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Date: 25 September 2023

Dear Wales & West Utilities Limited,

SIF Project Direction ref: WWU/NextGen Electrolysis/SIFIESRR/Rd2 Alpha

Wales & West Utilities Limited submitted NextGen Electrolysis – Wastewater to Green Hydrogen (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.

Wales & West Utilities Limited 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 38A (Reasons for decisions) of the Gas Act 1986.

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: WWU/NextGen Electrolysis/SIFIESRR/Rd2_Alpha

Application number: 10080646

Project title: NextGen Electrolysis – Wastewater to Green Hydrogen

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: £295,824.00

2. PREAMBLE

This SIF Project Direction is issued by the Gas and Electricity Markets Authority (the “Authority”) to Wales & West Utilities Limited (the “Funding Party”) pursuant to the SIF Governance Document issued pursuant to Special Condition 9.13 of the Gas Transporter Licence (the “Licence”). It sets out the conditions to be complied with in relation to NextGen Electrolysis – Wastewater to Green Hydrogen (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

HYDROSTAR EUROPE LTD
NATIONAL GRID ELECTRICITY DISTRIBUTION 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.

Condition 4

The Funding Party must provide to the monitoring officer by the end of the Alpha Phase a short brief outlining how the Project has considered suitable technical and process designs to manage any dangerous and explosive substances in the wastewater feed including hydrocarbons and how it is ensuring the Project is in line with any relevant directives, standards and regulations.

4. COMPLIANCE

The Funding Party must comply with Special Condition 9.13 of the Gas Transporter Licence (the "Licence"), the SIF Governance Document and with this SIF Project Direction.

5. SIF APPROVED AMOUNT

The SIF Approved amount of £295,824.00 (as detailed under Section 1: Project details of this Project Direction) will be recovered by National Gas Transmission from GB customers and transferred to the Funding Party. The Funding Party is responsible for notifying National Gas Transmission 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 Gas Transmission, the reverse applies. The Funding Party must provide bank account details to National Gas Transmission 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. 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.

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>

Table 3. Project milestone¹⁶

Reference	Project milestone	Deadline	Overall objectives and key tasks	Summary of milestones	SIF Funding Request
Milestone 1	Work package 1: Project Management and Reporting	31 March 2024	<p>Overall Work Package Objectives: Project management activities to ensure that the project is running on schedule and to budget, whilst managing known risks and any which are found within the project activities</p> <p>Key Tasks: 1. Establish baseline Project Management Plan (PMP) 2. Risk Management 3. Reporting and Documentation</p>	MS1: End of project report reviewed: All parties involved have reviewed the report, left comments and made respective changes for the report to be signed off. (£29,837.00).	£29,837.00
Milestone 2	Work package 2: Exploitation and Dissemination	31 March 2024	Overall Work Package Objectives: Management of the exploitation and dissemination of the project output technologies. This work package will focus on approaching and building	MS2: Exploitation and Dissemination activities completed: Successful relationships built with additional stakeholders, be	£22,627.00

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

			relationships with potential end users in key locations, along with an economic assessment to be used in discussions and for business planning Key Tasks: 1. Exploitation Management incl. IP management 2. Dissemination activities 3. Recyclability and end of life study 4. Economic Assessment	that potential users of hydrogen or companies with wastewater potential feedstock. (£22,627.00).	
Milestone 3	Work package 3: Electrolyser system development	31 March 2024	Overall Work Package Objectives: Development of a micro testing unit which can be used to trial the use of wastewater to generate Green Hydrogen. This work package will focus initially on the calculations and finalisation of designs for the unit, then the assembly and testing of multiple units simultaneously to assess the success of using different wastewater sources. The production of hydrogen will also be used in conjunction with an analysis of	MS3: Micro testing rigs assembled: The multiple micro testing rigs having been assembled and passed the safety checks required before use. (£83,942.00). MS4: Testing complete and report compiled: The testing procedures having been conducted safely and results gained, then recorded into a	£115,307.00

		<p>potential sites which could have collocated wastewater and hydrogen usage, along with potentially using the waste oxygen and heat if applicable</p> <p>Key Tasks:</p> <ol style="list-style-type: none"> 1. Calculations of the effects of power levels on chemical reactions seen in the electrolyser 2. Membrane less designs to ensure consistent flow and separation of hydrogen from output gases 3. Order hardware for micro testing unit (2kW) 4. AI control system development for matching to fluctuating renewables 5. Assemble micro testing unit 6. Operational tests with different water sources on micro unit 7. Operational power modulation tests on micro unit 	<p>technical report. (£31,365.00).</p>	
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			8. Colocation designs for sites (process wastewater use, oxygen consumption, waste heat recirculation) 9. Report and evaluate		
Milestone 4	Work package 4: Electrolyte development	31 March 2024	<p>Overall Work Package Objectives: Development and simulation of the electrolyte component of using wastewater for electrolysis. This work package will first define the general composition of the electrolyte which is needed to facilitate electrolysis, then simulate the changes to concentrations of the constituent substances as the wastewater feedstock changes. This will lead to a physical preparation of electrolyte to be used within the electrolyser testing</p> <p>Key Tasks: 1. Development of electrolyte composition under static conditions for different wastewater types</p>	<p>MS5: Simulation model completed: A functioning simulation model which updates the composition of electrolyte required based on the wastewater input. (£40,170.00).</p> <p>MS6: Electrolyte testing complete and report compiled: The testing procedures having been conducted safely and results gained, then recorded into a technical report. (£20,370.00).</p>	£60,540.00

			<p>2. Identification of electrolyte components which must change under differing wastewater ion concentrations</p> <p>3. Modelling and simulation of electrolyte changes in response to differing wastewater ion concentrations</p> <p>4. Sample collection of rainwater and river overflow water</p> <p>5. Analysis of water compositions for each sample</p> <p>6. Electrolyte solution made to enable electrolysis of the collected samples</p> <p>7. Testing of electrolyte effectiveness on micro electrolyser unit</p> <p>8. Report and evaluate</p>		
Milestone 5	Work package 5: Gas network technical analyses	31 March 2024	<p>Overall Work Package Objectives:</p> <p>An analysis of the wider network operations and the locations at which the wastewater electrolysis system could be implemented. This is to achieve the strategic goals of the network operator whilst simultaneously facilitating the</p>	<p>MS7: Strategically beneficial locations identified: A map showing multiple locations across the network in which injection hydrogen would be beneficial for network operators goals. (£17,003.00).</p>	£33,104.00

			<p>widescale investment in Green Hydrogen generation at low cost</p> <p>Key Tasks:</p> <ol style="list-style-type: none"> 1. Identification of high natural gas demand single customers on the network 2. Identification of strategically beneficial locations for hydrogen injection 3. Design of setups to feed high natural gas users with hydrogen (whilst considering sensitive users) 4. Nodal injection analysis of flow directions and effects on hydrogen concentrations in the network 5. Economic analyses of potential grid injection solutions 	<p>MS8: Economic and simulation analyses complete: A cash flow model which predicts the returns and different costs over the lifetime of a system, to help producers know whether the site is worth investing in. (£16,101.00).</p>	
Milestone 6	Work package 6: IP and Patenting	31 March 2024	<p>Overall Work Package Objectives:</p> <p>Core research then preparation and drafting of all patent filings for exploitation and protection of project innovations</p> <p>Key Tasks:</p>	<p>MS9: Core patent submitted: The core patent having been filed following successful research, claim drafting and legal reviews. (£11,331.00).</p>	£11,331.00

			<ol style="list-style-type: none"> 1. Basic core patent research 2. Draft patent with all relevant or required claims 3. Final patent reviews for submission 		
Milestone 7	Work package 7: Project Analysis and next steps	31 March 2024	<p>Overall Work Package Objectives: A summarisation and compilation of the results from the project, both quantitative and qualitative, along with a plan for the work packages which would form a successful Beta phase</p> <p>Key Tasks:</p> <ol style="list-style-type: none"> 1. Summarisation of all experimental studies into a report 2. Analysis of results to inform key work packages for Beta 3. Beta phase planning and preparation of proposed development locations 	MS10: Alpha report with next steps for Beta complete: Full report which details the findings from Alpha phase, which are then used to guide the choices made within the Beta phase. (£23,078.00).	£23,078.00

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 9.13 of the Gas Transporter 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 9.13 of the Gas Transporter 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 38A (Reasons for decisions) of the Gas Act 1986.

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	£187,961
Materials	£88,600
Subcontracting	£45,720
Travel and subsistence	£6,480
Other costs	£0
Total	£328,761.00

Project Partner	Total project costs (£)	Project contribution (£)	Total SIF Funding requested (£)	Project contribution (%)
NATIONAL GRID ELECTRICITY DISTRIBUTION PLC	£9,348.00	£936.00	£8,412.00	
HYDROSTAR EUROPE LTD	£299,016.00	£29,952.00	£269,064.00	
WALES & WEST UTILITIES LIMITED	£20,397.00	£2,049.00	£18,348.00	
Total	£328,761.00	£32,937.00	£295,824.00	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)