ENERGY PARTNERSHIP CHILE-ALEMANIA

Ministerio de Energía
Gobierno de Chile

Federal Ministry for Economic Affairs and Climate Action

CHILE: CURRENT STATUS OF GREEN HYDROGEN, COAL EXIT AND CLIMATE RESILIENCE

This brief examines the status of Chile in the areas of coal exit, green hydrogen, and climate resilience development. As a country committed to reducing its CO_2 emissions by 30 to 45 percent by 2030 compared to 2016, Chile recognizes the critical role of transport in climate action. Chile is now focusing on advancing its green hydrogen initiatives and improving climate resilience. Key developments, policies, and projects that define Chile's commitment to a sustainable energy future will be discussed.

Goals and progress Coal exit:

In 2019, an agreement was forged between companies and the Chilean government to launch the "Coal-Fired Unit Retirement and Conversion Plan," developed in collaboration with GIZ. This ambitious initiative laid out a phased strategy to phase-out coal-fired power generation in Chile by 2040. Building on this commitment, the Ministry of Energy reaffirmed its dedication in November 2024 with the publication of the "Decarbonization Plan."

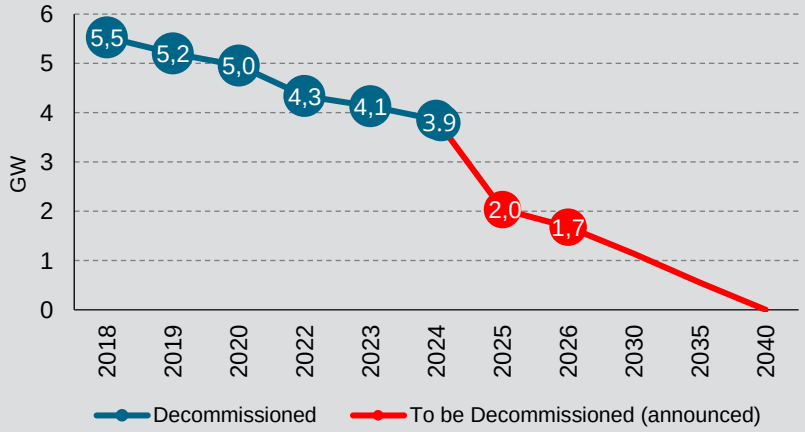
Chile's pledge to a cleaner energy future gained further momentum in 2021 at COP 26 in Glasgow, where the then Minister of Energy and Mining announced the country's official membership in the Powering Past Coal Alliance (PPCA). This bold move underlined Chile's determination to move away from coal and embrace a more sustainable energy landscape.

Fast forward to January 2025—Chile has successfully retired 11 of the 28 coal-fired units originally in operation at the time of the agreement, marking a significant 39% reduction in coal-based power generation. Yet, the journey is far from over, with 3.9 GW of installed capacity still awaiting decommissioning in the years ahead.

In terms of environmental measures, a modification is being proposed to Supreme Decree 13, which determines the amount of Greenhouse Gas emissions. This would include even greater restrictions than the existing ones but also seeks to consider a planned exit of coal-fired generation units according to the decarbonization plan.

Path for coal phase out capacity

2018 – 2024 decommissioned GW
2025 – 2040 to be decommissioned GW

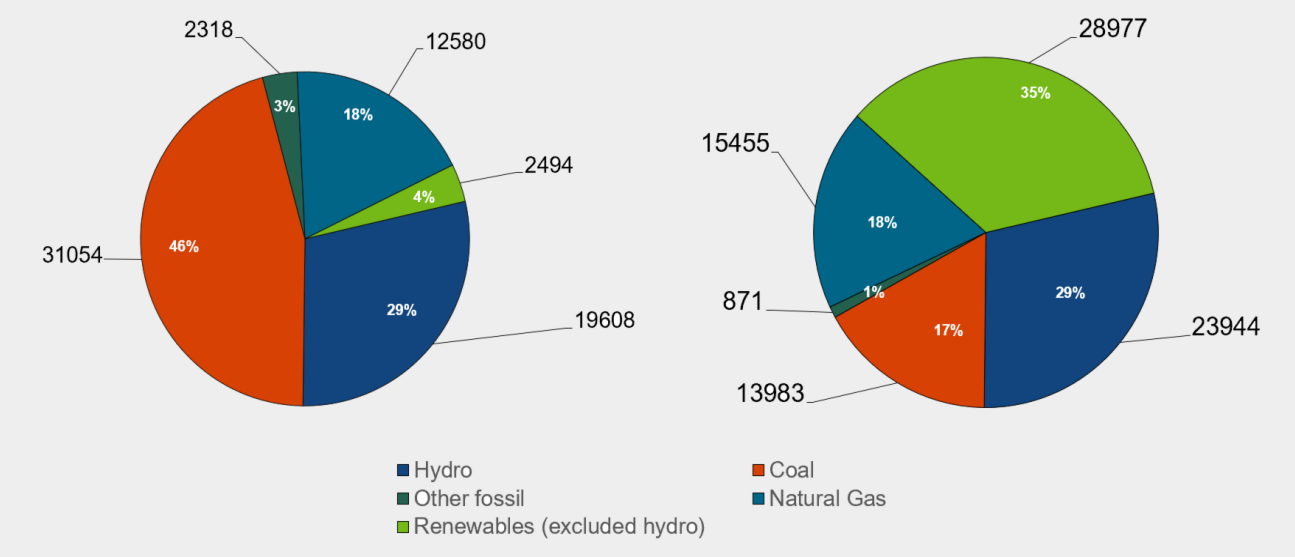


giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Source: own elaboration using data from the decarbonization plan of the Ministry of Energy.

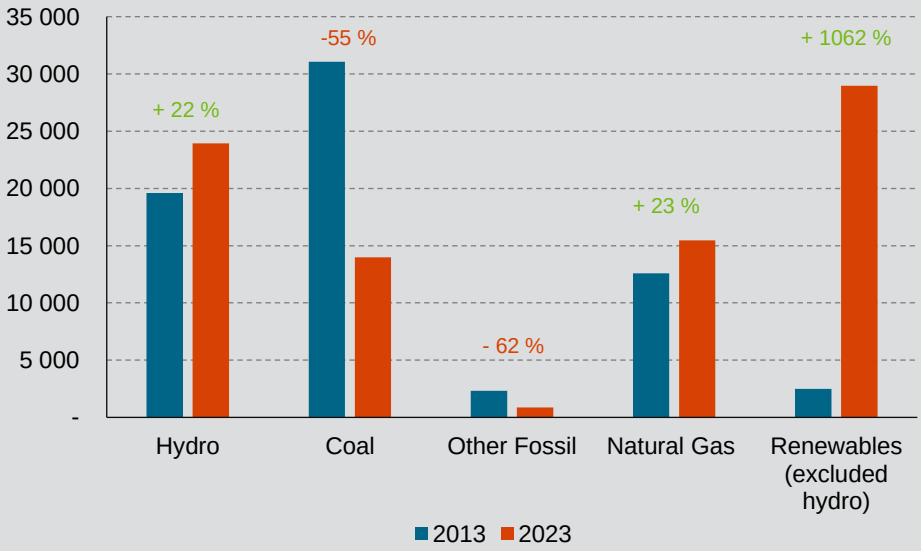
As illustrated in the graph below, Chile's has undergone through a substantial transformation over the past decade, reflecting a global shift towards cleaner and more sustainable energy sources. Between 2013 and 2023, hydroelectric power remained a key player, increasing from 19,608 MW to 23,944 MW. However, the most striking change has been the rapid expansion of non-conventional renewable energy—excluding hydro—which increased from 2,494 MW to nearly 29,000 MW, marking a 1,062% rise from 2013. This growth underscores Chile's commitment to diversifying its energy mix and reducing its carbon footprint. At the same time, coal-fired power generation has sharply declined, dropping from 31,054 MW to just under 14,000 MW (-55%). Other fossil fuel-based generation has also deceased, aligning with Chile's broader environmental objectives. Meanwhile, natural gas saw a modest increase, hinting at its role as a transitional fuel as the country integrates more renewables into its grid.

Electricity generation mix in Chile
2013 - 2023
(GWh and percentage)



Source: own elaboration using data from the national electric coordinator.

Electricity generation in Chile
2013 - 2023
(GWh and percentage)



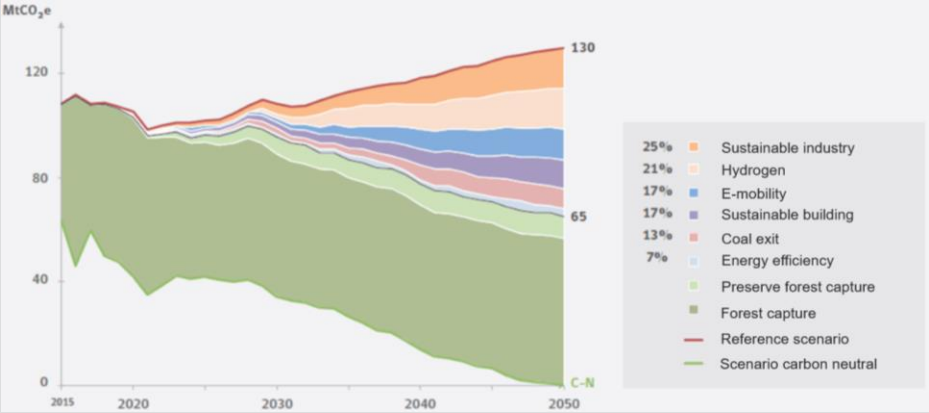
Source: own elaboration using data from the national electric coordinator.

The Green Hydrogen National Strategy and action plan:

Chile has been a leader in promoting the green hydrogen industry, which has led to the creation of numerous pilot projects and investment announcements. According to the IEA´s project database 2024, this has established the country as a leader in investment announcements in the region. The country's exceptional wind resources have made Chile an attractive destination for investments, given to the low LCOE of solar and wind energy, which are considered among the cheapest in the world.

Green hydrogen and its derivatives are identified as a key sector for the country's energy transition process aimed to achieve a more sustainable economy, representing an alternative that has the potential to contribute 21% to emission reduction helping the country to achieve carbon neutrality by 2050.

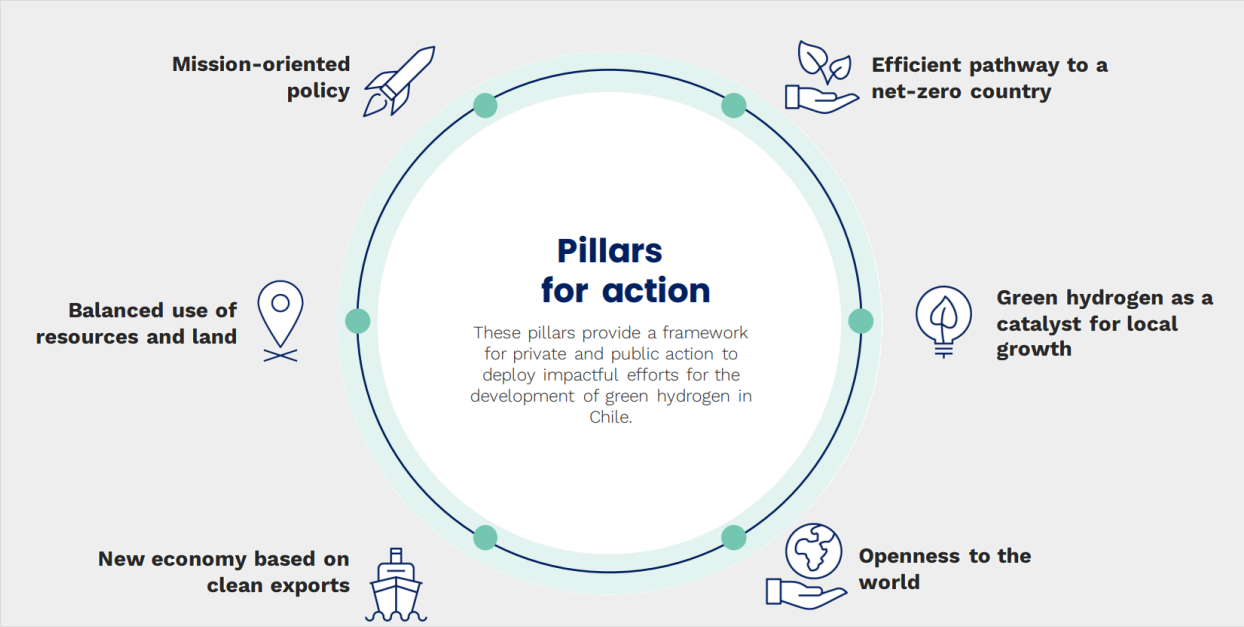
Path to Carbon Neutrality in 2050



Source: Ministry of Energy Chile.

Since the launch of the Green Hydrogen National Strategy, Chile has been fast-tracking the development of the industry through a Green Hydrogen Action Plan[1]. This plan outlines key initiatives designed to set a comprehensive framework, covering areas such as certification processes, sustainability criteria, governance structures, permitting systems, industry sustainability, productive linkages, and other essential elements. The objective is to establish an industry that not only contributes to local value but also fosters inclusivity, ensuring that no one is left behind.

Pillars of the Green Hydrogen Action Plan



[1]National Green Hydrogen Strategy: https://energia.gob.cl/sites/default/files/documentos/estrategia_h2_-_ingles_final.pdf

Source: National Green Hydrogen Strategy.

Pioneering the production of Synfuels

In the Magallanes region, the Haru Oni pilot project has become the world's first pilot plant for the production of synthetic fuels, both in Chile and globally. Built by Highly Innovative Fuels (HIF), this plant utilizes renewable wind energy. Through electrolysis, the project aims to produce green hydrogen. Additionally, it captures CO2 from biogenic sources and employs a synthesis process to combine CO2 and hydrogen, producing synthetic fuels, including synthetic gasoline and synthetic natural gas.

In 2023, the company began exporting e-fuels to Porsche, marking a significant milestone in the commercialization of synthetic fuels. Porsche received a commercial shipment of 24,600 liters of synthetic fuel, which will be used at their Experience Centre and on Mobil 1 SuperCup circuits. These e-fuels can be used in conventional vehicles without modifications, offering a nearly carbon-neutral alternative to traditional gasoline. Porsche's investment in HIF Global highlights their commitment to sustainable mobility through synthetic fuels, paving the way for future collaborations and infrastructure development in the e-fuel sector.

Announced projects are failing to reach final investment decisions

According to the IEA's database, the country has around 67 projects, but only 7 are operational and 2 have reached final investment decision. According to agency, continued increases in interest rates have led investors from the world to withdraw equity from sectors struggling to meet shareholder requirements.[2]

International Energy Agency Hydrogen project database 2024

(Data for Chile)

	Product			
	Ammonia	H2	Methanol	Synfuels
Concept	14	19	1	
DEMO		1		
Feasibility study	11	10	2	
FID/Construction		2		
Operational		6		1

Source: IEA's project database.

[2] IEA's Green hydrogen review Page 147: https://iea.blob.core.windows.net/assets/89c1e382-dc59-46ca-aa47-9f7d41531ab5/GlobalHydrogenReview2024.pdf

Climate Change Resilience, Mitigation, Adaptation:

Climate change significantly challenges the Chilean energy sector, increasing it´s vulnerability due to phenomena such as intense heatwaves, prolonged droughts and more frequent extreme events. These changes have an impact on energy production, distribution and supply security, emphasizing the need to strengthen the resilience of the sector.

The Energy Partnership Chile-Alemania established its **task force** '**Climate Neutrality 2050 and Mitigation in the Energy Sector'** in March 2023 with a MoU between the Chilean and the German ministries. Both sides share a growing interest in strengthening cooperation in this field and creating a specific platform focused on achieving their ambitious national climate targets. Germany aims to achieve carbon neutrality by 2045, while Chile must be carbon neutral by 2050 at the latest.
Following a suggestion of the Chilean side, the topic of *Critical Infrastructure and Energy Security in the Face of the Effects of Climate Change* was included – a topic which had not yet been addressed in depth in Germany before. The Energy Partnership works to enhance the quantitative indices used to evaluate the impacts of the climate crisis on the national energy system[3], expanding their coverage to new sub-sectors as well as improving their accuracy. Such analysis of vulnerability indices aim to provide more effective tools for planning and implementing adaptation and mitigation actions, contributing to Chile´s long-term sustainability and energy security.
Examples:
Water Resources: hydropower plants face declining water availability due to prolonged droughts and changes in precipitation patterns, reducing their generation capacity and affecting energy security.
Electricity Infrastructure: transport and distribution networks are susceptible to damage from storms, floods and forest fires, which can lead to supply disruptions and high repair costs.

Hydrocarbon Infrastructure: oil and gas pipelines as well as marine terminals can be damaged by storm surges, sea level rise and landslides, interrupting fuel flow and jeopardizing energy security.

Residential, Commercial and Industrial Sectors: temperature variations and extreme events alter energy consumption patterns, increasing demand for cooling or heating and generating peaks that challenge the balance between supply and demand.

The Chilean **Framework Law on Climate Change**, or Law 21.455 was approved and published in 2022. The Chilean Nationally Determined Contributions (NDCs) to the Climate Accords advance the country's emission peak to 2025 and reduce the annual emissions to 95Mt CO_{2eq} by 2030. The plan to achieve carbon neutrality by 2050 also includes phasing out coal power plants and promoting renewable energy and electric vehicles as well as reforestation with native trees and reducing deforestation emissions is also part of the Chilean NDCs. The Green Hydrogen economy is set to make a significant contribution to GHG mitigation of around 24 percent. Chile is among first countries to formally adopt the legal objective of achieving a carbon neutrality and resilience by 2050, in response to the urgent need to counteract the effects of climate change. In its third article, the law defines the 'capacity of a system or its components to anticipate, absorb, adapt or recover from the adverse effects of climate change, maintaining its essential function, while preserving the capacity to adapt, learn and transform'. At the same time, the path of climate resilience presents opportunities to progressively advance towards a sustainable development of the national economy in a safe and efficient way, promoting actions that allow balancing the required investments with the reductions in operational costs that will be perceived.

[3] "Estudio que perfecciona el sistema de índices cuantitativos de impactos de la crisis climática en el sistema energético nacional chileno": https://energypartnership.cl/fileadmin/chile/media_elements/Studies/2025_Indices_cuantitativos_de_impactos_de_la_crisis_climatica_CHL.pdf

Published by:

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c/o Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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