

AN EXCEPTIONAL ENERGY CASE STUDY

Renewable Liquid Gas: eLG Project in Punta Arenas, Chile



Image provided by Empresas GASCO.

The Haru Oni project in Punta Arenas, Chile, represents a groundbreaking step in the global energy transition. As the world's first operational eFuels facility, it harnesses the region's exceptional wind resources to produce green hydrogen and capture CO₂, which are then synthesised into eFuels, including synthetic green Liquid Gas (eLG).

This Exceptional Energy case study explores the details of this groundbreaking initiative, supported by various partners, including WLGA member Empresas GASCO.



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Background

Chile is at the forefront of hydrogen project investments in Latin America and was one of the first countries worldwide to establish a National Hydrogen Strategy Policy, earning international recognition. With significant opportunities to expand its hydrogen sector, Chile is working closely with both public and private stakeholders to reach its ambitious goal of carbon neutrality by 2050. A key objective is to develop the hydrogen industry to a scale comparable with the country's robust mining sector.

For over 167 years, Empresas GASCO has been a key player in Chile's energy transformation. Leading production of the world's first carbon-neutral liquefied gas is one more demonstration of Gasco's commitment to the development of innovative technologies and solutions that significantly contribute to the energy transition.

The Magallanes region of Chile, with its exceptional wind resources, offers one of the highest potential for wind energy in the world, surpassing nearly all other global regions in both wind and solar power capabilities. However, its rich marine and wildlife ecosystems require careful consideration and protection. To address this, Chile is implementing new and stricter permitting processes designed to protect wildlife and create green hydrogen ecosystems.



Image provided by Tomas Griger, Canva.

The Solution

Haru Oni is the first operating eFuels facility in the world, and the first Synthetic Liquid Gas (eLG) in the world is produced in this facility. The plant uses renewable energy from the wind and an electrolysis process to produce green hydrogen. The project captures CO₂ from a biogenic source and uses a process of synthesis to combine the CO₂ and hydrogen to produce eFuels, including synthetic green methanol (eMethanol), gasoline (eGasoline) and synthetic green Liquefied Gas (eLG). These eFuels will create a pathway for existing infrastructure to become low carbon by continuously reusing and recycling the CO₂.

The first stage of the project consists of a pilot plant of 1.2 MW of electrolysis for demonstrating plant feasibility, technology integration, scalability and eFuels applications in existing infrastructure (e.g. eGasoline in domestic cars). An eFuels Laboratory was developed by Gasco, HIF Global and the University of Magallanes to test and develop the eFuels products. Future project stages will commercially scale the project to produce 175,000 tons of eMethanol/year using an electrolyser of 242 MW capacity.



Images provided by Empresas GASCO.

The Technology

The system for eFuels production at the Haru Oni project consists of several key components:

- **Feedstocks:** The process uses green hydrogen and CO₂. Green hydrogen is produced via an electrolyser (1.2 MW capacity) and fed through a wind turbine of 3.4 MW capacity. This CO₂ is captured via Direct Air Capture (DAC) technology.
- **eLG Production:** e-LG is a carbon-neutral liquefied gas that originates as a byproduct of the synthetic gasoline production process within the HIF Haru Oni demonstration plant. This occurs during the conversion of eMethanol to eGasoline, through MtG (Methanol-to-Gasoline) technology. The diagram below shows the feedstocks of the entire Haru Oni demonstration plant.

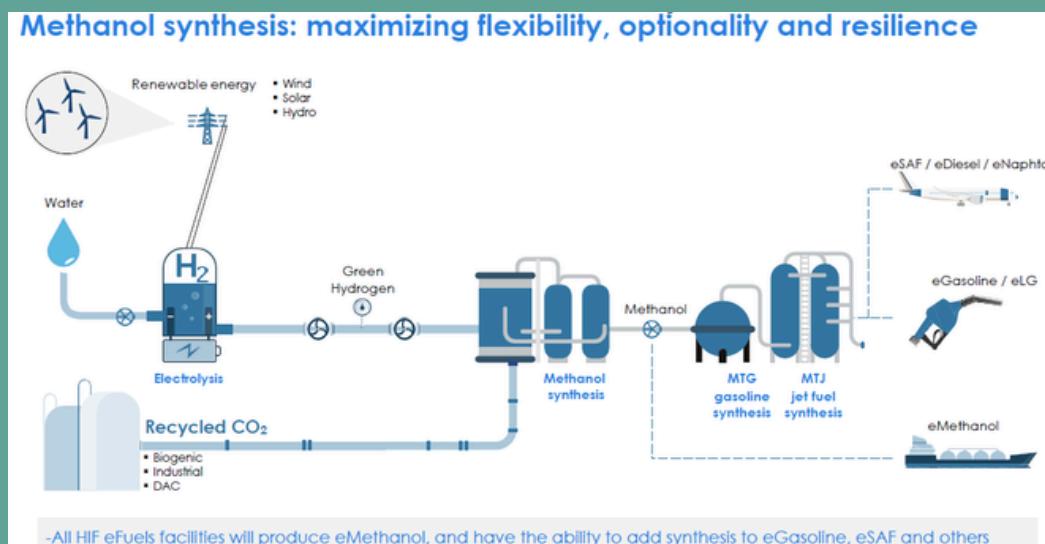


Image provided by Empresas Gasco.

Product Details

- **eGasoline:** The production capacity is 130k litres per year.
- **eLG:** The plant capacity is approximately 10-15 tons e-LG per year. The composition of the fuel has slightly more eButane content.

Scaling Up

To increase the widespread adoption of these projects:

- It is important that electrolysis costs and efficiency continue to improve.
- Ongoing experience operating the Haru Oni plant is important to ensure consistent production and product quality.
- Increasing the number of off-takers and exploring shipping exports will support growth.
- The construction of a commercial plant, already scheduled, will also play a key role in scaling up production.



Image provided by Empresas GASCO.

Empresas GASCO has leveraged tax reduction incentives related to R&D for eLG production. For the commercial phase, the national oil company (ENAP) provided access to its infrastructure at the Cabo Negro Plant in Magallanes to support the Haru Oni facilities.

Why eLG?

- **Marketing Attributes:** eLG boasts low carbon intensity, ease of storage, and transportation. It requires minimal modifications to existing infrastructure.
- **Applications:** In the region, eLG will primarily be used for domestic heating (cylinders), and Empresas GASCO is exploring additional applications, such as combustion in existing industrial boilers, power generation, others.
- **Market Development:** Empresas GASCO is committed to developing the market and ecosystem to increase awareness and reduce costs.

Demand for eLG is at a nascent stage and Empresas GASCO is working to grow this demand in both domestic and international markets. Additionally, ongoing technology testing and eLG characteristics will determine the timing for more production, as will agreements with off-takers. Currently, the eGasoline produced at Haru Oni plant is commercialised by the Porsche auto company.



Image provided by MagMos, Canva.

Timeline

- **2016:** Initial studies and project conceptualisation.
- **July 2021:** Start of construction for the Haru Oni plant.
- **December 2022:** First eFuels delivery, marking the project's transition from concept to reality.
- **October 2023:** First eLG delivery from Haru Oni to Empresas Gasco for starting test in lab.

Summary

The Haru Oni project highlights the success achieved through close collaboration between project partners and authorities, demonstrating alignment with the strategic objectives of all involved.



Image provided by Empresas Gasco.

Contributors



Equity partners



Co-developer for eLG production



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