We consider it appropriate to approve NGET's request to change this SDRC as it represents a major milestone in the Project, is the reason for the delays in commencing some of the innovation trials, and is considered a material change, as defined in the NIC Governance Document. Further, we consider this change to be in the interest of consumers as it is key in enabling delivery of the innovation trials, and thus consumer benefits of the Project.
- SDRC 1.12 "project close down". NGET requested the delivery of this SDRC be changed from October 2020 to October 2021. The Project's delays mean that innovation trials will not be complete by October 2020. We consider it appropriate, and in the interest of consumers, for the Project to be extended such that all learning can be achieved and disseminated prior to the Project close down. We therefore approve NGET's request to change this SDRC.
- NGET request to change the delivery and criteria of all SDRCs related to the innovation programme. We note that the changes to the criteria are to update the requirements for successful knowledge dissemination, which for some trials were to be defined at trial approval stage, and to reflect the updated programme of innovation trials (listed in Schedule 2 of this letter). We consider it appropriate, and in the interest of consumers, to change the criteria of the SDRCs related to the innovation programme to reflect the actual innovation trials to be conducted, and to ensure the learning and knowledge dissemination is appropriate. We consider that

the changes to the delivery of these SDRCs align the innovation trials to the Project's new timeframe and thereby enable delivery of the Project as a whole, thereby facilitating the delivery of consumer benefits.

We note that NGET requested to change the delivery dates of SDRCs: Trial 8 from October 2018 to July 2020; Trial 9 from July 2018 to July 2020; and Trial 10 from July 2018 to August 2020. These trials were all completed including successful knowledge dissemination on their respective requested changed delivery dates. The result reports for Innovation Trials 8 and 9 were submitted to us on 22 July 2020, and Innovation Trial 10's result report was submitted to us on 6 August 2020. Given these innovation trials and their associated SDRCs were met prior to NGET's submission of this change request, we do not consider it appropriate to retrospectively change these SDRCs.

We therefore reject NGET's requested changes to SDRCs Trial 8, Trial 9, and Trial 10. We consider the changes to all other SDRCs related to the innovation programme to be material, for the reasons outlined above, and therefore approve these requested changes.

Requested changes to Project Budget

NGET notified us of an increase to the Project budget by circa. £1.5m, with NGET paying for this cost. We note the Project's overspend is caused by the aforementioned delays and additional construction required. Specifically, NGET state that the Overhead Line area was contaminated and required significant ground stabilisation, and that the substation area was found to be contaminated, resulting in increased construction costs. We consider that the need for these additional works were out of the control of NGET. This overspend does not constitute a Material Change that requires the approval of the Authority.⁷ Nonetheless, for completeness, we will accordingly amend the Project Direction to reflect this increase in the project budget. In accordance with the NIC Governance Document, NGET are covering the cost of this budget overspend.

Requested change of the Project end date

NGET requested that the Project be extended by 1 year (31 October 2020 to 31 October 2021) to allow the revised innovation trials to be completed within the Project timeframe. We consider that the innovation programme trials that NGET propose to cancel (and replace) due to Project delays could be completed if the Project was to be extended by the

⁷ See paragraph 8.24 of the NIC Governance Document:
https://www.ofgem.gov.uk/system/files/docs/2017/07/electricity_network_innovation_competition_governance_document_version_3.0.pdf

full two years permitted in the NIC Electricity Governance⁸ rather than the one year requested. However, we accept NGET's reasons regarding minimisation of project overspend by running the Project for only one additional year rather than two, and have been assured that the revised innovation programme trials can be completed within this timeframe.

Future use of the facility

One of the requests was on SDRC 1.11 "Approval of model for enduring facility" pertaining to the future business model for the Deeside Centre, required the agreement of the Authority. This deliverable was due in October 2020. NGET submitted to us a Business Case Paper for Deeside Centre for Innovation's operating model, dated October 2019, in September 2020. That document outlined three possible operating model options: 1) The facility remains part of the NGET regulated business under the same governance structure adopted throughout the NIC period, 2) benefit for consumers and the industry is maximised by creating an independent organisation to own and operate the facility, and 3) The facility decommissioned and sold. NGET stated their preference to be option 1, requesting funding for the running costs in RIIO-T2, as well as funding to make further investments to the facility.

Separately to NIC project governance, our RIIO-2 Final Determination⁹ on NGET's RIIO-T2 business plan sets out our decision to reject NGET's consumer value proposition for funding to expand the facility. It also sets out our position to allow £49.3m of your requested £75.6m NIA funding allowance, £30m of which was related to expanding and operating the Deeside facility.

We accept that the Project's delays mean that consumer benefits have not yet been fully demonstrated. We therefore require that NGET resubmit their business plan for the SDRC "Approval of model for enduring facility" , in light of the conclusions reached in RIIO-T2 Final Determinations. We have been in discussions with NGET about this additional requirement, and we require this plan to be submitted to Ofgem by 31 March 2021. We will provide our response within one calendar month of receipt of report.

The report should include:

- Revised estimates of all costs associated with future operation of the facility including additional investments to the facility (including robust justification for the additional investment),

⁸ See paragraph 8.30 of the NIC Governance Document: https://www.ofgem.gov.uk/system/files/docs/2017/07/electricity_network_innovation_competition_governance_document_version_3.0.pdf

⁹ RIIO-2 Final Determinations: <https://www.ofgem.gov.uk/publications-and-updates/riio-2-final-determinations-transmission-and-gas-distribution-network-companies-and-electricity-system-operator>

- Options for future ownership of the facility as it stands at the end of the NIC period (i.e. with no further investments to the facility).
- Options for funding the operation of the facility and its trials.
- Details of how any revenues generated through the facility will be shared with, and returned to, consumers.
- Explanation of how the approach taken will maximise future value to all customers (including those of the other GB transmission licencees).

Conclusion of the Project

Paragraph 8 of the Schedule to the Project Direction requires NGET to maintain the Deeside facility at its own cost until such time as we deem sufficient trials have been conducted to have achieved or exceeded the network customer potential benefits set out in the Project's Full Submission. Paragraph 8 also requires that all trials meet the NIC Evaluation Criteria set out in the Electricity NIC Governance Document. We note that, following on from discussions with us, NGET has provided details of a new programme of trials, set out in Schedule 2, and we consider that completion of the innovation trials proposed in this change request would satisfy the requirements set out in paragraph 8 of the Project Direction.

Decision

We consider that the Project still has the potential to deliver network customer benefits. While the Project is expected to run over budget, NGET have committed to meeting the cost of this overspend.

However, we continue to have concerns regarding the quality of project management and reporting. To mitigate this, we are requiring NGET to report progress of the Project to Ofgem on a monthly basis from 1 April 2021, including detail of emerging issues in advance of their taking effect on SDRC timelines or budget allocations.

Subject to the condition above, we approve the changes where we set it out in this letter, and issue NGET with an amended Project Direction detailed in Schedule 1 to this letter.

This decision does not fetter our discretion with respect to any future decision on the Successful Delivery Reward, should you choose to make a submission after project completion; Ofgem views set out in this letter will be considered in the assessment of any such submission.

In accordance with Section 14 of the revised Project Direction, we hereby amend the Schedule to the Project Direction in the manner set out in the Schedule 1 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 Shilen Shah at Shilen.Shah@ofgem.gov.uk.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Steve McMahon', written in a cursive style.

Steve McMahon

Deputy Director, Electricity Distribution and Cross Sector Policy

For and on behalf of the Authority

Schedule 1 – Project Direction changes

Schedule to Project Direction

1. TITLE

Project Direction ref: NGET / Offgrid Substation Environment for the Acceleration of Innovative Technologies / ~~11 March 2021-6 November 2018~~.

2. PREAMBLE

This Project Direction is issued by the Gas and Electricity Markets Authority (the "Authority") to National Grid Electricity 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") of the Funding Licensee. It sets out the terms to be followed in relation to Offgrid Substation Environment for the Acceleration of Innovative Technologies (the "Project") as a condition of it being funded under the Network Innovation Competition (NIC) and the Funding Return Mechanisms.¹⁰

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. COMPLIANCE

The Funding Licensee must comply with Special Condition 3I of the Licence and with the Electricity 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 in accordance 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 8.66 of the Electricity NIC Governance Document, Disallowed Expenditure includes any funds that must be returned if the Project is halted without Ofgem's 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.

4. APPROVED AMOUNT FOR THE PROJECT

The Approved Amount is £10,863,012.80.

¹⁰ The Funding Return Mechanism is defined in part C of Special Condition 3I.

5. PROJECT BUDGET

The Project Budget is set out in Annex 1 of this Project Direction.

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, in accordance with Chapter 8 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 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.

6. 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 £2,780,233.76;
- (iii) complete the Project on or before the Project completion date of 31 October 2021 ~~2020~~; and
- (iv) disseminate the learning from the Project at least to the level described in Section 5 (Knowledge Dissemination).

7. REPORTING

Ofgem will issue guidance (as amended from time to time) about the structure and content of the reports required by paragraph 8.157 of the Electricity NIC Governance Document. The Funding Licensee must follow this guidance in preparing the reports required by paragraph 8.157 of the Electricity NIC Governance Document.

As required by paragraph 8.212 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.

From 1 April 2021, the Funding Licensee must report to Ofgem on the progress of the Project on a monthly basis. These monthly reports must include details of any emerging issues in advance of their taking effect on SDRC timelines or budget allocations.

8. DELIVERY OF INDIVIDUAL TEST TRIALS

As a result of the 2021 Project Direction amendments, a revised programme of trials has been included as part of the Successful Delivery Reward Criteria table. ~~In Appendix X of the Full Submission the Funding Licensee provides details on the 14 individual trials that it plans to undertake at the facility.~~ The Full Submission explains that the final programme of trials will be subject to the agreement of the governing Technical Advisory Board.¹¹

The Funding Licensee must ensure that these trials are achieved during the Project's timescale or are replaced by trials achieving equivalent benefits to the GB transmission system. Alternative trials will be subject to approval from the Project's Technical Advisory

¹¹ The Technical Advisory Board is defined in Appendix XII of the Full Submission.

Board. Each of the trials must meet the NIC qualifying evaluation criteria set out in for the Electricity NIC governance document (ie are 'Electricity NIC-compliant').

Aligned with the Successful Delivery Reward Criteria described in Table 3, at each innovation programme approval stage, the Funding Licensee must submit, to the Authority, the costs and estimated benefits from the trials that will be undertaken, as well as the cumulative costs and estimated benefits for Electricity NIC-compliant trials undertaken during the Project to that point. It must also present full details of the trials and justify the extent to which they satisfy the Electricity NIC criteria. If, within three months of the final innovation programme approval stage, based on its assessment, the Authority decides that the trials are not Electricity NIC compliant or the cumulative Electricity NIC-compliant trials do not have the potential to achieve an equivalent level of benefit to the trials articulated in its Full Submission, the Funding Licensee must:

- Continue to maintain the facility at its own cost until such time that the Authority deems sufficient Electricity NIC-compliant trials have been conducted that have the potential to achieve an equivalent level of benefit to that in the Full Submission; or
- Return an appropriate proportion of the substation conversion cost to customers. This value will be approved by the Authority based on the proportion of the costs associated with any unapproved trials or otherwise calculated to reflect the reduction in estimated benefits to the GB transmission system.

9. FACILITY USE POST THE NIC PROJECT PERIOD

By no later than 31 ~~March 2021~~ ~~October 2019~~, the Funding Licensee must submit a report to the Authority which outlines the options for how the facility will be managed and paid for beyond the Project's period. This report should also set out the ongoing commercial arrangements and how profits **and benefits** derived from the facility during the RIIO-T2 period will be shared with consumers. The Authority will then approve the Funding Licensee's proposals relating to the future management, funding and commercial arrangements of the facility ~~as part of the Funding Licensee's RIIO-T2 settlement~~.

The report should include:

- Revised estimates of all costs associated with future operation of the facility including additional investments to the facility (including robust justification for the additional investment),
- Options for future ownership of the facility as it stands at the end of the NIC period (i.e. with no further investments to the facility).
- Options for funding the operation of the facility and its trials.
- Details of how any revenues generated through the facility will be shared with, and returned to, consumers.
- Explanation of how the approach taken will maximise future value to all customers (including those of the other GB transmission licences).

10. 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%.¹²

11. 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 for the parts of the Project that have been fully funded by the NIC. Where the trials are fully funded by the NIC, the Funding Licensee must undertake the Project in accordance with the default IPR arrangements. In other circumstances the Funding Licensee must ensure that the IPR arrangements comply with Section 5.3 of its Full Submission.

12. 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 1 below (that comply with paragraphs 8.56– 8.65 of the Electricity NIC Governance Document).¹³

The second set of SDRCs, relating to the delivery of the innovation programme, are currently not compliant with the Governance Document requirements. The Funding Licensee will need to submit revised, compliant, SDRCs to the Authority for approval during the Project, as the innovation programme is finalised. When submitting the trial-specific SDRCs for approval, the Funding Licensee must demonstrate how each trial meets the evaluation criteria of the Electricity NIC Governance document.

Table 1. Successful Delivery Reward Criteria

Successful Delivery Reward criteria	Evidence
1) The design and development of the facility	
1.1 Formal agreement on Terms of Reference with Technical Advisory Board members: In order to achieve the efficiency required to meet the projects objectives it is essential that the other Transmission Licensees fully engage in the Technical Advisory Board. An early indication that this project will succeed will be in this Board agreeing the Terms of Reference.	<ul style="list-style-type: none">Signed Terms of Reference for the Technical Advisory Board in place (31 March 2016).
1.2 Detailed design of the facility completed and approved: The completion of both the infrastructure and technical layout designs are an important milestone on the way to delivery of the overall project as they will determine the level of testing / evaluation that can be carried out and at which stage.	<ul style="list-style-type: none">Detailed designs of the facility for all stages of construction and technical availability signed off by the Technical Advisory Board (31 July 2016).
1.3 Design, develop and publish internet site: One of the fundamental knowledge and dissemination channels for the project is the utilisation of the facility website, which will provide a secure area to share the outputs with the other Transmission Licensees.	<ul style="list-style-type: none">Successful creation and launch of the facility website (July 2016).

¹² This is the amount requested by the Funding Licensee in its Full Submission.

¹³ These are the Successful Delivery Reward Criteria set out in the Funding Licensees Full Submission

Successful Delivery Reward criteria	Evidence
<p>1.4 Scope of work for the phase 1 innovation programme approved: With there being a phased handover of assets it is essential to the project's success that a detailed plan be put in place, based on the assets available and trials proposed during this phase. This plan will include costs of the proposed trial projects, there estimated benefits and justification for how the trials satisfy the Electricity NIC criteria. The plan will also include any Network Innovation Allowance (NIA) projects which are able to be undertaken at this time.</p>	<ul style="list-style-type: none"> • Agreement and approval of the phase 1 innovation programme by the Technical Advisory Board. • Submission to Ofgem on details of trials, including costs, estimated benefits and justification of how the trials meet the Electricity NIC criteria (December 2016).
<p>1.5 Completion of stage 1 construction works: The completion of the construction of the buildings and the transfer of the protection and control panels to the new control room are a key milestone to the effective functioning and monitoring of the facility, as is securing the perimeter of the overhead line enclosure.</p>	<ul style="list-style-type: none"> • Successful approval of stage 1 of the construction works and hand-over by NGET's Construction Team (April 2019).
<p>1.6 Scope of work for the phase 2 innovation programmes approved: The continuation of the phased handover of assets is essential to the project's success and a detailed plan is to be put in place, based on the assets available and trials proposed during this phase. This plan will include costs of the proposed trial projects, there estimated benefits and justification for how the trials satisfy the Electricity NIC criteria. The plan will also include any Network Innovation Allowance (NIA) projects which are able to be undertaken at this time.</p>	<ul style="list-style-type: none"> • Agreement and approval of the phase 2 Innovation Programme by the Technical Advisory Board. • Submission to Ofgem on details of trials, including costs, estimated benefits and justification of how the trials meet the Electricity NIC criteria (March 2018).
<p>1.7 Completion of stage 2 construction works: The completion of the construction of the internal access road is a key milestone to the effective functioning of the facility, as this will enable the necessary vehicles to be able to access all areas of the facility.</p>	<ul style="list-style-type: none"> • Successful approval of the second stage of construction works and hand-over by NGET's Construction Team (January 2021 May 2018).
<p>1.8 Scope of work for the phase 3 innovation programme approved: The continuation of the phased handover of assets is essential to the project's success and that a detailed plan is put in place, based on the assets available and trials proposed during this phase. This plan will include costs of the proposed trial projects, there estimated benefits and justification for how the trials satisfy the Electricity NIC criteria. The plan will also include any Network Innovation Allowance (NIA) projects which are able to be undertaken at this time.</p>	<ul style="list-style-type: none"> • Agreement and approval of the phase 3 innovation programme by the Technical Advisory Board. • Submission to Ofgem on details of trials, including costs, estimated benefits and justification of how the trials meet the Electricity NIC criteria (March 2019).
<p>1.9 Commencement of phase 3 innovation programme: The delivery of the innovation</p>	<ul style="list-style-type: none"> • Appropriate dissemination and reporting on each of the projects

Successful Delivery Reward criteria	Evidence
programme testing / evaluation is a key milestone within the project and the ability to commence operations at the facility is fundamental to the measurement of its success.	uploaded to the facility website and published within the relevant journals / articles (September 2021 April 2019).
<p>1.10 Completion of stage 3 construction works: The completion of the construction of the Substation area is a key milestone to the effective functioning of the facility, as this will enable the delivery of HV equipment testing / evaluation projects.</p> <p>The completion of the construction of the Gas Insulated Switchgear enclosure is a key milestone to the effective functioning of the facility, as this will enable the delivery of GIS and SF6 testing / evaluation projects.</p>	<ul style="list-style-type: none"> • Successful approval of construction stage 3 and hand-over by NGET's Construction team (June 2021 May 2019).
<p>1.11 Approval of model for enduring facility: The Technical Advisory Board will determine, based on the flow of projects, the future of the facility.</p>	<ul style="list-style-type: none"> • All required arrangements put in place for the future of the facility. Dependent on the findings of the Technical Advisory Board and the agreement of the Authority. These arrangements are to be fully documented (to be submitted by the licensee on or before by 31 March 2021 October 2020).
<p>1.12 Project close down: All project learning will be consolidated and disseminated appropriately.</p>	<ul style="list-style-type: none"> • TAB approved close-down workshop and close down report submitted to Ofgem (October 2021 October 2020).
2) Innovation programme	
<p>Projects 1-6:</p> <ul style="list-style-type: none"> • Successful application of new policy: In order to utilise the condition monitoring and degradation curve research, it must be translated into a practically deployable policy which governs asset management decision making. • Successful knowledge dissemination: This will vary depending on the project and will be defined at project approval stage. 	<ul style="list-style-type: none"> • Sample of relevant investments tested to establish whether the replaced asset life had been extended by the policy (October 2020) • Workshops, training courses dissemination material (October 2020).
<p>Trial Project 1: Overhead line condition monitoring</p> <ul style="list-style-type: none"> • Successful application of new policy: In order to utilise the overhead line condition monitoring and degradation curve research, it must be translated into a practically deployable policy which governs asset management decision making. • Successful knowledge dissemination: Report identifying technology challenges and benefits, application guidelines and future implementation roadmap. 	<ul style="list-style-type: none"> • Sample of relevant technology tested to establish whether the asset life can be extended by the policy (September 2021). • Workshops, training courses dissemination material (September 2021).
<p>Trial Project 2: Circuit breaker monitoring</p> <ul style="list-style-type: none"> • Successful application of new policy: In order to utilise the circuit breaker monitoring and degradation curve research, it must be 	<ul style="list-style-type: none"> • Sample of relevant technology tested to establish whether the

Successful Delivery Reward criteria	Evidence
<p>translated into a practically deployable policy which governs asset management decision making.</p> <ul style="list-style-type: none"> • Successful knowledge dissemination: Report identifying technology challenges and benefits, application guidelines and future implementation roadmap. 	<p>asset life can be extended by the policy (September 2021).</p> <ul style="list-style-type: none"> • Workshops, training courses dissemination material (September 2021).
<p>Trial Project 3: Hydrogen fuel cell back-up generator</p> <ul style="list-style-type: none"> • Successful application of new policy: In order to utilise the Hydrogen Fuel Cell standby generator, it must be translated into a practically deployable policy which governs investment and asset management decision making. • Successful knowledge dissemination: Report identifying technology challenges and benefits, application guidelines and future implementation roadmap. 	<ul style="list-style-type: none"> • Sample of relevant technology tested to establish whether the solution can be utilised in future investments (September 2021). • Workshops, training courses dissemination material (September 2021).
<p>Trial Project 4: Disconnecter monitoring / evaluation</p> <ul style="list-style-type: none"> • Successful application of new policy: In order to utilise the disconnecter monitoring and degradation curve research, it must be translated into a practically deployable policy which governs asset management decision making. • Successful knowledge dissemination: Report identifying technology challenges and benefits, application guidelines and future implementation roadmap. 	<ul style="list-style-type: none"> • Sample of relevant technology tested to establish whether the asset life can be extended by the policy (September 2021). • Workshops, training courses dissemination material (September 2021).
<p>Trial Project 5: Transformer heat recovery</p> <ul style="list-style-type: none"> • Successful application of new policy: In order to utilise the transformer heat recovery systems, it must be translated into a practically deployable policy which governs asset management decision making. • Successful knowledge dissemination: Report identifying technology challenges and benefits, application guidelines and future implementation roadmap. 	<ul style="list-style-type: none"> • Sample of relevant technology tested to establish whether the solution can be utilised in future investments (September 2021). • Workshops, training courses dissemination material (September 2021).
<p>Trial Project 6: Insulator monitoring / evaluation</p> <ul style="list-style-type: none"> • Successful application of new policy: In order to utilise the insulator monitoring and degradation curve research, it must be translated into a practically deployable policy which governs asset management decision making. • Successful knowledge dissemination: Report identifying technology challenges and benefits, application guidelines and future implementation roadmap. 	<ul style="list-style-type: none"> • Sample of relevant technology tested to establish whether the asset life can be extended by the policy (September 2021). • Workshops, training courses dissemination material (September 2021).
<p>Trial Project 7: SF6 leak management & repair techniques</p> <ul style="list-style-type: none"> • SF6 Leakage is reduced: The research of better SF6 management should be applied in 	<ul style="list-style-type: none"> • SF6 expenditure reviewed to ensure reduction (after adjusting for asset volume changed).

Successful Delivery Reward criteria	Evidence
<p>the field to reduce maintenance cost and SF6 purchase cost.</p> <ul style="list-style-type: none"> Successful knowledge dissemination: Report identifying technology challenges and benefits, application guidelines and future implementation roadmap. This will vary depending on the project and will be defined at project approval stage. 	<p>Volume of work orders raised for SF6 top up to be checked annually (September 2021 August 2018).</p> <ul style="list-style-type: none"> Workshops, training courses dissemination material (September 2021 August 2018).
<p>Trial Project 8: Asset thermal model for remote operations</p> <ul style="list-style-type: none"> Reduction in false call outs: By better interpreting thermal data, unnecessary call outs will be avoided, reducing cost. Successful knowledge dissemination: This will vary depending on the project and will be defined at project approval stage. 	<ul style="list-style-type: none"> Number of false call outs will be tracked (October 2018). Workshops, training courses dissemination material (October 2018).
<p>Trial Project 9: RFI sensitivity and characterisation</p> <ul style="list-style-type: none"> Avoided increase in false call outs: As RFI surveys get rolled out cost increase would be incurred due to false call outs. By better interpreting RFI data, unnecessary call outs will be avoided, reducing cost increase. Successful knowledge dissemination: This will vary depending on the project and will be defined at project approval stage. 	<ul style="list-style-type: none"> The size and cost of the team carrying out the investigations will be monitored to ensure it does not expand (July 2018). Workshops, training courses dissemination material (July 2018).
<p>Trial Project 10: Digital data and visualisation</p> <ul style="list-style-type: none"> Ability to review asset layout and condition: Better re-use of civil assets and improved construction delivery efficiency. Successful knowledge dissemination: This will vary depending on the project and will be defined at project approval stage. 	<ul style="list-style-type: none"> Project requires further development to establish possible tracking mechanism (July 2018). Workshops, training courses dissemination material (July 2018).
<p>Project 11:</p> <ul style="list-style-type: none"> Successful application of new policy: In order to utilise the degradation curve research, it must be translated into a practically deployable policy which governs asset management decision-making. Successful knowledge dissemination: This will vary depending on the project and will be defined at project approval stage. 	<ul style="list-style-type: none"> Sample of relevant investments tested to establish whether the replaced asset life had been extended by the policy (September 2018). Workshops, training courses dissemination material (September 2018).
<p>Project 12:</p> <ul style="list-style-type: none"> Mitigation methodology rolled out: The understanding of the causes of noise will allow the development and application of noise mitigation technology. 	<ul style="list-style-type: none"> The number of investments replacing recently installed conductors due to noise complaints will be tracked (October 2019).

Successful Delivery Reward criteria	Evidence
<ul style="list-style-type: none"> Successful knowledge dissemination: This will vary depending on the project and will be defined at project approval stage. 	<ul style="list-style-type: none"> Workshops, training courses dissemination material (October 2019).
<p>Trial 11: CemFree trial</p> <ul style="list-style-type: none"> Successful application of new policy: In order to utilise CemFree technology, it must be translated into a practically deployable policy which governs construction decision making. Successful knowledge dissemination: Report identifying technology challenges and benefits, application guidelines and future implementation roadmap. 	<ul style="list-style-type: none"> Several samples of technology applications tested to establish whether the CemFree solution can be utilised in future investments (September 2021). Workshops, training courses dissemination material (September 2021).
<p>Trial Project 132: Architecture for substation secondary systems</p> <ul style="list-style-type: none"> Successful application of new policy: The better design should be translated into a new policy applied to new substation builds and some system refurbishments. Successful knowledge dissemination: Report identifying technology challenges, benefits, application guidelines and future implementation roadmap. This will vary depending on the project and will be defined at project approval stage. 	<ul style="list-style-type: none"> A sample of like for like secondary systems will be reviewed to establish what cost reduction has been achieved (September 2021 October 2020). Workshops, training courses dissemination material (September 2021 October 2020).
<p>Project 14:</p> <ul style="list-style-type: none"> Successful application of new policy and technology: The policy determining the use of gasses should be updated to reflect the new options. Successful knowledge dissemination: This will vary depending on the project and will be defined at project approval stage. 	<ul style="list-style-type: none"> Sample of GIS tested to establish whether new gasses are being used (October 2020). Workshops, training courses dissemination material (October 2020).
<p>Trial 13: Textured insulators technology</p> <ul style="list-style-type: none"> Successful application of new policy: In order to utilise Textured Insulators technology, it must be translated into a practically deployable policy applied to new overhead line builds. Successful knowledge dissemination: Report identifying technology challenges and benefits, application guidelines and future implementation roadmap. 	<ul style="list-style-type: none"> Samples of technology application tested to establish whether the Textured Insulators solution can be utilised in future investments (September 2021). Workshops, training courses dissemination material (September 2021).

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 £2,780,233.76.

13. 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.¹⁴

14. 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 8.55 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 8.55 of the Electricity NIC Governance Document)~~
 - i. in accordance with Chapter 8 of the Electricity NIC Governance Document;
 - ii. to reflect amendments to the Licence; or
 - iii. at such other times as the Authority considers it reasonable.

15. HALTING OF PROJECTS

This Project Direction is subject to the provisions contained in paragraphs 8.43 to 8.47 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 of the Licence.

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 Project 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.

¹⁴ As listed in Box 1.6 in Section 1 of the Full Submission pro-forma.

ANNEX 1: PROJECT BUDGET

Cost Category	Cost (£)
Labour	1,864,382.71 5,697,983.16
Equipment	2,428,836.00 7,126,000.00
Contractors	20,285,498.00 10,269,634.68
IT	0
IPR Costs	0
Travel & Expenses	0
Payments to users	0
Contingency	1,695,680.72
Decommissioning	0
Other	0
Total	26,274,397.43 24,789,298.57

Schedule 2 – Innovation Programme

	Original submission Trial	Replacement Trial	Reason for change	Expected benefits (original submission)	Expected benefits (new)
1	Overhead Line condition monitoring			£ 22,907,660	£ 19,000,000
2	Circuit breaker monitoring			£ 8,963,360	£ 8,963,360
3	Low and medium voltage switchgear panel monitoring	Hydrogen fuel cell back-up generator: Use of hydrogen fuel cells to replace diesel back-up generators	Expected benefits could not be delivered in Project timeline	£ 8,963,360	200t CO ₂ eq/p.a.
4	Insulation defect monitoring in gas insulated switchgear	Disconnect monitoring / evaluation: Use of wireless RF sensors to monitor temperatures of 400kV disconnect switches. Data captured will be used for asset condition visualisation, alarm triggering and logging and learning in order to improve data-led and quantification-led decision-making practices.	Expected benefits could not be delivered in Project timeline	£ 8,963,360	£ 4,260,000

5	HV harmonic impact on transformers	Transformer heat recovery: To develop and demonstrate a system which will recover waste heat from 400kV power transformers, in turn feeding district or communal heating networks, providing the opportunity for long-term heat supply and large-scale deployment across the UK.	Expected benefits could not be delivered in Project timeline	£ 3,754,520	£ 36,000,000
6	Tap changer monitoring	Insulator monitoring / evaluation: Use of wireless RF sensors to monitor leakage currents on insulators at Deeside. Data captured will be used for asset condition visualisation and learning in order to improve data-led and quantification-led decision making practices. The data will also show the correlations between insulator faults and leakage currents.	Expected benefits could not be delivered in Project timeline	£ 674,000	£ 4,320,000
7	SF6 leak management and repair techniques			£ 7,872,000	£ 7,872,000
8	Asset thermal model for remote operations	IP 8 & 9 combined into new project: 132 kV Cable Sealing End Testing		£ 4,092,160	£ 21,533,000
9	RFI sensitivity and characterisation			£ 17,903,200	
10	Digital data and visualisation			£ 19,140,000	£ 2,500,000
11	Degradation curve of a hot joint	Insulator cross-arms trial (rejected due to overlap with Retro Insulated Cross-Arms project¹)	Expected benefits could not be delivered in Project timeline	£ 19,140,000	£ 200,000,000

11	Conductor Audible Noise Evaluation	CemFree trial: Trial the use of Alkali Activated Cementitious Materials concrete, a lower carbon concrete when compared to typical Ordinary Portland Cement, in the construction of the test substation at Deeside without being exposed to the risk of disruption or damage to the electricity transmission system.	Expected benefits could not be delivered in Project timeline ²	-	2000t CO ₂ eq/p.a.
12	Architecture for substation secondary systems			£ 16,000,000	£180,000,000
13	Backfilling of current GIS with alternative gases	Textured insulators technology: Investigate the performance of textured, traditional, and ex-service insulators to provide a direct comparison of the technologies. Insulator failures modes and pre-failure identifiers will be investigated using in circuit and external condition monitoring equipment.	Not ready for trial	-	£ 4,050,000
				<u>£ 138,373,620</u>	<u>£288,498,360</u>

¹ We note that during discussions after the submission of the 2020 change request, NGET agreed to remove Innovation Trial 11: Insulator Cross Arm Trial from the expected benefits of the Project due to concerns of the expected learning overlapping from another NIC project, Retro Insulated Cross-Arms (RICA), a NIC project proposed by NGET in 2020.

² We note that replacement innovation programme trial 11 is focused on civil construction for which the construction of the facility represents an unique opportunity to trial. NGET state that replacement innovation trials were driven by a change in innovation priorities from asset management towards sustainable construction and operation, however we note that the change request stated: "expected benefits could not be delivered in Project timeline," as the reason for replacing the original innovation trial.