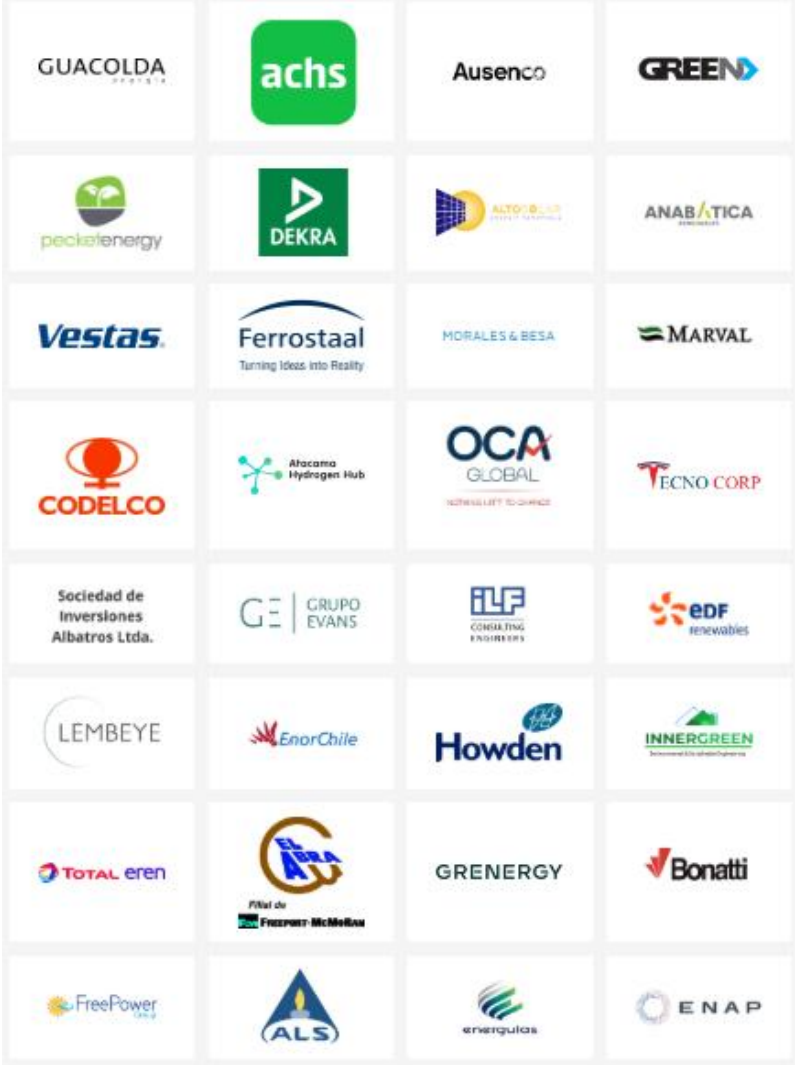
H2 Chile
ASOCIACIÓN CHILENA DE HIDRÓGENO

# Green Hydrogen as a transformative element in Chile's energy matrix

# We are H2 Chile

- ✓ **108 companies** and 40 individual professionals
- ✓ Representatives from public, private and academic sectors
- ✓ All hydrogen value chain represented


# International Alliances

Collaboration represents an opportunity for the exchange of knowledge, experiences and technology transfer.

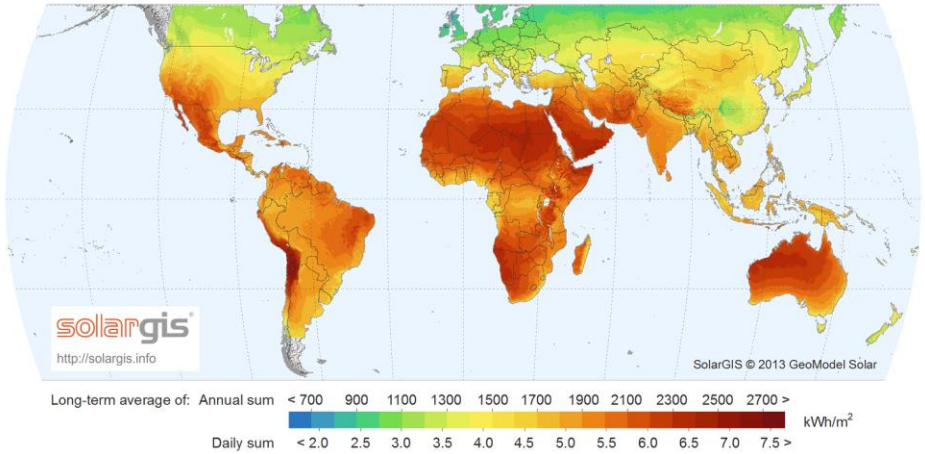
Promoting research, development and implementation of sustainable technologies

Integration of best practices, standards and cutting-edge processes along the renewable hydrogen value chain.

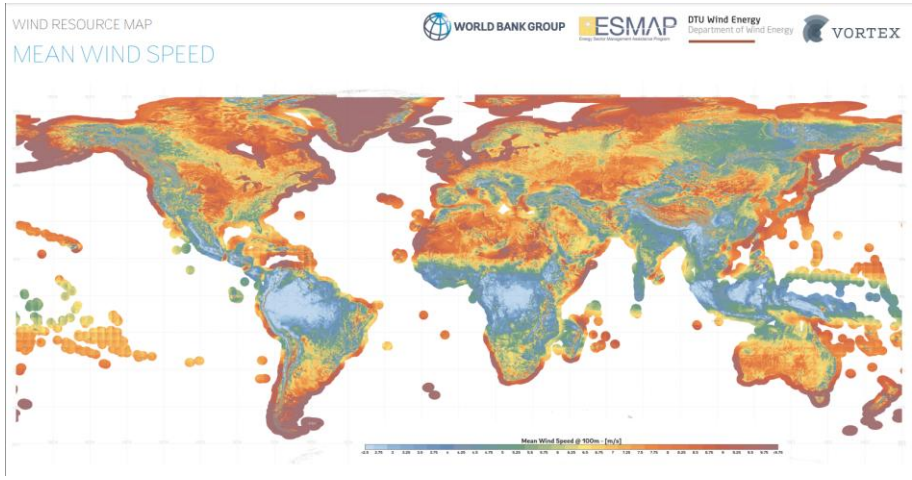
# And strong collaboration with our Chilean regional partners

Aiming to accelerate the growth and implementation of innovative solutions to develop the Green H2 Industry in Chile.

# Chile has the potential to be one of the leading countries in Latin America to produce Green H2




Source: SolarGIS © 2013 GeoModel Solar



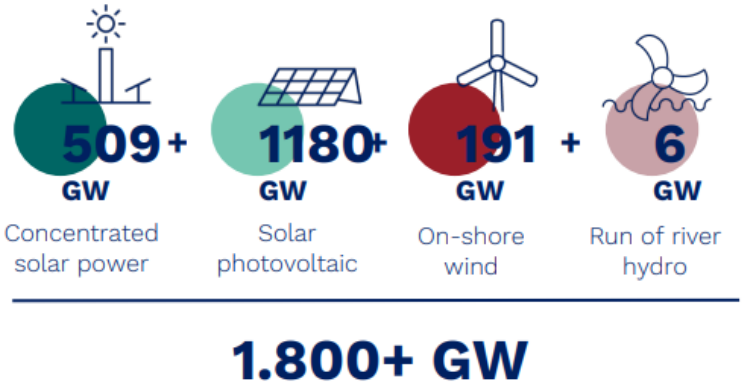

Source: Global Wind Atlas

## Capacity factors per country in best areas (%)

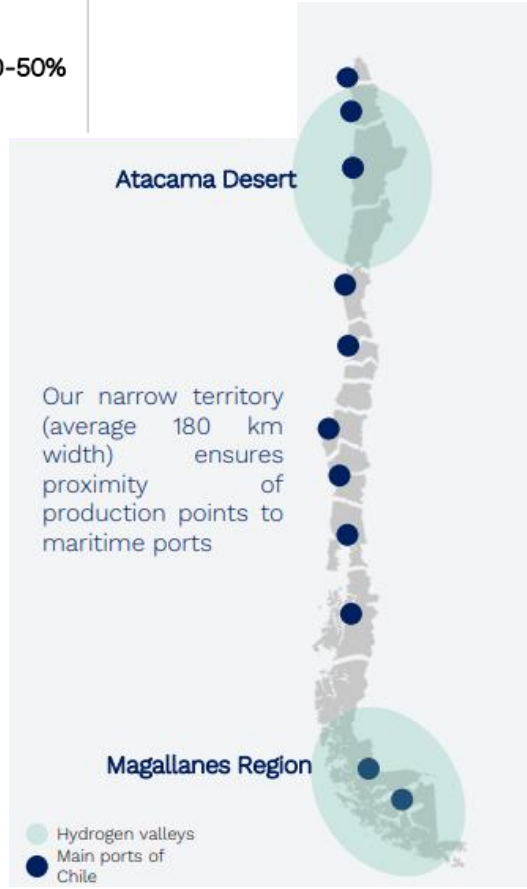
*Source: Ministry of Energy of Chile, McKinsey & Co*

| | | | | | |
|---|---|---|---|---|---|
| Solar PV | | 37% | ~30% | ~30% | ~25% | 20-25% |
| Wind | Off shore | >75% | | | 40-45% | 50-55% |
| | On shore | 70-75% | 30-35% | | 40-50% | |

- ✓ One of the **most powerful solar radiation** on the planet is in the Atacama Desert (North of Chile)
- ✓ One of the **best winds** in the world blow in the Magallanes Region (South of Chile)




Source: National Green Hydrogen Strategy, 2020



# How the Green Hydrogen becomes a National Policy?

## 2015 *CHILEAN ENERGY POLICY*


**By 2030:**

Chile to be an **energy exporter in the form of green hydrogen**, electric power or other energy sources.

**By 2050:**

70% of zero-emission fuels in non-electric energy end-uses

By 2050 → a vision of the energy sector that corresponds to a *reliable, sustainable, inclusive and competitive* industry

## 2021 *LONG TERM CLIMATE STRATEGY*


**2025**

Withdrawal of 65% of coal-fired generation from the national grid.

**2030**

80% of electricity generation from RES

**2040**

**20% of the fuel matrix based on green hydrogen**

**2050**

energy matrix 100% zero-emissions

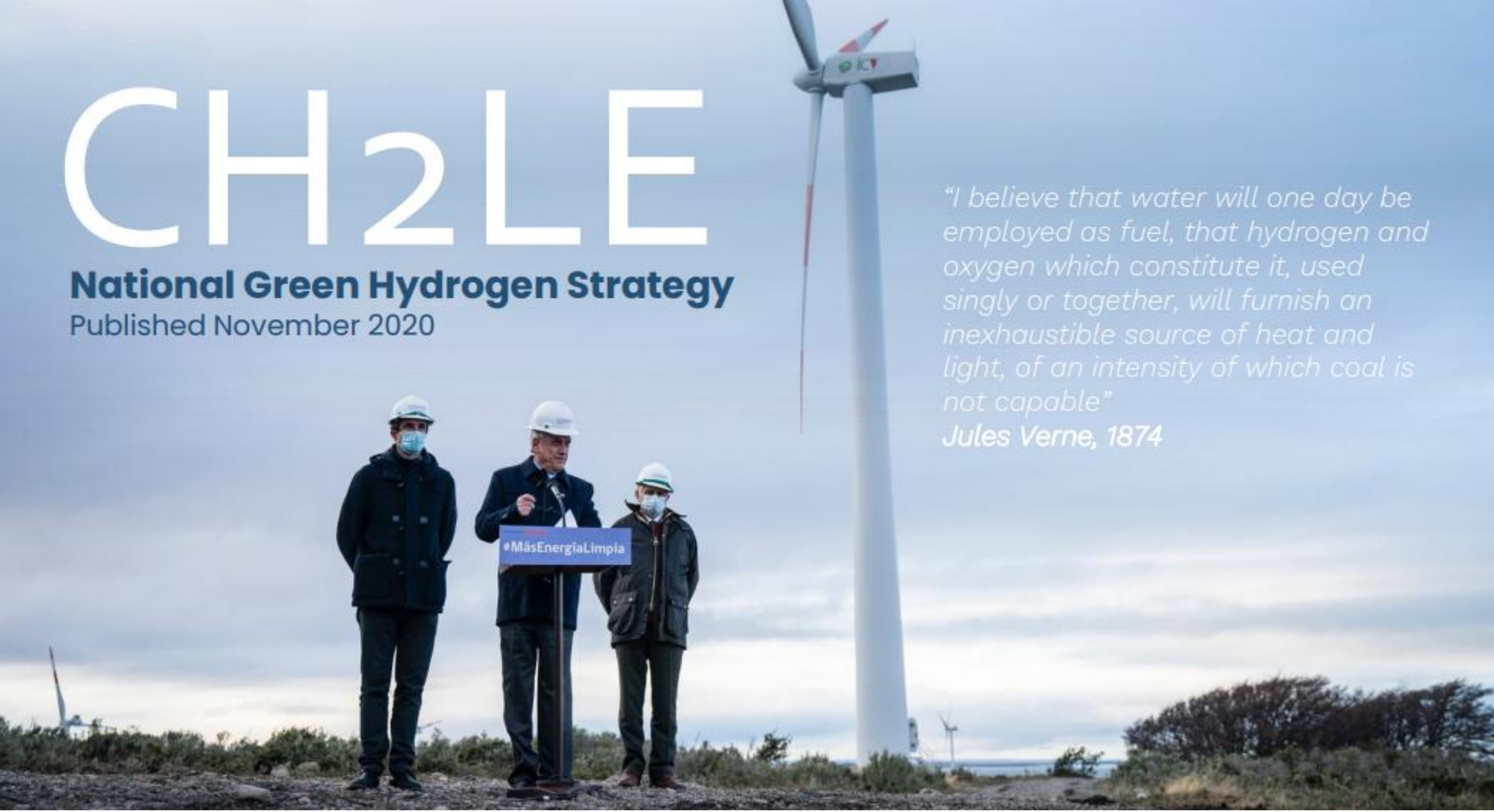
## 2021 *LONG-TERM ENERGY PLANNING (2022-2060)*


**Development of H2V and its derivatives**, mainly in mining and freight transport applications, **would contribute 24% of the emission reductions** needed to achieve carbon neutrality.

# CH2LE

## National Green Hydrogen Strategy

Published November 2020




*"I believe that water will one day be employed as fuel, that hydrogen and oxygen which constitute it, used singly or together, will furnish an inexhaustible source of heat and light, of an intensity of which coal is not capable"*

***Jules Verne, 1874***

# Green Hydrogen Action Plan 2023-2030

**The Plan establishes actions** to promote Chile as a ***producer and exporter* of Green Hydrogen**, while contributing to the ***sustainable growth of the country***, the local economy, improving the quality of life of the citizens, safeguarding a harmonious territorial location ***in compliance with climate and environmental commitments and regulations.***


## Main pillars of Chile's Green Hydrogen Action Plan (2023–2030)

🧭 **1. Promotion of the Domestic Market and Exports**

Stimulate local demand in sectors such as mining, transportation, and energy.

Facilitate access to international markets through infrastructure, trade agreements, and green origin certification.

⚖️ **2. Regulation, Safety, and Pilots**

Develop a clear and safe regulatory framework for the production, storage, transport, and use of hydrogen.

Implement pilot projects to validate technologies and business models under real-world conditions.

🌎 **3. Social and Territorial Development**

Ensure that the industry's deployment benefits local communities.

Promote citizen participation, regional development, and territorial harmony in project implementation.

🎓 **4. Capacity Building and Innovation**

Strengthen human capital through technical and professional training programs.

Promote research, technological development, and innovation across the green hydrogen value chain

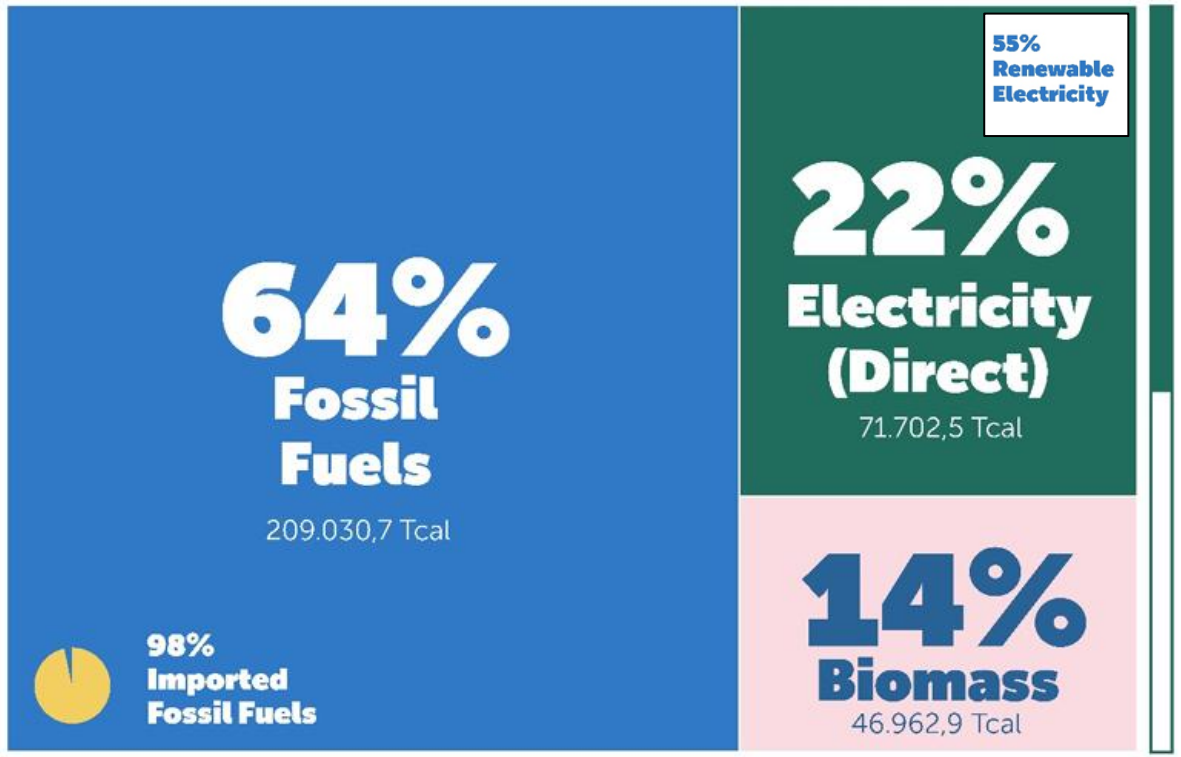
Source: Green Hydrogen Action Plan, Ministry of Energy, April 2024.

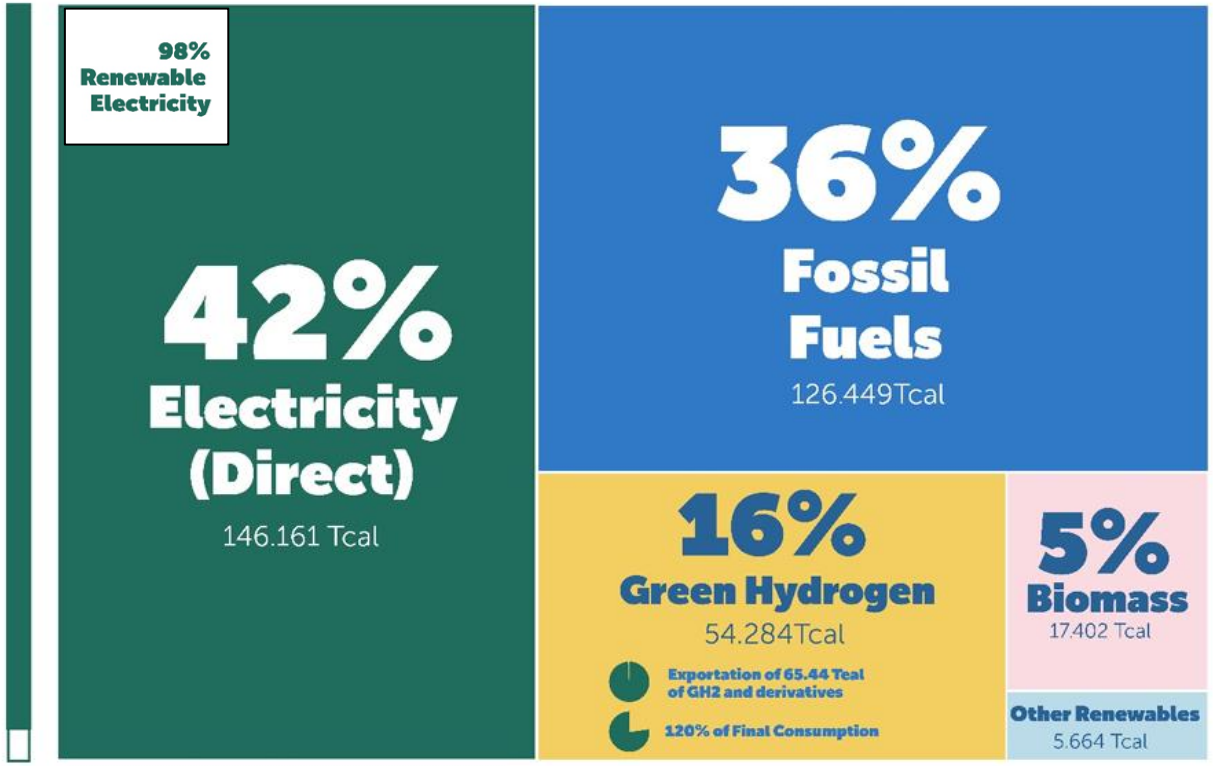
# Transforming the Energy Matrix to a more Secure and Independent System

**Final Energy Consumption @ 2022**

**Policy & regulations**
**Investments**

**Expected Final Energy Consumption @ 2050 – Carbon Neutrality Scenario**

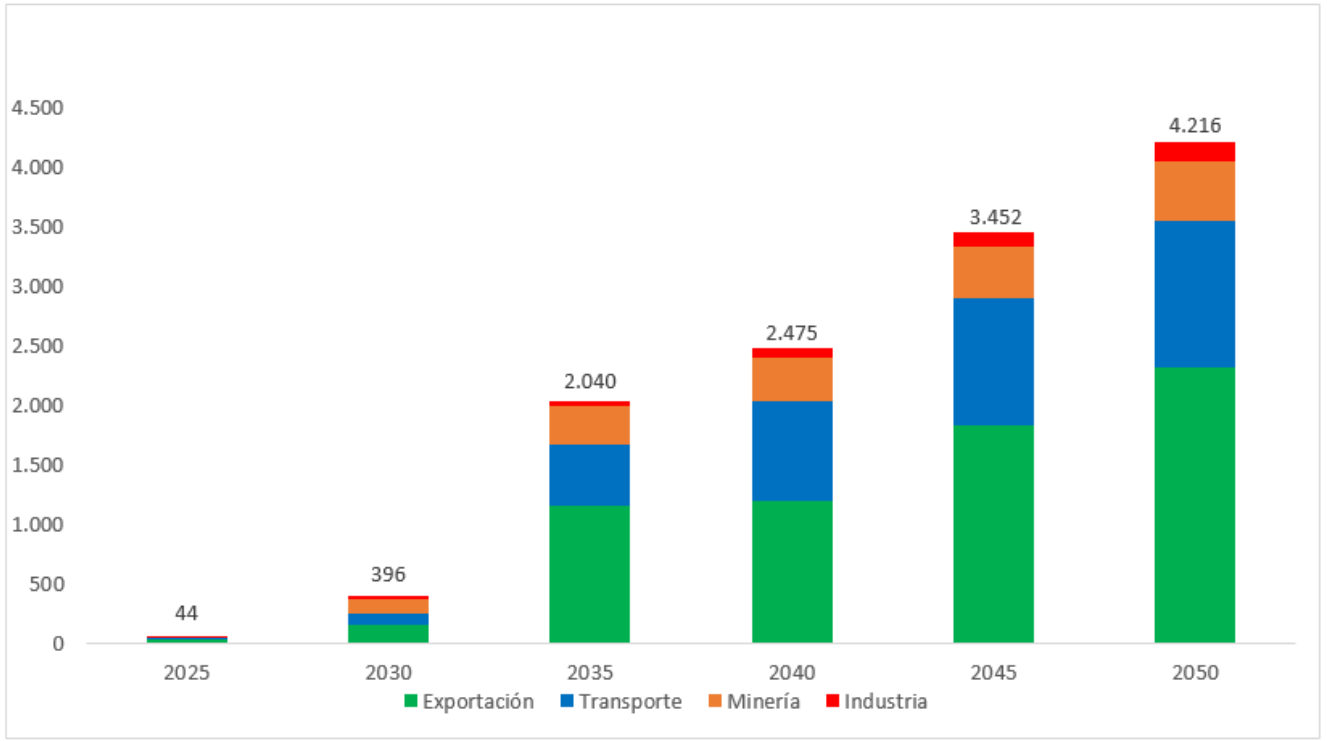



Sources: Min Energía

# Transforming the Energy Matrix to a more Secure and Independent System

## Green H2 projected demand – Carbon Neutrality Scenario by 2050




~65,4 Tcal of energy to be exported as Green H2 derivatives, manly as green ammonia, methanol and e-fuels

Sources: Min Energía

# Chile: Current state of the industry


**74 announced Projects**
Green H2 & derivatives

**9 projects**
**In operation**
Pilot scale

36 projects
Local uses

22 projects
Export

7 projects
Local & export

**5 projects**
environmental evaluation

**40 bUSD**
**Total investments**

**~10 GW**
Electrolysis capacity

## Train Antofagasta FCAB

The first hydrogen-powered locomotive in Chile and Latin America, marking a milestone in the railway history of the Southern Cone


Source: FCAB

## Public – private consortium


First intercity bus powered by green hydrogen

Source: La Tercera

## Walmart Chile and Grupo Marval

Launching the first green hydrogen truck in Chile

Source: Walmart, Marval

## GasValpo H2 Blending

Blending 5% of H2 in the existing NG network.
Goal is to reach 20%

## HIF Haru Oni

Combine the $CO_2$ and green hydrogen to produce 130 kL/year of e-Fuels
Electrolysis capacity: 1,2 MW

Source: HIF

## Walmart Chile & ENGIE


Source: ENGIE

First Industrial-Use Green Hydrogen Production Plant in Latin America for mobility applications
Electrolysis capacity: 0,6 MW

Sources: H2 Chile, Min Energía, SEIA

https://www.walmartchile.cl/revolucion-sustentable-walmart-y-marval-lanzan-primer-camion-de-hidrogeno-verde-en-chile/
https://www.fcab.cl/2024/09/09/ferrocarril-de-antofagasta-se-prepara-para-recibir-la-primera-locomotora-de-hidrogeno-de-latinoamerica/

# I+D initiatives are growing

**Clean Technologies Institute (ITL) – Antofagasta Region**

Aims to become the largest applied research and development (R&D) center in Chile's history, focused on: clean energy (such as solar and green hydrogen), low-emission and sustainable mining, circular economy, electromobility and energy storage.

Its strategic goal is to create a sustainable mining-energy cluster that drives regional development, technological innovation, and advanced human capital formation and transform the Antofagasta Region into a scientific, technological, and industrial hub of national and international relevance, accelerate energy transition and industrial decarbonization and generate technological solutions for the efficient and sustainable use of natural resources.

Collaborative model: Involves 24 partners, including 11 universities, tech centers, mining and energy companies.

**University of Concepción – Biobio Region**

Pilot-scale project to produce green copper using green hydrogen, representing a major technological innovation in the mining sector with the objective to replace traditional copper smelting with a zero-emissions and zero-waste process.

Project currently at TRL 5 and with the technology already patented in Chile, Mexico, China, Japan, and South Korea. Protection underway in other copper-producing countries.

**Technological Center for Innovation in Green Hydrogen – Magallanes Region**

Technology Center established to promote R&D, piloting, and scaling of hydrogen technologie, train human capital and support local value chains.

**Electrolyzer Manufacturing and Assembly Program - CORFO (Chilean Economic Development Agency)**

Aimed to promote the installation of electrolyzer manufacturing plants in Chile (500–1,000 MW/year capacity), encouraging local-international partnerships. Co-finance up to 60% of project costs.

**Technological Programs for Hydrogen Adoption in Industry - CORFO (Chilean Economic Development Agency)**

A Technological Program for the Use and Adoption of Hydrogen in Chilean industry was launched in 2023.
Five projects were awarded, including Hidrohaul, a USD 6.15 million initiative to develop hydrogen-powered logistics solutions (e.g., trucks, trailers, refueling stations).

# Chile is preparing the people to run the industry

## 🎓 Green Hydrogen Training Programs

- ✓ **University of Chile – Diploma in Green Hydrogen and Its Derivatives**
  Focus: Production, applications, project evaluation, regulatory and environmental aspects

- ✓ **Pontificia Universidad Católica – Executive Class**
  Courses: Production, storage, energy economics, industry analysis
  Target Audience: Energy professionals and entrepreneurs

- ✓ **Universidad Mayor – Diploma in Innovation and Use of Green Hydrogen**
  Focus: Generation, storage, regulations, and innovation tools

- ✓ **INACAP – Diploma in Green Hydrogen for Industry**
  Focus: Value chain, regulations, sustainable industrial applications
  Target Audience: Technical and industrial professionals

- ✓ **Universidad Católica de Temuco – Diploma in Green Hydrogen Science and Technology**
  Focus: Technical, economic, and environmental evaluation of renewable hydrogen projects

- ✓ **H2 Grand Prix – Horizon Educational Program & SOFOFA's High School Network(*)**
  International science and engineering education program for high school students that promotes the adoption of renewable energy and hydrogen technologies. It is based on the STEM model (Science, Technology, Engineering and Mathematics).
  The program aims to inspire the next generation of professionals in green hydrogen and sustainable technologies while it strengthens technical-professional education and promotes youth engagement in Chile's energy transition

(*) SOFOFA is one of Chile's most important business associations, representing the industrial and manufacturing sector

# Thank you!

*“The Green H2 is meant to contribute to decarbonize the global and regional economy, generate value for the territories and be a key player in the clean and fair energy transition. We must be aware of the relevance of natural ecosystems and biodiversity care, so the designs and implementation of our projects should have a systemic view of the three crises: Climate Crisis, Biodiversity and Pollution”*

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