



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

TERMS OF REFERENCE (ToR)

FOR THE PROVISION OF SERVICES RELATED TO CLEAN HYDROGEN MARKET ASSESSMENT under the programme "Accelerate-to-Demonstrate (A2D) Facility" (SAP ID: 220201)

Date: 8 November 2023

1. GENERAL BACKGROUND INFORMATION

The United Nations Industrial Development Organization (UNIDO) is the specialized agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalization, and environmental sustainability. The mission of UNIDO, as described in the [Lima Declaration](#) adopted at the fifteenth session of the UNIDO General Conference in 2013, is to promote and accelerate [inclusive and sustainable industrial development](#) (ISID) in Member States. The relevance of ISID as an integrated approach to all three pillars of sustainable development is recognized by the 2030 Agenda for Sustainable Development and the related Sustainable Development Goals (SDGs), which will frame United Nations and country efforts towards sustainable development in the next fifteen years. [UNIDO's mandate is fully recognized in SDG-9](#), which calls to "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation". The relevance of ISID, however, applies in a greater or lesser extent to all SDGs. Accordingly, the Organization's programmatic focus is structured in four strategic priorities: [Creating shared prosperity](#); [Advancing economic competitiveness](#); [Safeguarding the environment](#); and [Strengthening knowledge and institutions](#).

Each of these programmatic fields of activity contains a number of individual programmes, which are implemented in a holistic manner to achieve effective outcomes and impacts through UNIDO's four enabling functions: (i) technical cooperation; (ii) analytical and research functions and policy advisory services; (iii) normative functions and standards and quality-related activities; and (iv) convening and partnerships for knowledge transfer, networking, and industrial cooperation. Such core functions are carried out in Departments/Offices in its Headquarters, Regional Offices, and Hubs and Country Offices.

The **Directorate of Technical Cooperation and Sustainable Industrial Development (TCS)**, headed by a Managing Director, oversees the Organization's development of capacities for industrial development as well as industrial policy advice, statistics and research activities and the Organization's normative contribution to Member States and global development community in achieving the SDGs. The Directorate also ensures the application of strategies and interventions for sustainable industrial development related to Environment, Energy, SMEs, Competitiveness and Job creation, as well as Digitalization and Artificial Intelligence. Through coordination in-house and with Member States and industry stakeholders, it ensures that the services provided in these areas contribute toward effective and appropriate technical, business and policy solutions and are focused on results and on realizing any

potential for scaling up and positioning UNIDO as a leading platform for industrial development in developing countries and global fora.

The responsibility of the **Division of Decarbonisation and Sustainable Energy (TCS/DSE)** is to assist Member States in the transition to a sustainable energy future through the application of renewable energy solutions for productive uses, adoption of the efficient concepts of energy use by industry and the introduction of low-carbon technologies and processes. In transitioning to a sustainable energy future, the challenges of addressing energy poverty and climate change are an integral part of the Division's activities, as is the dissemination of relevant knowledge and technologies and paths to plan, manage and finance the energy transition.

2. PROGRAMME CONTEXT

Accelerating the clean energy transition is crucial for mitigating the most severe impacts of climate change and to meet the Sustainable Development Goals (SDGs), particularly in developing countries¹. Almost half of the emissions reductions needed to meet global net zero emissions climate targets by 2050 will come from technologies that are not yet commercial (i.e. they are currently at the demonstration or prototype phase) (IEA 2021). Delivering the scale and pace the transition needs therefore requires accelerated technology innovation in clean energy across multiple sectors.

The [Accelerate-to-Demonstrate](#) (A2D) Facility was launched by UNIDO in May 2023 with an initial GBP 65 million funding from the UK Government (the Department for Energy Security & Net Zero) to accelerate the commercialization of innovative clean energy technologies in developing countries. The Facility focuses on key thematic areas that are off-track for meeting net zero climate targets by 2050: critical minerals, clean hydrogen and cross-cutting areas (particularly industrial decarbonisation and smart energy). The funding is international climate finance-badged Official Development Assistance (ODA) and contributes to the UK Government's GBP 1bn [Ayrton Fund](#) commitment

The A2D Facility can support the following types of activities:

- ❖ **Pilot projects (primary focus):** supporting the development, implementation and operation of pilot projects on-the-ground, particularly those with catalytic lighthouse effects.
- ❖ **Capacity building:** supporting in-country or virtual workshops with innovators, adopters, local industry representatives, government policy makers, financing institutions, experts or equivalent, which aim to directly support the process to accelerate the commercialization of innovative clean energy technologies in-country, particularly through projects with catalytic lighthouse effects.
- ❖ **Data collection:** supporting the collation and dissemination of performance data or survey data on piloted innovative clean energy technologies, where the underlying data infrastructure in the developing country-of-focus needs to first be strengthened before an innovative clean energy technology can be pilot-tested.
- ❖ **Knowledge production:** supporting applied research, analysis, reports, market assessments, studies and in-country dissemination activities, which directly support the process to accelerate the commercialization of innovative clean energy technologies in developing countries.

¹ Countries eligible to receive aid (Official Development Assistance (ODA)) as defined by the OECD's Development Assistance Committee (DAC) List.

The Facility cannot support the following types of activities:

- ❖ **Policy, regulatory and legislative support that is not directly linked to the creation of demonstration projects:** supporting the design and implementation of policy roadmaps, standards for technologies or processes, regulations and laws, and capacity building activities for policy-makers, government officials or equivalent.
- ❖ **Knowledge production and data collection:** research, analysis and data collection activities that are not directly linked to accelerating the commercialization of innovative clean energy technologies in developing countries.
- ❖ **Thematic focus:** projects that are not focused on at least one of the A2D Facility's thematic areas-of-focus (critical minerals, clean hydrogen, industrial decarbonisation and smart energy).
- ❖ **TRLs focus:** projects that are not in the TRLs 3-7 range in the developing country-of-focus.

3. AIM OF THE ASSESSMENT

Funded through the A2D Facility, this analytical assessment focuses on one of the core thematic areas of the program, Clean Hydrogen. Clean Hydrogen is a key component of the clean energy transition, but the cost challenges are hindering its widespread adoption. IEA (2023) estimates that the annual production of clean hydrogen could reach 38 million tonnes by 2030, a figure that is already 50% larger than the figure that the IEA Hydrogen Review 2022 suggested. However, around 50% of the projects are in the initial stages of development. Only 4% of the potential hydrogen production capacities have taken Final Investment Decision (FID). Inflation and global geopolitical instability have further increased the capital costs of already capital-intensive hydrogen projects. For clean hydrogen projects, an increase in cost of capital by three percentage points can increase the cost of the entire project by one-third (IEA, 2023). There remains an important role for technology innovation to reduce the costs and accelerate the commercialisation of clean hydrogen projects in developing country contexts.

This contractual service aims to undertake a large-scale market assessment of innovative clean energy technologies for Clean Hydrogen in developing countries by:

- **Innovation landscape:** identifying the landscape of technology innovations, innovators and the types of innovative clean energy technologies being developed (in the Technology Readiness Levels (TRLs) 3-7 range) and on the market of relevance to developing country contexts across the value chain in clean hydrogen.
- **Market:** identifying the current market and demand from developing countries (at a granular level) and the potential market and demand in developing countries (at a granular level) for innovative clean energy technologies in clean hydrogen across the value chain.
- **Project pipeline:** developing a potential portfolio of lighthouse pilot projects that the A2D Facility could consider targeting in innovative clean energy technologies in clean hydrogen in developing countries across the value chain.
- **Impacts:** assessing the quantitative and qualitative impacts of supporting innovative clean energy technologies in developing countries in clean hydrogen, against a good range of the most relevant Sustainable Development Goals (SDGs) and co-benefits beyond SDGs 13, 1 and 9 (the primary SDGs-of-focus for the programme) (as determined by the Supplier), and producing a theory of change underpinned by evidence for how the support maps to those SDGs, including any potential unintended consequences.
- **Deep dives:** deeper quantitative and qualitative assessments of the impacts, including any unintended potential consequences, from supporting innovative clean energy technologies in clean hydrogen in developing countries in relation to SDGs 13, 1 and 9.

4. SCOPE OF THE PROPOSED CONTRACTED SERVICES

The scope of the proposed contract is to prepare a clean hydrogen market assessment. The market assessment is global with developing countries being the beneficiaries of the support provided by the A2D Facility. The assessment will be both quantitative and qualitative, at a granular level of detail, and disaggregated by country and region. However, applicants should propose methodologies that will meet the aims and requirements of the analytical assessment and answer the following research questions.

Market Review:

1. Landscape of innovators:

- What is the landscape of innovators working on clean hydrogen in developing country contexts?
- Which parts of the clean hydrogen value chain in developing countries receive a greater focus from an innovation investment perspective?
- Where is the innovation expertise strongest and weakest, and what has received the most and least focus and support across different parts of the clean hydrogen value chain (such as, but not limited to, production, transport, storage and other parts of the clean hydrogen infrastructure and value chain)?
- What are the barriers and market constraints that innovators are currently facing?

2. Landscape of technologies:

- What is the landscape of innovative clean energy technologies (TRLs 3–7) for clean hydrogen across different parts of the value chain in developing country contexts?
- Which parts of the clean hydrogen value chain in developing countries receive a greater focus from a technology innovation perspective?
- Where would an intervention in innovation clean energy technologies for clean hydrogen have the most transformative impacts and be most additional in the current policy landscape and countries' national strategies?
- To what extent are current innovative clean energy technologies in clean hydrogen applied to developing country contexts in the TRLs 3-7 range?
- What are the primary market constraints for technology innovation in clean hydrogen in developing country contexts?

3. Landscape of stakeholders:

- Who are the key stakeholders in technology innovation in clean hydrogen within developing country contexts, and how crucial is their role in advancing projects from early planning and analytical products to pilot demonstrations? This includes identifying both types of stakeholders who can positively support progress and those who may experience setbacks, necessitating additional interventions (categories of stakeholders, rather than specific organizations) (i.e. types of stakeholders rather than specifically-named organizations).
- Who are the main beneficiaries (across the end-use sectors, such as, but not limited to, transportation, electricity generation, industry, heating and cooling, hydrogen export, energy storage, amongst others) of support from projects focused on innovation in clean hydrogen in developing country contexts? (i.e. types of beneficiaries rather than specifically-named organizations, groups or people)
- Who are the primary investors in technology innovation in clean hydrogen in developing country contexts? (i.e. types of investors rather than specifically-named organizations and companies)

4. Landscape of initiatives:

- What are the key existing and planned initiatives, partnerships and collaborations in clean hydrogen in developing country contexts, what are the activities-of-focus, in which countries and how are they funded?
- What are the key delivery programmes, projects and workstreams that include a focus on innovation in clean hydrogen (such as, but not limited to, hydrogen valleys, clusters, hubs, amongst others) in developing country contexts, what are the activities-of-focus, in which countries and how are they funded?
- What are the gaps in the current landscape of initiatives?

Programme Development:

5. Delivery mechanisms:

- What are the current delivery mechanisms for funding innovation in clean hydrogen in developing country contexts? (E.g. data infrastructure, venture investing, accelerators, incubators, market-building (such as prizes, green public procurement, results-based financing, Advanced Market Commitments), calls-for-proposals, other mechanisms)

6. Types of projects:

- What are the types of existing pilot projects that are focused on technological innovation in clean hydrogen in developing countries? (This includes a comprehensive list of existing and planned (late-stage planning) pilot projects and the types of existing and planned (late-stage planning) pilot projects and deep dives into a sample of case studies within this broader list).
- What types of activities do those projects support? (This includes a comprehensive list of existing and planned (late-stage planning) activities and the types of existing and planned (late-stage planning) activities and deep dives into a sample of case studies within this broader list).
- What is the potential portfolio of lighthouse pilot projects for technology innovation in clean hydrogen in developing country contexts?

7. Countries:

- Which developing countries have the most demand (interest or requests) for support for technology innovation in clean hydrogen and in the TRLs 3-7 range?
- Which developing countries have the existing policy frameworks and regulatory environment relating to technology innovation in clean hydrogen, including national strategies under development, other existing initiatives, and plans for hydrogen valleys (if applicable)?
- Which developing countries have the most potential (where the scope of impacts could be significant according to evidence, including, but not limited to, existing or planned enabling policy environments and frameworks) for technology innovation in clean hydrogen and in the TRLs 3-7 range?

8. SDG assessments:

- SDG assessments: what are the evidence-based theories of change for supporting technology innovation in clean hydrogen in developing country contexts against the most relevant SDGs (as identified by the Supplier)? (These assessments should be quantitative and qualitative and cover the most relevant SDGs beyond SDG 13, 1 and 9 and then conduct deeper dives into SDGs 13, 1 and 9).

5. DELIVERABLES/REPORTS

The Supplier must produce the following deliverables:

- **Deliverable 1: inception report:** in Word document form covering the proposed details of how the contractual service will be implemented and the work plan (including timelines, components, budgets, roles and responsibilities, a dissemination strategy, reporting and other relevant information).
- **Deliverable 2: interim report:** in Word document form covering all elements of the contractual service and progress updates on deliverables 3-10. At the interim stage, UNIDO, UK DESNZ and the Supplier will discuss and agree any refined research questions for the second half of the commission.
- **Deliverable 3: market assessment:** in Word document form covering all elements of the market assessment (including the results of each component of the contractual service, annexes with the data or links to the data, and be in a visual and publishable format). Market assessment executive summaries should be produced in English, French and Spanish.
- **Deliverable 4: project pipeline:** a potential project pipeline for the A2D Facility (the format to be agreed with UNIDO) based on the analyses undertaken.
- **Deliverable 5: website-friendly content:** content to include on the A2D Facility website that is visually appealing and public-friendly.
- **Deliverable 7: electronic leaflet:** concise, visual, short and public-friendly summary of the assessment, which focuses primarily on the human story and beneficiaries.
- **Deliverable 8: database:** a user-friendly database of the raw data underlying the analyses (the format to be agreed with UNIDO).
- **Deliverable 9: slidepack:** a visual and engaging Powerpoint presentation slidepack providing a summary of the assessment and the key findings.
- **Deliverable 10: dissemination:** in addition to presenting the results to UNIDO and the donor (UK Government), presenting the project's key findings in at least two international events (to be agreed with UNIDO) and through online dissemination activities, and actively monitoring the effectiveness of those dissemination activities (and submitting the results to UNIDO – the format to be agreed with UNIDO).

6. GENERAL TIME SCHEDULE

Instalment	Deliverables	Target Date
First Instalment: 10%	Signature of contract and start of work	9th February 2024
	Kick-off meeting with UNIDO and UK DESNZ	Week commencing on 12th February 2024
	Inception report (work plan) drafts: up to three drafts are anticipated, and acceptance will be based on alignment with UNIDO and UK DESNZ's expectations	19th February – 4th March 2024
	Final Inception report (work plan) submitted	7th March 2024

Second Instalment: 10%	Interim report (Powerpoint) first draft submitted	30th April 2024
	Presentation and discussion of the Interim report with UNIDO and UK DESNZ, including discussing any refined questions for the second half of the commission	8th May 2024
	Interim report (Powerpoint) second draft submitted (based on the discussion and comments from UNIDO and UK DESNZ) and including any refined questions for the second half of the commission	23rd May 2024
	Interim report (Powerpoint) final draft submitted	30th May 2024
Third Instalment: 20%	First draft of deliverables 3-9 submitted to UNIDO and UK DESNZ	15th July 2024
	Presentation of above draft deliverables 3-9 to UNIDO and UK DESNZ	17th July 2024
Fourth Instalment: 10 %	Second draft of deliverables 3-9 submitted to UNIDO and UK DESNZ	23rd July 2024
	Presentation of above draft deliverables 3-9 to UNIDO and UK DESNZ	25th July 2024
Fifth Instalment: 40%	Final publishable versions of deliverables 3-9 submitted to UNIDO and UK DESNZ for final approval	30th July 2024
	Dissemination presentation to UNIDO and UK DESNZ	2nd August 2024
Sixth Instalment: 10%	Dissemination presentation in 2 international events and online dissemination activities and monitoring: mid-June to end-July (dates and events to be confirmed with UNIDO); submission of results on the effectiveness of the dissemination activities to UNIDO	30th July – 30th August 2024 (to be confirmed and format to be agreed with UNIDO)

7. SUPERVISION AND PROGRAMME MANAGEMENT

The Supplier will be under the supervision of the UNIDO Project Coordinator (Clean Hydrogen) in the A2D Facility Secretariat and the A2D Facility Manager. The A2D Facility Secretariat will work directly with the service provider to: (a) ensure daily operations, (b) monitor and ensure the delivery of results, and (c) assist in evaluation processes. The A2D Facility Secretariat will approve the disbursement of all instalments in accordance with this ToR, and only when the quality of the products has been achieved.

The deliverables listed in section five will also be reviewed by the donor (UK DESNZ). A kick-off meeting will take place on 12TH February 2024 (to be confirmed between UNIDO, UK DESNZ and the Supplier) with steering committee meetings every two weeks between 12TH February 2024 and the presentation of the draft deliverables to UNIDO and UK DESNZ on 25th July 2024.

The dissemination presentation to UNIDO and the donor on 2nd August 2024 will include a final steering committee meeting. Ad hoc meetings can be arranged in-between project steering committee meetings where needed, as agreed between UNIDO and the Supplier.

8. REQUIREMENTS FOR KEY PERSONNEL

To deliver the Contract successfully, the Supplier will need to demonstrate that they have the right team structure, skills, and expertise to deliver the methodology proposed.

Team Structure

- A clear operating structure is provided, which explains the roles, responsibilities, seniority and reporting lines for each member of the delivery team across all organizations involved in the delivery of the Contract (where the product is delivered as part of a consortium).
- Suitable contingency measures must be in place should the Contract team change, giving UNIDO the confidence that this risk would be managed without negatively affecting program delivery.
- An appropriate balance of senior-level, mid-level and junior-level on the team is demonstrated, ensuring enough strategic oversight but also that resources are used efficiently to successfully deliver all of the objectives.
- The team should be gender-balanced and collectively possess the qualifications outlined under the skills section below to achieve the objectives of this contractual service.
- Named resources must be provided to deliver tasks, and where individuals are not identified or where CVs did not provide a clear justification, a role description is provided against which new joiners to the team will be assessed.
- If applicable, how a consortium team would work across organizational boundaries to ensure a seamless experience for UNIDO as the client and other key stakeholders in the contractual service. There should be one lead organization that is the main contact point for UNIDO.

Skills and Expertise

The following key areas of expertise are required **in at least one of the team members**:

- **Clean Hydrogen expertise.** A team member should have at 15 years' experience of researching and analysing clean hydrogen from a clean energy perspective across the clean hydrogen value chain, with a particular focus on developing country contexts.

- **Technology innovation expertise.** A team member should have at least 10 years' experience of researching, mapping and analysing technology innovation programs that are focused on developing country contexts.
- **Sustainable Development Goals (SDG) expertise.** A team member should have at least 10 years' experience of undertaking quantitative and qualitative analyses of impacts of either technology innovation projects or clean hydrogen projects against the SDGs, with a particular focus on SDGs 13, 1 and 9 in developing country contexts.
- **Gender equality and social inclusion.** A team member should have at least 10 years' experience of undertaking quantitative and qualitative analyses of impacts of technology innovation projects or clean hydrogen projects on gender equality and social inclusion, with a particular focus on developing country contexts.
- **Practical experience** including:
 - Essential: 15 years' experience of working internationally with a wide range of public and private stakeholders in developing country contexts, including small and medium-sized enterprises (SMEs), innovators and research institutes.
 - Desirable: 5 years' experience of working with UN agencies and the ability to work collaboratively and flexibly with them to deliver agreed outputs.

9. LANGUAGE REQUIREMENTS

Excellent working proficiency of written and spoken English is required. Working proficiency in other UN languages would be an asset for both the desk assessments, field research and dissemination elements of the contractual service. As per the deliverables outlined in section 4, the market assessment executive summary should be translated into the French and Spanish.

Submission of writing samples of final reports from previous, similar Contracts is encouraged (up to two writing samples maximum).

10. QUALIFICATION REQUIREMENTS AND TECHNICAL EVALUATION CRITERIA

Please refer to Appendix 2 – Qualification requirements and evaluation criteria