

REQUEST FOR EXPRESSIONS OF INTEREST **CONSULTING SERVICES**

Selection #: RG-T3777-P002

Selection Method: Simplified Competitive Selection

Country: Trinidad and Tobago

Sector: Infrastructure and Energy Sector

Funding – TC #: ATN/OC-18386-RG

Project #: RG-T3777

TC name: Promotion of the Green Hydrogen Market in LAC Countries

Description of Services: The main objective of this consultancy is to assess Trinidad and Tobago's green hydrogen (GH₂) potential production, demand, exports, and transformation capabilities of into green ammonia and/or methanol. The study will also identify opportunities and challenges to leverage the current natural gas infrastructure to produce and commercialize competitively GH₂ as well as opportunities to transform grey H₂ (current production) into blue H₂ (decarbonized H₂).

Link to TC document: <https://www.iadb.org/en/project/RG-T3777>

The Inter-American Development Bank (IDB) is executing the above-mentioned operation. For this operation, the IDB intends to contract consulting services described in this Request for Expressions of Interest (EoI). The EoIs must be delivered using the IDB Portal for Bank Executed Operations (<http://beo-procurement.iadb.org/home>) by: **March 15th, 2021 at 5:00 P.M. (Washington D.C. Time)**.

EoI should include summarized information about the firm or consortium's experience in relation to: (i) grey, blue and/or green hydrogen production, special focus on green; (ii) transformation of hydrogen (H₂) into ammonia and/or methanol for export; (iii) thorough understanding of petrochemical plant adaptation to deal with green and blue hydrogen; (iv) open innovation methodologies (design thinking, technology foresight, market consultation) and (iv) investments and pricing structures of different types of hydrogen (grey, blue and green), trade and commercialization conditions. All information needs to be presented with a cover letter indicating the interest of the firm or consortium's experience to participate.

The consulting services, which will be further specified to the short-listed firms or consortiums in the Terms of Reference of this consultancy, will include the assessment of the potential green hydrogen market development in Trinidad and Tobago. With the decreasing production costs for solar and wind-generated power, green hydrogen has been gaining momentum around the world as a clean energy solution to drive sustainability. As such, accelerating the development and commercial use of hydrogen energy technologies can provide a strategic opportunity for Trinidad and Tobago as a large hydrocarbon and petrochemical producer and by extension the possibility to contribute to the decarbonization of the country.

The study will contribute to the Government of Trinidad and Tobago overall initiative to understand the potential of hydrogen in decarbonizing Trinidad and Tobago's economy while analyzing the country's competitiveness to produce green hydrogen and export of green petrochemical products such as the ammonia and methanol. It will also contribute to gain an understanding of how the country can participate in the hydrogen industry supply chain. If hydrogen is successfully integrated within the energy value chain, it has the potential to: i) create long-term sustainability of the petrochemical sector and by extension local and regional economies ii) contribute Trinidad and Tobago in achieving its target for a reduction in carbon emission by 15% by 2030 and the longer-term decarbonization of various sectors, iii) reuse and adapt the existing natural gas infrastructure to generate new sources of revenue for the economy, by enhancing green and blue hydrogen and to iv) to create new opportunities for innovative local suppliers.

The consulting services (“the Services”) include around 4 months for the [following](#) services:

1. Analysis of the opportunity for GH2 market development in Trinidad and Tobago based on the potential demand, exports and sources for GH2 production. The consultant will evaluate the opportunities to integrate GH2 in the local economy, potential renewable energy supply to produce green hydrogen at competitive prices and recommend next actions for the development of a GH2 pilot project. The analysis will be required to present a technical analysis as well as high-level investment costs associated to GH2 development.
2. Assessment of technology options to leverage and adapt the current natural gas infrastructure and human capital to develop the low carbon hydrogen economy. The consultant should identify and consult with key stakeholders technology gaps, assess the technologies and innovative options in the global markets to integrate hydrogen adapting current natural gas and petrochemical infrastructure, identify synergies and local requirements. If existing global solutions don't meet the needs for hydrogen integration, identify the gaps that would need to be met by a customized solution including local expertise. The scope will also include mapping of challenges for repurposing current infrastructure, prioritization of them, technology foresight for available solutions, technical consultation with potential providers of solutions (engineering firms, current suppliers, research organizations, start-ups), and definition of technical standards to be met.

Eligible consulting firms will be selected in accordance with the procedures set out in the Inter-American Development Bank: [Policy for the Selection and Contracting of Consulting firms for Bank-executed Operational Work - GN-2765-1](#). All eligible consulting firms, as defined in the Policy may express an interest. If the Consulting Firm is presented in a Consortium, it will designate one of them as a representative, and the latter will be responsible for the communications, the registration in the portal and for submitting the corresponding documents.

The Consulting Firm (including shareholders and executive directors) hired for the current services, as well as its parent company or subsidiaries, will be disqualified to provide future goods, services and works resulting from the services executed under this study.

The IDB now invites eligible consulting firms to indicate their interest in providing the services described above in the [draft summary](#) of the intended Terms of Reference for the assignment. Interested consulting firms must provide information establishing that they are qualified to perform the Services (brochures, description of similar assignments, experience in similar conditions, availability of appropriate skills among staff, etc.). Eligible consulting firms may associate in a form of a Joint Venture or a sub-consultancy agreement to enhance their qualifications. Such association or Joint Venture shall appoint one of the firms as the representative.

Interested eligible consulting firms may obtain further information during office hours, 09:00 AM to 05:00 PM, (Washington D.C. Time) by sending an email to: Christiaan Gischler (christiaang@iadb.org). cc Paola Carvajal (lilianca@iadb.org), Gustavo Crespi (gcespi@iadb.org) and Jaime Sologuren (jaimeso@iadb.org).

Inter-American Development Bank
Division: Infrastructure and Energy INE/INE
Attn: Christiaan Gischler, Program Team Leader

1300 New York Ave, NW, Washington DC 20577, USA
Tel: +1 202 623-3411
E-mail: christaang@iadb.org
Web site: www.iadb.org

Draft Summary of Terms of Reference¹

Regional RG-T3777

Prefeasibility Study to Establish a Green Hydrogen Pilot Facility in Trinidad And Tobago

1. Background and justification

- 1.1. With the decreasing production costs for solar and wind-generated power, green hydrogen has been gaining momentum around the world as a clean energy solution to drive sustainability. As such, accelerating the development and commercial use of hydrogen energy technologies can provide a strategic opportunity for Trinidad and Tobago as a large hydrocarbon and petrochemical producer and by extension the Caribbean region.
- 1.2. For over 100 years, hydrocarbons have been the primary driving force behind T&T's economy. T&T is the largest oil and gas producing country in the Caribbean, with the energy sector historically accounting for approximately 40% of the country's GDP, and the petrochemicals sector contributing over 20% of total export earnings. In the 1970s, the surge of natural gas usage began with the Trinidad and Tobago Electricity Commission's initial use of natural gas for power generation. The energy sector has since evolved where natural gas is the major hydrocarbon that is produced and processed by downstream users. Based on the 2019 figures, usage of natural gas produced in Trinidad and Tobago can be apportioned as follows: LNG production (55%), Petrochemical usage (36%), Electrical power generation (7%), Other industrial usage (2%)
- 1.3. The COVID-19 induced crash of oil and petrochemical prices globally, it serves as a motivation for Trinidad and Tobago to accelerate efforts to diversify its economy. Critical therefore is a focus on innovative-based industries such as existing and pipeline opportunities in Renewable Energy and Energy Efficiency (RE&EE) to ensure greater resiliency and adaptability to changing economic conditions and stimulate industry development, while contributing to the decarbonization of the economy. For Trinidad and Tobago (T&T), the well-established petrochemical sector presents a major opportunity to displace hydrogen currently created from natural gas (grey hydrogen) with hydrogen produced from renewable sources (green hydrogen).
- 1.4. Today, solar and wind-generated power are among the cheapest sources to produce in areas with high solar irradiation and/or wind speeds, where unsubsidized production costs for solar and wind are 2 to 4 cents (in US dollars per kWh worldwide). Hydrogen, according to the International Energy Agency (2019), is gaining considerable momentum around the world and could finally be on a path to fulfill its longstanding potential as a clean energy solution. Green hydrogen can not only decarbonize but also add a significant element of economic sustainability to the local energy sector. Rethinking the use of energy in all sectors of the economy has the potential to boost economic growth, create jobs, enhance prosperity, support social development and advance environmental sustainability. Moreover, the development of a green hydrogen production complex in Trinidad and Tobago can become a platform from which a regional industrial cluster is built out, providing much needed support to regional decarbonization efforts.
- 1.5. IDB approved the regional technical cooperation RG-T3777 with the objective to accelerate the decarbonization process in Latin America and the Caribbean (LAC) through the development of a green hydrogen market in the region as an innovative and competitive energy carrier. The current consulting work will support Trinidad and Tobago to assess the opportunities to develop the green hydrogen contributing to the decarbonization and diversification of the economy.

¹ The preliminary scope of work is subject to be adjusted or modified in the Request of Proposal.

2. Objective

The main objective of this consultancy is to assess Trinidad and Tobago's green hydrogen (GH2) potential production, demand, exports, and transformation capabilities of into green ammonia and/or methanol. The study will also identify opportunities and challenges to leverage the current natural gas infrastructure to produce and commercialize competitively GH2 as well as opportunities to transform grey H2 (current production) into blue H2 (decarbonized H2).

3. Scope of work.

The scope of work will include the following tasks:

Part One - Confirm the opportunity for green hydrogen integration, export and production in Trinidad and Tobago.

- 3.1. Estimate potential demand from different sectors and opportunities to integrate GH2
- 3.2. Assess the potential to produce competitive green hydrogen
- 3.3. Recommend next actions for the development of green hydrogen as an opportunity to decarbonize the economy and a pilot project to confirm the feasibility of the GH2 development.

Part two - 2. Assessment of technology options to leverage the current natural gas infrastructure and human capital to develop the low carbon hydrogen economy.

- 3.4. Assess the possibilities of producing blue hydrogen by using techniques of carbon capture, utilization and storage (CCUS) of greenhouse gases (GHG).
- 3.5. Identify synergies with the natural gas and petrochemical infrastructure to support the development of the GH2 value chain
- 3.6. Identify challenges (organizational, regulatory, technology, etc.) for repurposing current infrastructure for producing H2, prioritize those challenges, carry out technology foresight exercises to search for available solution for these challenges, and if required open technical consultations with potential suppliers of innovative solutions (engineering firms, current suppliers, research organization, start-ups, etc).
- 3.7. Identify technology options and conduct a cost-benefit analysis of repurposing current infrastructure
- 3.8. Develop a technology implementation plan to leverage the current infrastructure in T&T and promote the transition towards a low carbon hydrogen market development

4. Key Tasks

Part One - Confirm the opportunity for green hydrogen production, consumption and export in Trinidad and Tobago.

4.1. Estimate potential demand from different sectors and adaptability to integrate GH2

- Assess the potential scenarios of green hydrogen demand and integration to the different sectors of the economy (petrochemical, power, industrial, transport, etc.)
- Prioritize the potential opportunities for green hydrogen demand based on profitability, emission mitigation, infrastructure synergies, economic impact and other to suggest by the consultant.
- Identify regulatory, institutional, commercial and any other barriers and enablers to develop the GH2 in the prioritized sectors.

4.2. Assess potential green hydrogen supply and competitiveness.

- Assess the required renewable electricity supply needs, technology options (solar, wind, etc.), that would be necessary to satisfy the GH2 identified demand, considering current or announced projects over the next 10 years that could direct electricity for the production of green hydrogen

- Estimate the costs of energy resulting from the estimated renewable generation, and the price competitiveness green hydrogen produced with it.
- Estimate the potential green hydrogen amount production that could be directed to supply domestic or international demand prioritized in task 4.1

4.3. Recommend next actions for the development of GH2 as an opportunity to decarbonize the economy and a pilot project to confirm its feasibility.

- Consolidate a pre-feasibility study report to develop the green hydrogen value chain in T&T including priority sectors for GH2 integration, potential sources for GH2 production, potential investments and enablers for market development.
- Suggest a green hydrogen pilot plant project to confirm the technical and economic results. The project should include at least a conceptual design, location options, estimated investments, and scale.
- Recommend next actions for promoting the green hydrogen market development. The consultant will include the definition of objectives, targets, and recommended actions (policy actions) to government and state companies to promote GH2.

Part two - 2. Assessment of technology options to leverage the current natural gas infrastructure and human capital to develop the low carbon hydrogen economy.

4.4. Identify synergies with the natural gas and petrochemical infrastructure to support the development of the GH2 market.

- Based on the analysis conducted in task 4.1 and 4.2, map of potential synergies of current natural gas and petrochemical infrastructure (pipelines, storage, plants, ports, etc.) with GH2 future developments
- Assess the possibilities of producing blue hydrogen by using techniques of carbon capture, utilization and storage (CCUS) of greenhouse gases (GHG).
- Benchmark international cases and/or practices integrating GH2 to current natural gas infrastructure to assess infrastructure opportunities and risks.
- Define the infrastructure modification/adaptation required to capitalize on the potential synergies.
- Identify technical challenges (including organizational, regulatory, commercial, etc. related to the technical ones) for repurposing current infrastructure to produce H2. Prioritize those challenges according to Trinidad and Tobago ambition.

4.5. Identify technology options and conduct a cost-benefit analysis for repurposing current infrastructure.

- Carry out technology foresight exercises to search for available solutions to prioritized challenges, and technology needs identify in tasks 4.1 to 4.4.
- Identify mature technology solutions to repurposing current infrastructure for the hydrogen business.
- For under developed, embryonic or technology gaps open technical consultations with potential suppliers of innovative solutions (engineering firms, current suppliers, research organizations, start-ups, etc).
- Conduct a cost-benefit analysis of the potential technology investments for repurposing the infrastructure to prioritize the potential opportunities for green and blue hydrogen demand.

4.6. Develop a technology implementation map to leverage the current infrastructure in T&T and promote the low carbon hydrogen market development

- Define the technology implementation roadmap, stakeholders, roles, and specific actions.
- Identify potential business models as well as incentives/enablers for success to implement technology investments.