

National Grid Electricity Transmission PLC
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Date: 25 September 2023

Dear National Grid Electricity Transmission PLC,

SIF Project Direction ref: NGET/SF6 Whole Life Strategy/SIFIESRR/Rd2 Alpha

National Grid Electricity Transmission PLC submitted SF6 Whole Life Strategy (the Project) to be considered for funding through the Alpha Phase of round 2 of the Strategic Innovation Fund (SIF). As explained in greater detail below, this Project previously received SIF Funding and completed a Discovery Phase for round 2 of the SIF. In our¹ SIF Funding Decision issued on 22 September 2023, we selected the Project² for conditional funding for the round 2 Alpha Phase and as a result we are now issuing this SIF Project Direction to implement that decision.

National Grid Electricity Transmission PLC must comply with the conditions contained in this SIF Project Direction as a condition of the Project receiving funding through the SIF. These conditions can be found in the Schedule to this document.

Progression through SIF Phases

The SIF consists of a multi-phase approach for Projects in order to mitigate the risk associated with innovations. The Discovery Phase focuses on feasibility, the Alpha Phase on experimental development, and the Beta Phase on deployment and demonstration.

The Project previously received SIF Funding for the round 2 Discovery Phase³ and submitted an Application for the Project to be considered for SIF Funding for the round 2

¹ The terms 'we', 'us', 'our' refer to the Gas and Electricity Markets Authority. Ofgem is the office of the Authority.

² Unless otherwise specified, defined terms in this SIF Project Direction have the meaning given to them in Appendix 1 of the SIF Governance Document.

³ The Project Directions for round 2 of the Discovery Phase are available at: <https://www.ofgem.gov.uk/publications/strategic-innovation-fund-round-2-discovery-projects-approved-funding>

Alpha Phase of the SIF. As stated above, the Project has been selected by Ofgem to receive SIF Funding for the Alpha Phase of round 2.

Role of UK Research & Innovation (UKRI)

As per Chapter 1 of the SIF Governance Document⁴ the role of UKRI is to deliver the SIF in line with the SIF Governance Document - administering the funding programme, monitoring the delivery of Projects, collating data from Projects on benefits, making recommendations to Ofgem on operational matters, supporting third-party innovators and, where possible, successful Projects to become 'business as usual' activities. To support the success of the Projects and the SIF programme, we expect that the Funding Party and Project Partners collaborate with Ofgem and UKRI.

SIF Project Direction

Paragraph 5.14 of the SIF Governance Document states that a SIF Project Direction will:

- Set out the Project-specific conditions, to which the Funding Party is committing in accepting SIF Funding.⁵
- Require the Funding Party to undertake the Project in accordance with the commitments made in the Application. Where appropriate, the SIF Project Direction may therefore include extracts from the Application or refer to specific sections of the SIF Application.⁶
- Where applicable, set out conditions (such as Project stage gates) linked to milestones and deliverables, which Projects must meet.⁷
- Set out the SIF Approved Amount for the Project, that will form part of the calculation contained in the SIF Funding Direction issued by the Authority under chapter 7 of the SIF Governance Document.⁸
- Set out the Project budget that the Funding Party must report against and how variations in the Project budget will be reported.⁹
- Where applicable, set out special information sharing requirements applicable to the Project.¹⁰
- Set out the mechanism for the Funding Party receiving the SIF Approved Amount as set out in the SIF Funding Direction.¹¹

⁴ <https://www.ofgem.gov.uk/publications/sif-governance-document>

⁵ 'Project specific conditions' detailed under Point 3 – 'Condition President' of this SIF Project Direction.

⁶ 'Project specific conditions' detailed under Point 3 – 'Condition President' of this SIF Project Direction.

⁷ 'Project specific conditions' detailed under Point 3 – 'Condition President' of this SIF Project Direction.

⁸ 'SIF Funding Amount' detailed under Point 5 – 'Condition President' of this SIF Project Direction.

⁹ Annex 1 – Project Budget.

¹⁰ 'Project specific conditions' detailed under Point 3 – 'Condition President' of this SIF Project Direction.

¹¹ 'SIF Funding Amount' detailed under Point 5 – 'Condition President' of this SIF Project Direction.

All SIF Project Direction requirements are detailed in the Schedule to this SIF Project Direction.

Decision

Provided the Funding Party complies with the SIF Governance Document and with the Schedule to this SIF Project Direction, the Project is deemed to be an Eligible SIF Project¹².

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

Marzia Zafar

Deputy Director, Decentralisation & Digitalisation

For and on behalf of the Authority

¹² The meaning 'Eligible SIF Project' is described in Chapter 2 of the SIF Governance Document.

Schedule to SIF Project Direction

1. PROJECT DETAILS

SIF Project Direction reference: NGET/SF6 Whole Life Strategy/SIFIESRR/Rd2_Alpha

Application number: 10084569

Project title: SF6 Whole Life Strategy

Innovation Challenge/Project Phase: Improving energy system resilience and robustness
/ Alpha Phase round 2

Project start date: 01 October 2023

Project end date: 31 March 2024

SIF Approved Amount for SIF Funding: £403,311.00

2. PREAMBLE

This SIF Project Direction is issued by the Gas and Electricity Markets Authority (the "Authority") to National Grid Electricity Transmission PLC (the "Funding Party") pursuant to the SIF Governance Document issued pursuant to Special Condition 9.19 of the Electricity Transmission Licence (the "Licence"). It sets out the conditions to be complied with in relation to SF6 Whole Life Strategy (the "Project") as a condition of it being funded under the SIF Funding Mechanism.¹³

Unless otherwise specified, defined terms in this SIF Project Direction have the meaning given to them in the Licence or Appendix 1 of the SIF Governance Document.

References to specific sections of the Funding Party's Application in this SIF Project Direction are, for ease of reference, made by referring to the section number in the Funding Party's Application.

3. PROJECT SPECIFIC CONDITIONS

In accepting funding for the Project, the Funding Party is subject to the following Project-specific condition(s):

Condition 1

The Funding Party must not spend any SIF Funding until contracts are signed with the Project Partners named in Table 1 for the purpose of completing the Project.

¹³ The SIF Funding Return Mechanism is defined in the SIF Governance Document.

Table 1. Project Partners

THE UNIVERSITY OF MANCHESTER
DNV SERVICES UK LIMITED
DILO ARMATUREN UND ANLAGEN GMBH
SCOTTISH HYDRO ELECTRIC TRANSMISSION PLC

Condition 2

The Funding Party must report on the financial contributions made to the Project as set out in its Application. Any financial contributions made over and above that stated in its Application should also be reported and included within the Project costs template.

Condition 3

The Funding Party must make reasonable endeavours to participate in all meetings related to the Project that they are invited to by Ofgem, UKRI and DESNZ during the Alpha Phase.

4. COMPLIANCE

The Funding Party must comply with Special Condition 9.19 of the Electricity Transmission Licence (the "Licence"), the SIF Governance Document and with this SIF Project Direction.

5. SIF APPROVED AMOUNT

The SIF Approved amount of £403,311.00 (as detailed under Section 1: Project details of this Project Direction) will be recovered by National Grid Electricity System Operator from GB customers and transferred to the Funding Party. The Funding Party is responsible for notifying National Grid Electricity System Operator of the bank account details to which transfers must be made, in addition to completing Annex 2 of this SIF Project Direction. If a Funding Party is required to return funding to National Grid Electricity System Operator, the reverse applies. The Funding Party must provide bank account details to National Grid Electricity System Operator within two weeks of accepting this SIF Project Direction.

6. PROJECT BUDGET

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

The Funding Party must report on expenditure against each line under the category total in the Project Budget and explain any projected variance against each line as part of its

detailed report which will be provided, in accordance with Chapter 7 of the SIF Governance Document. The Funding Party must report variations in the Project budget as outlined in Chapter 6 of the SIF Governance Document.

7. PROJECT IMPLEMENTATION

The Funding Party must undertake the Project in accordance with the commitments it has made in the Application and with the conditions of this SIF Project Direction. These include (but are not limited to) the following:

- (i) undertake the Project in accordance with its Application,
- (ii) complete the Project on or before the Project completion date as detailed under section 1 of the schedule of this SIF Project Direction, and
- (iii) disseminate the learning from the Project at least to the level described in chapter 3 of the SIF Governance Document. Dissemination of learning must be carried out whether the Project was concluded successfully or otherwise.

8. REPORTING

Ofgem and UKRI may issue guidance (and amend it from time to time) about the structure and content of the Project reporting required by Chapter 6 of the SIF Governance Document. The Funding Party must follow this guidance in preparing the reports.

As set out in chapter 6 of the SIF Governance Document, the Funding Party may be required to submit an end of Phase report to the UKRI monitoring officer for the round 2 Alpha Phase. An end of Phase report is required for the round 2 Alpha Phase if the Project is not planning on submitting an Application to the round 2 Beta Phase and, if the Funding Party submits an Application for the Project for the round 2 Beta Phase but is not successful. Within this report, the Funding Party must submit information related to questions on Project delivery as detailed in chapter 6, table 6 of the SIF Governance Document.

9. MONITORING

The Funding Party must comply with any reasonable request for information by its monitoring officer at UKRI and related deadlines. Ofgem, with the support of UKRI, will together monitor Project delivery, impacts and benefits. Throughout the term of the Project, progress is monitored by UKRI through a monitoring officer. The monitoring

officer is the first point of contact for official notifications, queries and correspondence with UKRI and the Authority, unless otherwise required by this SIF Project Direction.

As detailed in Chapter 6 of the SIF Governance Document, meetings with the monitoring officer will take place at regular intervals, as advised by Ofgem or the monitoring officer during the delivery of the Project, and at the end of each Project Phase.

10. EVALUATION

The Funding Party has acknowledged when it submitted its Application for this Project, that reporting information and data gathered during the Project's timescales (as detailed in Section 1 of this SIF Project Direction) will be used to evaluate Project performance. In addition, the Funding Party may be required to provide requested information outside of the Project timescales and, in particular, for the period from the Project end date to the end of the SIF Programme. Further data and reporting information may be requested (frequency and method based on requirement) outside of standard monitoring and reporting requirements as deemed necessary. Further data and information requirements must be complied with by the Funding Party and Project Partners.

11. DATA SHARING

As set out in Chapter 3 of the SIF Governance Document, the Funding Party must follow Data Best Practice Guidance with regards to all data gathered or created in the course of a Project. We expect the Funding Party to document any reasons, such as commercial sensitivities, for desensitising data. As defined by, and in accordance with, Data Best Practice Guidance, Funding Parties must have a data triage process. Where multiple Project Partners are collaborating on a Project, the consortium must adopt a consistent Open Triage Process for the data related to the Project. Ofgem may require that Project information and data is also shared with other specified parties, such as parties working on complementary innovation funding programmes (subject to redaction of sensitive data).

12. CYBER SECURITY

It is the responsibility of the Funding Party and all Project Partners to implement and maintain appropriate security measures to protect personal data in accordance with The GDPR (General Data Protection Regulation)¹⁴ and DPA (Data Protection Act) 2018¹⁵.

¹⁴ https://ec.europa.eu/info/law/law-topic/data-protection/data-protection-eu_en

¹⁵ <https://www.legislation.gov.uk/ukpga/2018/12/contents/enacted>

Protection of computer systems from unauthorised access or being otherwise damaged or made inaccessible must be in place alongside effective working practices. These must be maintained in line with the Funding Party's IT Management Strategies and policies.

13. PROJECT MILESTONES

The Funding Party must provide an outline in its end of Project Phase meeting with its UKRI monitoring officer that verifies the Project milestones have been achieved or explains why they have not.

Project milestones are outlined below in Table 3, based upon details contained within Question 7 and Appendix Question 9 in the Funding Party's.

Table 3. Project milestone¹⁶

Reference	Project milestone	Deadline	Overall objectives and key tasks	Summary of milestones	SIF Funding Request
Milestone 1	SF6 Intervention FEED	31 March 2024	<p>Overall Work Package Objectives: Front end engineering design (FEED) of 2-3 case studies with different intervention approaches to better understand the practical challenges and inform the implementation plan required for the Beta phase.</p> <p>Key Tasks:</p> <ol style="list-style-type: none"> 1. Define the key assessment parameters and selection methodologies for the case studies 2. Select 2-3 suitable case studies for FEED analysis 3. Review NGET internal policy documents to support the FEED analysis 4. Conduct the FEED analysis 	<p>M1: Kick-off Meeting (£15,000.00).</p> <p>M2: Midpoint Review Meeting (£15,000.00).</p> <p>M3: Submission of Final Report (£40,500.00).</p>	£70,500.00

¹⁶ As outlined in in the Application or Project Plan appendix.

			5. Final report writing and submission		
Milestone 2	Site Handling of non-SF6 Gas Mixtures	31 March 2024	<p>Overall Work Package Objectives: Establishing mixture ratio tolerance and guidelines for reuse and refill of SF6 alternative mixtures. This will require gas assessment on site using commercial gas analysers from DILO/WIKA in Deeside (via outdoor environment) and further verification analysis in the laboratory using gas chromatography–mass spectrometry (GC-MS).</p> <p>Key Tasks:</p> <ol style="list-style-type: none"> 1. Selection of suitable workshop sites after the kick-off meeting. 2. Sample collections of different gas blends 3. Analysis of gas samples with commercially available measurement equipment 4. Analysis of gas samples using GC-MS to determine exact gas ratio 	<p>M1: Kick-off Meeting (£0.00).</p> <p>M2: Sample collection (£0.00).</p> <p>M3: Submission of Final Report (£112,000.00).</p>	£112,000.00

			5. Formulate a guideline for gas handling of gas blends		
Milestone 3	Novel SF6 Disposal Testing	31 March 2024	<p>Overall Work Package Objectives: Trial of different techniques to destroy SF6 with minimal energy input and develop a low carbon disposal approach. Laboratory scale experiments will be performed in Manchester.</p> <p>Key Tasks:</p> <ol style="list-style-type: none"> 1. Review relevant literatures 2. Design, develop a suitable plasma reactor that can handle SF6 and its by-products 3. Implement a modified test reactor for demonstration 4. Perform experimental investigations and result analysis 5. Perform Aspen+ modelling of the incineration process 6. Final report writing and submission 	<p>M1: Kick-off Meeting (£15,000.00).</p> <p>M2: Midpoint Review Meeting (£15,000.00).</p> <p>M3: Implementation of a modified reactor for handling SF6 (£35,000.00).</p> <p>M4: Submission of Final Report (£0.00).</p>	£65,000.00

Milestone 4	Data Analytical Approach of Leakage Rates	31 March 2024	<p>Overall Work Package Objectives:</p> <p>Developing a data analytical approach for SF6 leakage assessment and forecast.</p> <p>This is to improve the quality of data that is used and improve the reliability of the assessment that prioritises asset replacement and identifies the most suitable interventions. The objective is to develop an approach that would explore the concept of excess SF6 leakage, enable easier sharing of data across network and to more easily identify problem types, families and manufacturers of plant, and any correlation to the location of assets.</p> <p>Key Tasks:</p> <ol style="list-style-type: none"> 1. Collate the top-up and leakage data from different partners 2. Develop models for assessing the data 3. Develop a methodology for long-term data capture, storage and forecast 	<p>M1: Kick-off Meeting (£15,000.00).</p> <p>M2: Midpoint Review Meeting (£15,000.00).</p> <p>M3: Submission of Final Report (£40,500.00).</p>	£70,500.00
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			4. Verify the model using continuous monitoring data from live substation 5. Final report writing and submission		
Milestone 5	Roadmap for Implementation of Interventions	31 March 2024	<p>Overall Work Package Objectives: Develop a strategic roadmap to inform the intervention options leading to an SF6-free network across the GB that outlines most economically effective route to remove SF6 from the network during the most optimal time period i.e. the time period when costs are minimised and emissions reduced is maximised.</p> <p>Key Tasks:</p> <ol style="list-style-type: none"> 1. Review of updates to regulations and regulatory environment for the removal of SF6 including regulatory penalties and the concept of "excess SF6 leakage" in the regulatory settlement process 2. Review of supply chain considerations and how these impact the roadmap 	<p>M1: Kick-off Meeting (£17,500.00).</p> <p>M2: Midpoint Review Meeting (£17,500.00).</p> <p>M3: Submission of Final Report (£30,000.00).</p>	£65,000.00

			<p>3. Review of outage requirements for each interventions and developing a principles-based approach to minimising their impact on the network</p> <p>4. Use of the techno-economic model to explore the targets set for removing SF6 to inform the most economically effective route to remove SF6 from the network during the most optimal time period</p> <p>5. Develop and submit final report</p>		
Milestone 6	Techno-economic Analysis	31 March 2024	<p>Overall Work Package Objectives: Provide a Cost-benefit analysis of various SF6 interventions based on a greater understanding following other work packages. In the discovery phase, substation analysis was confined to 400 kV GIS but in the alpha phase we will consider including AIS Circuit Breakers and GIS at different voltage levels (e.g. 132, 275 and 400 kV).</p> <p>Key Tasks:</p>	<p>M1: Kick-off Meeting (£17,500.00).</p> <p>M2: Freezer model and assumptions to enable analysis (£17,500.00).</p> <p>M3: Submission of final report (£30,000.00).</p>	£65,000.00

		<ol style="list-style-type: none">1. Refinement of future scenarios against which different SF6 replacement strategies will be measured2. Refinement of estimate of costs and benefits of different strategies based on further work on WP1, WP2, WP3 and WP43. Testing of sensitivities of model of certain conditions including date of intervention to inform optimal pathway4. Freeze model to allow time for analysis and report writing5. Carry out analysis of model results and submit summary report		
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14. USE OF LOGO

The Funding Party and the Project Partners, External Funders and Project Supporters or subcontractors¹⁷ must not use the Innovate UK/UKRI and/or Ofgem logo for purposes associated with the Project in any circumstances.

As an alternative for use of both Ofgem and UKRI logos, all external Project communications must include the following standard form of wording:

- (i) "this project is funded by network users and consumers under the Strategic Innovation Fund, an Ofgem programme managed in partnership with UKRI."

For additional guidance, refer to the communications and media guidelines for competition winners, detailed as part of your delivery pack. These guidelines are designed to help with some suggestions and encourage you to take a proactive approach to communicating about your Project.

15. SHARING OF LESSONS LEARNED

The Funding Party is required to ensure that the sharing of lessons learned and the facilitation of knowledge transfer is conducted as effectively as possible, to ensure that all parties, and therefore all consumers including future consumers, can benefit from Projects.

As contained within Chapter 3 of the SIF Governance Document, we require the Funding Party to work collaboratively to maintain the ENA Smarter Networks Portal so that all reporting and dissemination of learnings on Projects (as required by chapter 6 of the SIF Governance Document) is available via the ENA Smarter Networks Portal.

16. COLLABORATION

The Funding Party must collaborate with third-party innovators as Project Partners, as well as work closely with other parties in the energy supply chain, as set out in Chapter 3 of the SIF Governance Document.

The Funding Party must collaborate with other parties and with UKRI to organise an annual conference in a format appropriate to enabling the building of consortiums and disseminating learning widely. The conference may be a single event for gas and electricity, or more than one event, as appropriate.

¹⁷ As detailed in the Application.

17. AMENDMENT OR REVOCATION

As set out in Chapter 7 of the SIF Governance Document, this SIF Project Direction may be amended or revoked under the following circumstances:

- (i) if the Funding Party considers that there has been a material change in circumstance that requires a change to the SIF Project Direction, and the Authority agrees; or
- (ii) to reflect amendments made to the Licence.

18. HALTING OF PROJECTS

This SIF Project Direction is subject to the provisions contained in Chapter 7 of the SIF Governance Document relating to the halting of Projects. By extension, this SIF Project Direction is subject to any decision by the Authority to halt the Project to which this SIF Project Direction relates and to any subsequent relevant SIF Funding Direction issued by the Authority pursuant to Special Condition 9.19 of the Electricity Transmission Licence (the "Licence").

Further to the requirements in Chapter 7 of the SIF Governance Document, in the event the Authority decides to halt the Project, to which this SIF Project Direction relates, the Authority may issue a statement to the Funding Party clarifying the effect of that halting decision as regards to the status and legal force of the conditions contained in this SIF Project Direction.

NOW THEREFORE:

In accordance with the SIF Governance Document issued pursuant to Special Condition 9.19 of the Electricity Transmission Licence (the "Licence") of the Licence the Authority hereby issues this SIF Project Direction to the Funding Party 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.

Failure to comply with the conditions of this SIF Project Direction means that Ofgem may treat all or part of the SIF Approved Amount received by the Funding Party as SIF Disallowed Expenditure.

ANNEX 1: PROJECT BUDGET

SIF Project Direction costs	
Cost Category	Total Project costs (£)
Labour	338,553
Materials	31,000
Subcontracting	31,000
Travel and subsistence	6,450
Other costs	2,121
Total	£448,124

Project Partner	Total project costs (£)	Project contribution (£)	Total SIF Funding requested (£)	Project contribution (%)
National Grid Electricity Transmission PLC	£136,888.00	£44,813.00	£92,075.00	
The University of Manchester	£170,280.00	£-	£170,280.00	
DNV SERVICES UK LIMITED	£104,780.00	£-	£104,780.00	
DILO Armaturen und Anlagen GmbH	£18,200.00	£-	£18,200.00	
SCOTTISH HYDRO ELECTRIC TRANSMISSION PLC	£17,976.00	£-	£17,976.00	
Total	£448,124.00	£44,813.00	£403,311.00	11%

ANNEX 2 TO SCHEDULE: TEMPLATE OF BANK ACCOUNT DETAILS TO BE PROVIDED TO EITHER NGT (BOX.GSOSETTLEMENTS@NATIONALGRID.COM) OR NG ESO (revenue.invoice@nationalgrideso.com)

Company name:

Primary Contact Details (only one contact permitted)

First Name:

Last Name:

Email address:

Mobile phone number:

Work phone number:

Address details

Address name:

Street address:

City:

State / region:

Post code:

PO box: (if applicable)

PO box post code: (if applicable)

Banking details

These should be evidenced in non-editable format. The evidence provided must show company name and bank details and it should be dated within the last 6 months.

Any of the below documents will suffice:

- Bank statement (scanned document)
- Void cheque
- Paying in slip
- Screenshot of online banking (showing a logged in account with bank account and sort code, with browser visible)