Chile strategy for H_2 internal demand: the role of the fuel cell

ECIT

Ciencia e Ingeniería

- *ENGINEERING*
- *SCIENCE*
- *TRAINING*

THE COMPANY

ECIT (Energy, Sciences, Engineering and Technology), is a Chilean consulting company dedicated to engineering, science and training for energy solutions, such as renewable technologies, hydrogen projects, industrial safety and energy efficiency. ECIT was born in 2023 from the interest of its partners in addressing the energy gaps in the industry with a wide network of international collaboration for the execution of their projects.

Our Mission is to offer a personalized and expert service based on quality and safety.

Our Vision is to become a key player for energy decarbonization in Chile and the world, based on the development of hydrogen solutions and derivatives.

EXPERIENCE






25 CLIENTS

28 ENGINEERING PROJECTS AND STUDIES

17 TRAINING PROGRAMS.

04 REGISTRATION PROCESSES- SEC.

1st DS13 REGISTRATION - COLBÚN NEHUENCO

FOUNDING PARTNERS

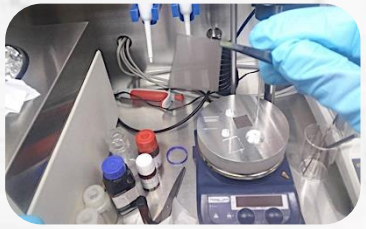
SEBASTIÁN ÁLVAREZ
ENGINEERING MANAGER

DR. JOSEFA IBACETA
GENERAL MANAGER

DR. JOSEFA IBACETA

GENERAL MANAGER

Engineer and Master in Mechanics from the University of Chile and PhD in Electrical Engineering from the Technische Universität in Berlin, with +16 specialization courses in business, energy and climate change, green hydrogen and derivatives.




*SEC Class 1 (Gas) & 5 (Hydrogen) certified installer

FEATURED EXPERIENCES

R+D Engineer

- UC Merced (USA): thermal PV model
- TUB (Germany): PV thin film design based on perovskite.
- Fraunhofer (Chile): solar PV and thermal energy, H2V, MeOh, DME and CCU.
- Hoycka (Antofagasta): Project Leader of H2V- mining applications, R+D design Power-to-power project.
- Certified Energy Manager – Energy Sustainability Agency
- Carbon Footprint Verifier for Huella Chile

International collaboration

- Director of the INVECA Network: Chile-Germany Scientific Collaboration.
- Director of H2 Chile Association

Teacher:

+250 teaching hours of H2 and energy

+20 training instances: including 8 diploma courses in Chile, Peru and Uruguay.

FOUNDING PARTNERS

SEBASTIÁN ÁLVAREZ

ENGINEERING MANAGER

Mechanical Civil Engineer from the University of Chile specialized in the development, evaluation and regulation of renewable energy, decarbonization, energy efficiency and green hydrogen projects. He has led engineering, technical consultancies and safety certification processes for industrial plants.

He is a teacher in diploma courses at the Universidad Católica, Adolfo Ibañez, Andrés Bello and initiatives of GIZ and AHK.

**SEC certified installer*
Class 1 (Gas) and 5 (Hydrogen)

FEATURED EXPERIENCES

- Engineering Leader TRA-Bussogroup
  Plant SEC Design, Implementation, and Registration of H_2 plants

CNP

CICITEM

GASVALPO

U ANTOFAGASTA

U DE LA GUAJIRA

U ADOLFO IBAÑEZ

- Project Manager Antuko
  80, 100 and 1,000 MW of H_2 and Ammonia projects. Regulatory development and management.
- UChile Energy Center Researcher
  -First national survey of Energy Efficiency.
  -Study of regulations and thermal insulation of homes.
  -Co-author: Country report on the state of the environment in Chile, Energy chapter (2019).

FEATURED PROJECTS

Studies for the public sector and public policies

H2 local value chain

R&D roadmap

H2 mobility in Latinamerica

Update of National strategy

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FEATURED PROJECTS

ECIT
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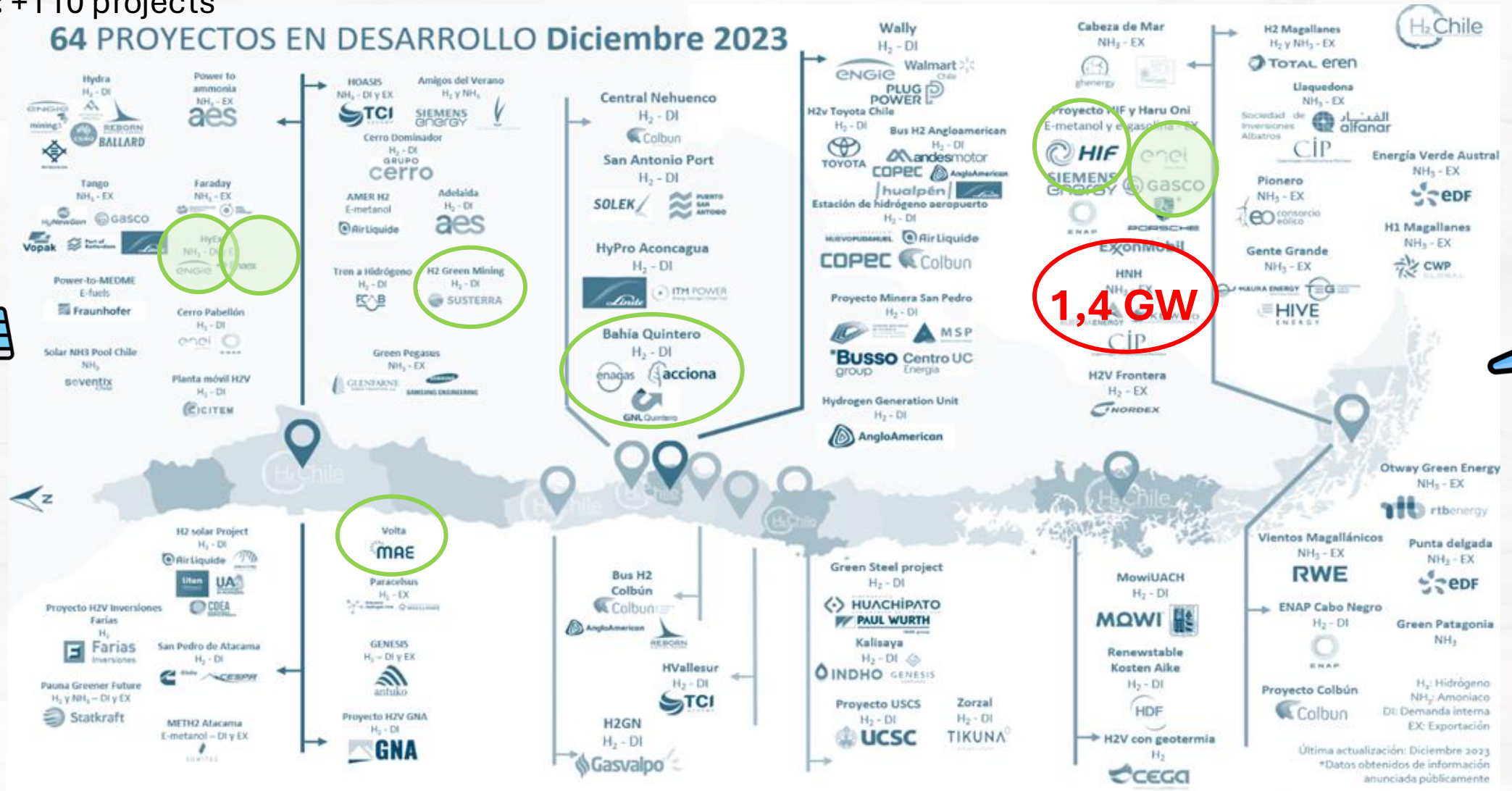
Safety and regulation for the private sector


CHILE

Production projects

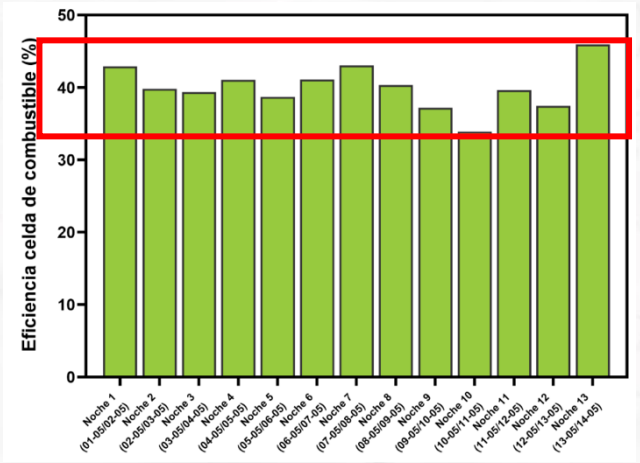
TODAY: +110 projects



NORTH

Antofagasta: Mining applications can operate between 2,600 and 4,500 m a.s.l., where atmospheric pressure decreases to approximately 73.7–57.7 kPa and oxygen availability is reduced between 27% and 43% above sea level. This can decrease the net performance of the cell and increase the consumption of the cathode compressor. Low relative humidity (37%), high thermal amplitude (Δ15-25°C), extreme UV radiation (IUV ≥11) and high exposure to mineral dust and salts are added.

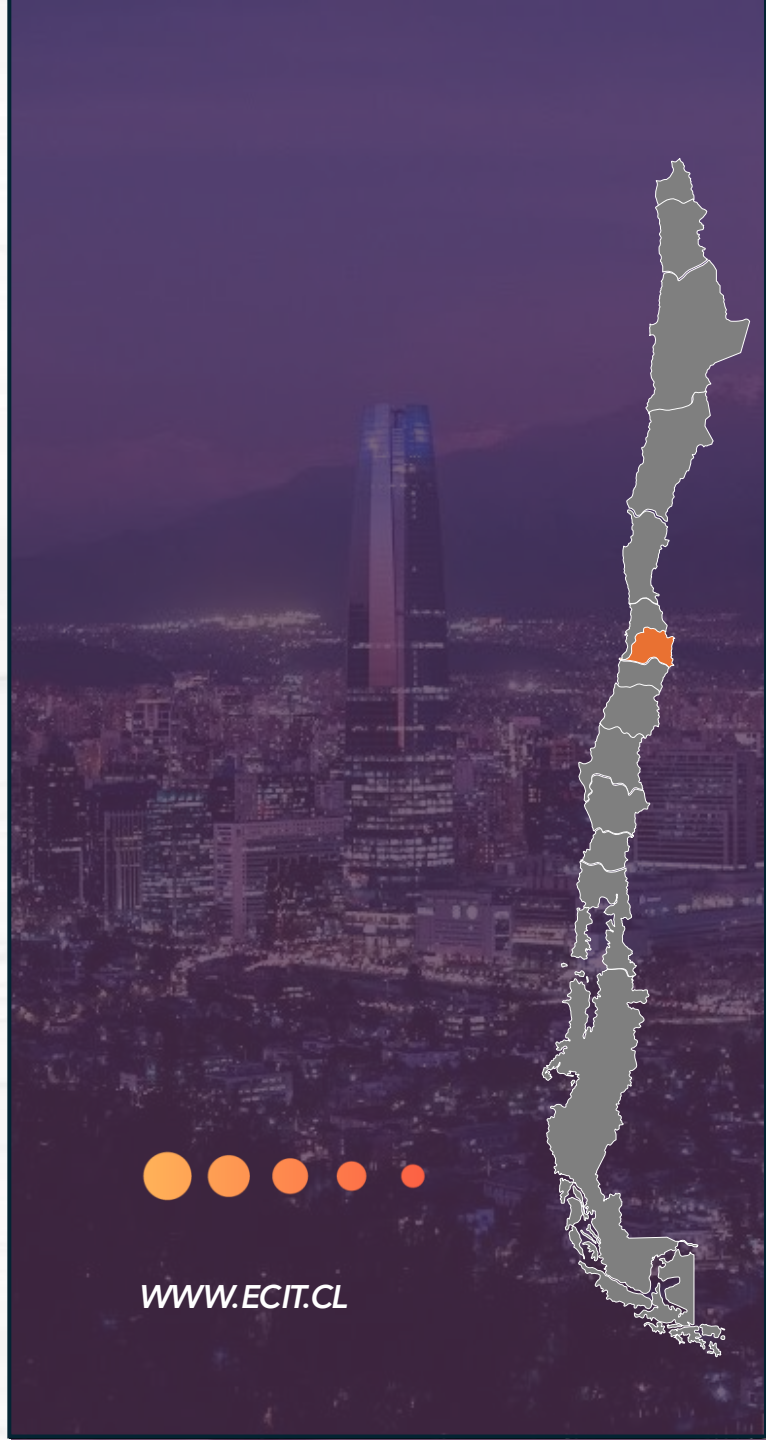
Main industry: Mining, ports



CENTER

Santiago: The applications are normally located between 470 and 600 m a.s.l. The main conditions are average summer maximum temperatures close to 30 °C, extreme UV radiation (UVI ≥11) and exposure to urban pollution, especially $PM_{2.5}$, PM_{10} and gases associated with traffic and combustion. These conditions increase the needs for cathode air cooling and filtration.

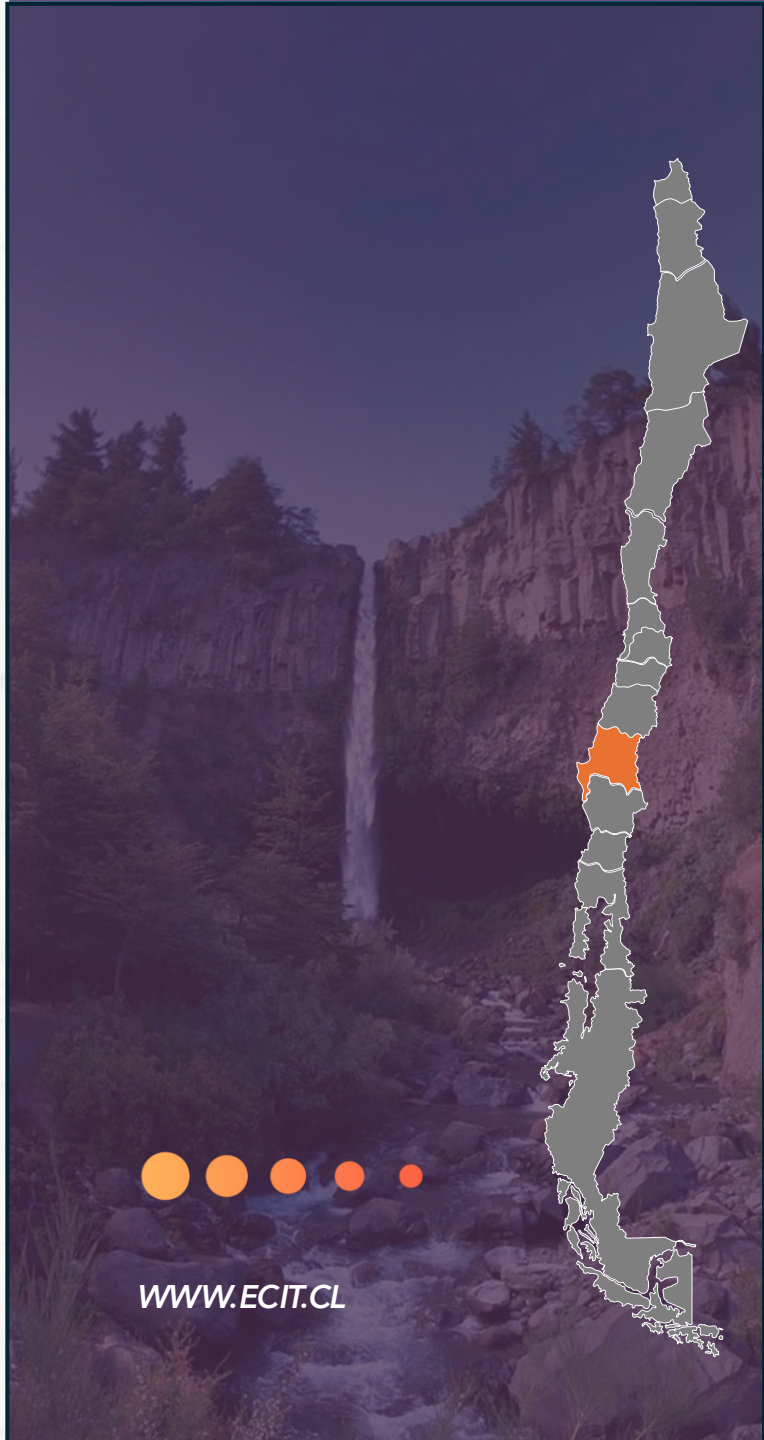
Main industry:
Logistic, Urban and intercity buses, Data center and telecom support, airport ground support teams.



CENTER-SOUTH

Biobío: The most relevant conditions are high relative humidity —74–87%, precipitation close to 984 mm/year, and exposure to marine aerosol and industrial pollutants. These variables can generate condensation, corrosion, filter saturation and ionic contamination of the cathode system.

Main industry:
Port equipment and port transfer trucks. Forklifts and yard tractors in forestry plants and logistics centers. High-utilization forestry trucks. Service vessels, ferries and tugboats. Support of process plants and cold rooms



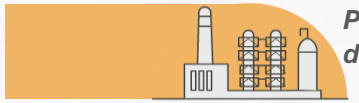
SOUTH

Magellan and Chilean Antarctica: The main conditions are low temperatures – average monthly minimums of up to – 0.7 °C – relative humidity of 69–86%, marine exposure and intense winds, with gusts recorded above 140 km/h. These conditions increase the risk of freezing of the water produced, cold start-up, corrosion, snow ingress and high stresses on air inlets and outlets.

Main industry: Microgrids and isolated infrastructure backup. Service vessels, ferries and tugboats. Buses and tourist vehicles with return to base. Support of fishing plants and cold chain.

R&D Roadmap proposal

Hydrogen production and conditioning



Production and packaging of derivatives

Transport and storage

Applications and consumption

Enabling

R&D Roadmap

THEME	SHORT						MEDIUM								LONG
	2026	27	28	29	30	31	32	33	34	35	36	37	38	39	2040+

LINK: Applications and consumption

Technological adaptation of H2 combustion machinery	**Goal:** Sufficient local capacities for manufacturing or retrofitting, maintenance and operation of vessels.
Cost-effective electromobility use cases	**Goal:** Innovative profitable cases of trains, HRS, buses and tourism applications identified.
Adoption of new H2 electromobility technologies	**Goal:** Commercial availability of H2 electromobility for long-distance cargo transport, logistics and ports.
Technological adaptation for the use of hydrogen as a feedstock	**Goal:** Commercial steel and green copper produced in Chile and local operation and maintenance capabilities.
Energy use of H2 + d in isolated areas	**Goal:** Cases of profitable use or with social benefit for isolated areas identified.

Conclusions

Fuel cells can support Chile's decarbonization by replacing diesel in heavy-duty transport, mining, ports, and remote operations. They provide reliable, low-emission power where batteries face limitations in range, weight, or charging time. Their deployment can also create local demand for Chile's emerging renewable hydrogen industry.

Low TRL

To take advantage of country strengths and scientific rigor: models and methodologies to optimize the efficiency and operation of technologies.

Medium TRL

Develop technical implementation capacities for the market, necessary for production and export goals.

High TRL

Adapt mature technologies to the extreme environmental conditions and the great climatic diversity of the country.

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