

REQUEST FOR EXPRESSIONS OF INTEREST **CONSULTING SERVICES**

Selection #: CH-T1235-P003

Selection Method: Simplified Competitive

Country: Chile

Sector: Energy

Funding – TC #: ATN/JF-18347-CH

Project #: CH-T1235

TC name: Promotion for the Development of a Green Hydrogen Market in Chile.

Description of Services: Prefeasibility study for a synthetic fuel project in the Magallanes region based on green hydrogen.

<https://www.iadb.org/es/project/CH-T1235>

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.

Expressions of interest must be delivered using the IDB Portal for Bank Executed Operations (<http://beo-procurement.iadb.org/home>) by: March 25th, 2021, 5:00 P.M. (Washington D.C. Time).

The consulting services (“the Services”) are to study the prefeasibility of synthetic liquid fuel production in the Magallanes Region, based on green hydrogen from wind energy (second quarter of 2021).

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 IDB now invites eligible consulting firms to indicate their interest in providing the services described below 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: paolar@iadb.org

Inter-American Development Bank
Division: **Energy**
Attn: **Natacha Marzolf, Team Leader**
1300 New York Ave, NW, Washington DC 20577, USA
Tel: **56-2-24313700**
Fax: **56-2-24313713**
E-mail: paolar@iadb.org
Web site: www.iadb.org

Draft Synopsis Terms of Reference for EOI

1. **Background and Justification**

- 1.1 Internationally recognized organizations, governments, NGOs, researchers, and companies have concluded that the use of low-carbon hydrogen (H₂) as an energy carrier is key to a rapid, sustained, and cost-effective reduction of emissions of greenhouse gases throughout the economy and, in particular, in hard-to-abate sectors such as heavy transport or high-grade heat. This is required for an effective mitigation of the effects of man-induced climate change and provides a solution for jurisdictions to achieve their emissions reduction commitments in a timely and cost-effective manner. However, the production and use of H₂ and, specially, green H₂ –that which is produced through the renewable-electricity-powered electrolysis of water– as an energy carrier is a novel trend, so costs are relatively high when compared to existing fossil technologies and there is uncertainty regarding various techno-economic and operational aspects. In addition, there are no established markets -yet- for trading this clean fuel. However, some countries and states are strongly promoting these technologies to develop these markets and commercialize such technologies.
- 1.2 Chile is a country with a significant potential for competitive production of green H₂ –due to its extensive, high-quality renewable resources and its suitable ecosystem for clean energy investment–, as well as a country with significant emissions reduction commitments. Regarding the former, a potential for green H₂ production of over 160 million tons per year has been recognized in Chile¹, which correlates with the over 1.75 TW of untapped renewable electricity generation potential mapped in the country². Regarding the latter, a Climate Change Draft Bill of Law is currently in Congress, which states that Chile will become a carbon-neutral country by 2050³. The National Determined Contribution (NDC) for Chile for 2030 has been recently updated with a more ambitious goal of reaching a peak of national Greenhouse Gas emissions by 2025 and a target of 95 MtonCO_{2eq} by 2030 –a reduction of approximately 30% in per GDP terms from 2016 emissions⁴.
- 1.3 The southernmost areas of Chile, the Magallanes Region, has been identified as a key region for the development of competitive production of green hydrogen, given its high wind energy availability -with a potential that is several orders of magnitude vaster and competitive than other renewable energy sources in the region-. An analysis by the Ministry of Energy (The Ministry or MINENERGIA) estimates the electricity potential from wind sources in the region

¹IEA. (2019). *The Future of Hydrogen: Seizing today's opportunities*. Report prepared by the IEA for the G20, Japan. Available at: www.iea.org/reports/the-future-of-hydrogen.

² Ministry of Energy of Chile & GIZ. (2014). *Energías Renovables en Chile – El Potencial eólico, solar e hidroeléctrico de Arica a Chiloé*. Available at: <http://4echile.cl/4echile/wp-content/uploads/2017/03/Energias-Renovables-en-Chile-El-potencial-eolico-solar-e-hidroele%CC%81ctrico-de-Arica-a-Chiloe.pdf>

³ Boletín 13191-12 del Senado de Chile. Available at: https://www.senado.cl/appsenado/templates/tramitacion/index.php?boletin_ini=13191-12

⁴ Ministry of Environment. (2020). First update of the Nationally Determined Contribution of Chile. Available at: <https://mma.gob.cl/primer-proceso-de-actualizacion-de-la-contribucion-determinada-a-nivel-nacional-ndc/>

to be 126 GW of capacity, with an average capacity factor of 50%, and several on shore sites with capacity factor up to 80%⁵. However, its electric grid is isolated from the rest of the country and has a peak demand of only 40 MW. Hence, the production of green H2 becomes an alternative to make use of the region's renewable potential to displace use of hydrocarbons in sectors such as transportation or residential/industrial heat, as well as creating a potential export to other regions in the form of H2 itself or its derivatives. Facilitating projects equivalent to only 1GW of renewable power production for green H2 could translate into investments of over 3 billion USD, considering power and hydrogen installations and equipment, as well as 1.5 Mton of CO2 emissions reduction if the H2 was used to replace diesel oil in multiple applications. Hence if only 10% of the region's energy production capacity was to be utilized for green fuel production, over 35 billion USD of investment would pour into local assets.

- 1.4 One of the key challenges to the development of a green H2 industry in the region is the uncertainty in technical and economic aspects of both supply and demand. Hydrogen production technologies from renewable power sources are technically mature but have not been demonstrated at scale in Chile, whereas synthetic liquid fuel production technologies are still in lower stages of Technology Readiness Level. Hence required and optimal infrastructure and operation of an electrolyzer and synthetic liquid fuel facility is a key uncertainty that holds investment back, especially in the specific conditions of the Magallanes Region.
- 1.5 An additional challenge is the techno-economic uncertainty of whether the direct production of synthetic liquid fuels from green hydrogen in the Magallanes region would be more cost-efficient than the production of synthetic crude oil from green hydrogen for later refinement in the refinery in Magallanes, which operates with constant idle capacity.
- 1.6 Thus, a study is required to produce techno-economic, environmental, social, and commercial information for a synthetic fuel production project from green H2 produced by wind power in Magallanes in order to facilitate the analysis of investment projects and private stakeholder development. Additionally, an assessment of how the direct production of synthetic fuels from green hydrogen compares in cost-effectiveness terms with the production of synthetic crude oil from green hydrogen for later refinement in a refinery will inform public policy and decision makers on whether each alternative is more globally efficient. This study's results will serve to reduce the uncertainty that investors and developers face in early stages of a technology's development and potentially unlock significant investments in clean energy in the region while allocating risks and identifying risk mitigants.

2. **Objectives**

- 2.1. **General objective:** To study the prefeasibility of synthetic liquid fuel production in the Magallanes Region, based on green hydrogen from wind energy.
- 2.2. Specific objective 1: To review the different technologies of synthetic liquid fuel production from hydrogen, including the technical, economic, and regulatory issues.
- 2.3. Specific objective 2: To identify key opportunities and challenges related to the production of synthetic liquid fuels in the Magallanes region and their scaling up.
- 2.4. Specific objective 3: To produce key information for private and public project developers to assess in a well-founded manner whether to pursue further development of a synthetic liquid fuel production plant.

⁵ Ministry of Energy. (*to be published*). Identificación de Potenciales Renovables, Caso Eólico: Hidrógeno Verde en la Región de Magallanes y de la Antártica Chilena.

3. Scope of Services

- 3.1. A consulting firm with experience in strategic, technical, economic, and/or commercial studies regarding the hydrogen sector is required. The firm shall have experience in synthetic fuel project development and/or techno-economic studies on the topic. It is desirable that the firm also has experience in the oil & gas sector⁶. The firm shall be technologically neutral and not have preferences for or any partnership(s) with any vendor of specific technologies or technical solutions that are proprietary to the latter.
- 3.2. The team proposed to execute the study by the consulting firm shall be multidisciplinary and have experience in the key activities per section 3.1. above. The team shall consolidate both quantitative and technical skills, as well as the ability to effectively communicate findings and methodologies.

⁶ Experience in the oil and gas sectors is desirable due to the similarities present between these industries and the emerging hydrogen market, both in terms of technical issues (infrastructure, installations, equipment, capabilities, security concerns, among others) and of economic and commercial issues (capital intensive industries, business models for fuels, companies from the oil and gas sector entering the hydrogen business, among others). Additionally, the novel market of hydrogen as an energy carrier is still to mature and acquire experience, so transferring experience from consolidates markets can be an adequate solution to carrying out complex assessments in these early stages.