# Green Hydrogen Action Plan

2023-2030

Gobierno de Chile

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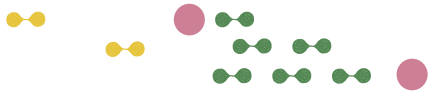


# Green Hydrogen Action Plan 2023-2030

April 2024

# NOTE

This action plan focuses on the green hydrogen industry, its derivatives, and the entire value chain.

The document is structured into six sections. The first section presents the words of the Minister of Energy, Diego Pardow, regarding the scope of the Green Hydrogen Action Plan. The second section provides a selection of the most relevant milestones and a detailed list of the objectives to be achieved, organised into two time windows.

In the third section, the reasons for promoting the development of the green hydrogen industry in Chile are outlined. Its fundamental role in achieving the goal of carbon neutrality by 2050 is highlighted, as well as the opportunities it offers for the sustainable development of the country.

The fourth section presents the process of drafting the plan, including the participative strategy in five instances and the methodology used for developing the proposed actions.

The fifth section contains the strategic guidelines that have shaped the definition of plan actions. This includes target images of what the country aims to achieve through the green hydrogen industry, the sustainability criteria used to build the proposal, and a governance structure that will serve as a vehicle for achieving the established objectives.

This Plan's backbone lies in section six, titled "lines of action." For each line of action, the objective explaining the grouping of actions is described, and a Gantt chart is presented as a prologue to understanding the actions, their relationships, and milestones. The colours of the horizontal bars indicate the common scope (if any) between different actions. Moreover, connectors representing the relationship between actions are presented. If the connector has a single direction, it indicates input-output, and if it has double direction, it indicates mutual feedback. Milestones representing significant activities that give tangibility to the implementation of actions are also included. In milestones where a dotted line appears, it indicates processes or actions that repeat year after year, such as annual reports or critical updates.

# TABLE OF CONTENTS

# 1

# MESSAGE FROM THE MINISTER OF ENERGY

# MESSAGE FROM THE MINISTER OF ENERGY

Chile has great opportunities to leap towards a more diverse, productive, and innovative economy that drives the country forward, generates quality jobs, and puts us at the forefront of key industries for a more sustainable future for the planet.

President Gabriel Boric has been clear. We have an immensely powerful triad: copper, lithium, and green hydrogen. With green hydrogen, we have a unique opportunity to innovate, to provide the necessary incentives, and thus prepare ourselves and facilitate the creation of an industry for the future.

In this journey, the green hydrogen industry will contribute to the productive reconversion of those communities that have coexisted with polluting industries. Therefore, industry development will be with and for communities, progressively transitioning from fossil fuels to clean fuels like green hydrogen. Investment, more jobs, local development, but above all, coherent with our State policy towards a carbon-neutral country.

To achieve the deployment of the industry and the challenges it presents, agreements that transcend time are required, providing the necessary certainty for the industry, materialising through State policies. Today, we have a consensual and long-term energy vision reflected in our National Energy Policy and the National Green Hydrogen Strategy, which defined the first guidelines for boosting this industry in the country and established ambitious medium and long-term goals.

But to materialise the deployment of a sustainable green hydrogen industry in our country, we needed to complement the National Strategy. That's why, as a government, we worked on the construction of this Action Plan that focuses on and prioritises measures to be developed in this decade. With this document, we seek to maintain the tradition of consensus policies in energy matters, but with a pragmatic focus on concrete actions for all stakeholders.

The Green Hydrogen Action Plan underwent an intense participation process through various instances. Twenty-two face-to-face and online civic hearings and workshops were held in all regions of the country, attended by more than a thousand people, industry representatives, and civil society organisations. Additionally, the document received around 1,900 comments and observations during the Public Consultation process.

In parallel, other instances were held such as Interministerial Meetings that were the focus of technical work on the Action Plan, a Consultative Council, and a Strategic Committee, consisting of ten women and men, including former President Michelle Bachelet and former Energy Minister Juan Carlos Jobet, among other figures from the academic and political world. This allowed the instrument to be endowed with a cross-sectional perspective that transcends different governments and prioritises the country's best interests.

The 81 actions contained in this Plan are aimed at responding to different lines of work: (1) governance and multi-stakeholder participation; (2) information, dissemination, and civic education; (3) mechanisms for economic and financial support for the industry; (4) environmental management; (5) industry sustainability; (6) regulatory enablement; (7) permitting system; (8) compatibility and territorial integration of projects; (9) enabling infrastructure development; (10) demographic challenge of energy transition; (11) electricity transmission and energy costs; (12) uses for decarbonising the economy; (13) demonstrative projects; (14) promotion of productive linkages; (15) strengthening and development of human capital; (16) gender perspective in the industry; (17) promotion of research, development, and innovation; and (18) opening to international markets.

As you know, our country possesses unique comparative advantages. Firstly, there's our natural environment. The winds in southern Chile and solar radiation in the Atacama Desert surpass those of anywhere else in the world, providing ideal conditions for energy generation through wind and solar plants that cannot be replicated elsewhere.

The second advantage Chile has is a long-term institutional commitment to climate change that allows the entire country to push for the deployment of this industry, respecting the environment and in coordination with local communities.

These two advantages, and thinking about our future competitors, are essential for Chile to become a world leader in the production of this clean fuel. Other countries like the United States and Australia have begun to show their strategies, and in that sense, Chile's bet is a safe, institutional path anchored in the rules governing international trade.

In the past year, the first projects have been deployed, which are a sample of the diversity and development possibilities that this industry can offer to our country. We have a blending project in Coquimbo where green hydrogen is being delivered to some homes through the natural gas network, allowing this technology to be brought closer to people. In the Metropolitan Region, there is a logistics centre that uses green hydrogen in forklifts, thus reducing operation times.

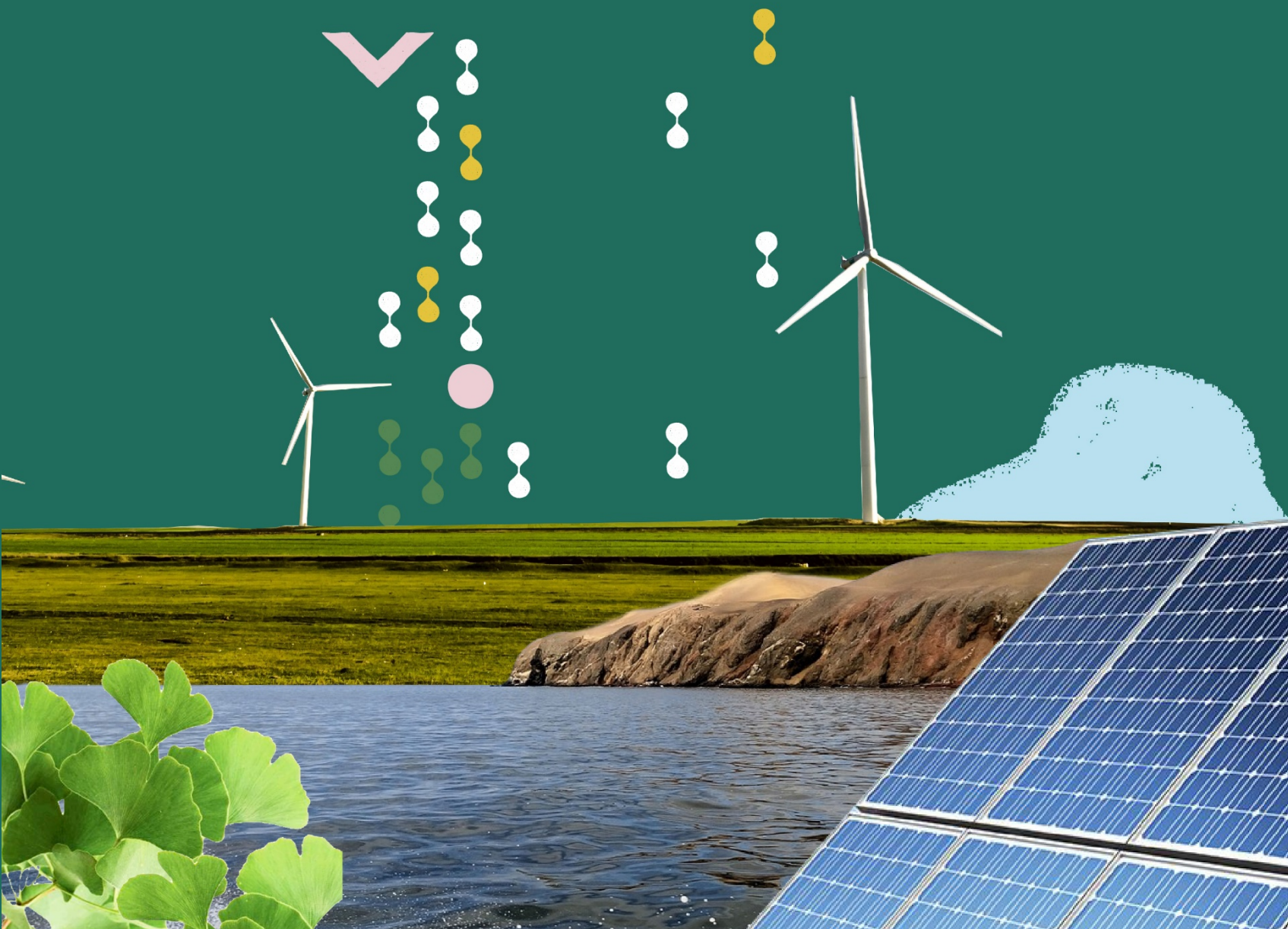
This nascent industry has also allowed certain tasks to be reoriented, as in Magallanes, where the synthetic fuel production plant from green hydrogen has required testing to adapt to these new energy sources. The above is just a sample of the potential that this industry has for Chile.

This Green Hydrogen Action Plan offers a common, clear, and concrete path to take advantage of the unique opportunity our country has. The roadmap we are presenting will allow us to create the enabling conditions that will drive the creation of this new industry, the generation of quality jobs, the development of productive linkages in the regions of the country, and progress in innovation and technological development, contributing to the economic and social development of Chile and its inhabitants, and at the same time, making a substantial contribution to the fight against the climate crisis.

Diego Pardow Lorenzo
**Minister of Energy**

# 2

# KEY MILESTONES



# KEY MILESTONES

*The ten milestones listed below are highlighted for their role in enabling the industry. Their implementation will be realised in the first time window of this Action Plan.*

- Installation of electrolyser equipment in technical-professional high schools for practical teaching of the electrolysis process and other components of the green hydrogen value chain, starting in the Magallanes Region and then in the Antofagasta and Biobío regions.

- Formal opening of the GH2 Financial Facility instrument in 2024 and commencement of work with projects for financing from 2025 onwards.

- Closure of the first process of allocation of "Ventana al Futuro" (Window to the Future) state-owned lands, realising projects mainly in the Antofagasta Region. Additionally, a second allocation process will begin.

- Awarding of the tender for the reinforcement of the Mardones Pier, in the Magallanes Region, to increase its logistical capacities for the landing of equipment and inputs necessary for the industry.

- Strengthening of the R&D Law, tripling its upper threshold of tax credit, through the Income Tax Reform Law.

- Publication of Public Environmental Baselines facilitating environmental assessment processes and standardising available information, starting in the Magallanes Region and subsequently in the Antofagasta Region.

- Publication of the first version of the green hydrogen information and consultation platform, to facilitate the delivery of information regarding the industry, in line with the access to information standards of the Escazú Agreement.

- Launch of the "Magallanes Technological Development Centre" (to be tendered) and the "Technological Development Centre for the Maritime and Naval Industry" (Chilean Navy), to strengthen the development and management of green hydrogen technological innovation.

- Start-up of the green hydrogen plant in Cabo Negro in the Magallanes Region, which will allow hydrogen to be injected into the ENAP industrial complex gas networks, promoting hydrogen consumption, and supporting decarbonisation.

- Publication of feasibility results for the transportation of copper and sulphuric acid to materialise the first green commercial maritime route in Latin America before 2030, prioritising the Antofagasta Region and other industrial zones of the country.

# 2.1 TIME WINDOWS

Green hydrogen and its derivatives can play a role far beyond our commitments to carbon neutrality and energy security needs. It offers a unique opportunity for the sustainable transformation of our energy and industrial systems, contributing to national economic growth, local development with high environmental standards, and positioning itself as a sector that sets an example for other industries.

The Action Plan is envisaged for green hydrogen, its derivatives, and the entire value chain. Therefore, the proposed actions are varied in both scope and theme and competence. For example, some depend on a single public service while others require coordinated interministerial work; many of them are designed to be implemented in a concatenated and logical manner; some are specific in nature, while others are cross-cutting.

As a result of the Action Plan development process, these measures have been arranged into 18 lines of action to advance the establishment of certain necessary conditions for the development of green hydrogen and derivatives.

The **first implementation time window (2023-2026)** is designed to achieve the appropriate investment signals, rules, and necessary regulations (with a strong focus on trends towards ammonia) and to strengthen relationships with potential buyers. The **second time window (2026-2030)** is designed to begin to materialise productive development and decarbonisation with an emphasis on regional and local development. In this context, Figure 1 shows these conditions to be achieved based on the measures.


FIGURE 1: TIME WINDOWS FOR ACTION IN THIS DECADE

3

# A WINDOW OF OPPORTUNITY FOR CHILE

# 3.1 WHY GREEN HYDROGEN?

Currently, Chile faces significant challenges in decarbonising its energy matrix, as our sector is still highly dependent on fossil fuels: 64% of final energy consumption comes from fossil sources[1], not including fossil fuels used for electricity generation, and this sector is responsible for 76%[2] of the country's total greenhouse gas emissions (28% from thermal power generation, 25% from transportation, 15% from industry, 7% from building consumption, 1% from fugitive emissions).

Additionally, our country imports nearly 98% of the fossil fuels we use, leaving us in a vulnerable position, both in terms of supply security and fluctuating international fuel prices.

Despite this, Chile has the conditions to address challenges related to emissions and supply vulnerability, especially due to our enormous potential for renewable energies. While hydroelectricity has always been present in our electrical matrix, the last decade has seen a significant increase in the participation of other renewable energies. Before 2015, the country had 720 MW of installed capacity in wind energy and 225 MW in solar energy, and to date, the figures reach 4,509 MW and 8,938 MW, respectively[3]. This contribution could continue to increase in the future, as our estimated potential for renewable energy development reaches 2,315 GW[4], 70 times the currently installed electrical capacity.

[1] National Energy Balance 2022. Ministry of Energy.

[2] 5th Biennial Update Report to the United Nations Framework Convention on Climate Change.

[3] Installed Generation Capacity Statistics, National Energy Commission (CNE from its acronym in Spanish).

[4] Identification and Quantification of Renewable Energy Potentials 2021, Ministry of Energy. 1 GW = 1,000 MW.

In light of this scenario and in order to meet climate challenges, in 2019, in preparation for COP 25, we started working to define a cost-effective pathway to carbon neutrality by 2050, which was reflected in the Paris Agreement. The pathway identified, as a first effort, the incorporation of more renewable energies into the electrical system to reduce its emissions factor. However, we must make substantial progress in decarbonising and electrifying other energy consumption, as currently only 22% of our country's final energy use is supplied by electricity.

Projections in the Long-Term Energy Planning (PELP from its acronym in Spanish) 2022-2060 show that direct electrification could increase to over 50% of final consumption. The challenge remains to decarbonise the remaining 50%, which involves energy consumption that is difficult to electrify, such as those associated with high-tonnage transport, interregional buses, household natural gas use, among others.

The response to this challenge is electrification and indirect decarbonisation through an energy vector, such as green hydrogen or synthetic fuels derived from it. In this way, the major actions to achieve carbon neutrality are:

1. Promoting energy efficiency (contributing 35% of the emissions reduction necessary to achieve carbon neutrality).
2. Increasing the contribution of renewable energies to the electrical system (contributing 24%).
3. Promoting electromobility (contributing 18%).
4. Developing green hydrogen and derivatives, primarily in mining and freight transport applications (contributing 24%).

In parallel, and reinforcing the path that was being outlined, in 2019, as the State of Chile, we signed an agreement with the owners of coal-fired power plants for their decommission by 2040,

or their retrofit, and the commitment to not install new plants in the country.

Likewise, this commitment to Energy Transition is established in various public policy instruments. In 2019, we published the Long-Term Climate Strategy (ECLP from its acronym in Spanish) which establishes a route to emissions neutrality, where one of the goals is to ensure that at least 20% of the fuel matrix is constituted by green hydrogen or derivatives. Additionally, for the first time in the country, in 2022, we established a binding climate commitment through the enactment of the Climate Change Framework Law and its carbon neutrality target by 2050.

Also in 2022, we updated the National Energy Policy considering the significant changes that had occurred in the country and the world since the first version in 2015. The commitments of this update of the Policy are focused on accompanying the transition process towards 2050.

In this context, green hydrogen opens up a great opportunity for Chile, as we have comparative advantages in renewable energy availability for its production and regulatory conditions that favour foreign investment. We have the opportunity to position ourselves as a producing and exporting country of this energy, which also contributes to the sustainable growth of our local economy, improving the quality of life of citizens, safeguarding harmonious territorial location, and adhering to climate and environmental commitments established by our country.

### *3.1.1 Historical Energy Mix up to 2022*

Currently, Chile has a highly fossil fuel-dependent energy consumption, mostly imported. The latest National Energy Balance, based on 2022 data, indicates that:

- 64% of the energy used in the country was supplied by fossil sources, such as diesel, gasoline, natural gas, among others. Of these, 98% is imported from other countries.
- 14% of the energy corresponds to biomass.
- 22% of the total energy was supplied by electricity. Of this, 55% came from renewable sources.

From the above, it is possible to affirm that only 22% of the final energy consumption was supplied by renewable and clean sources in the country. Of the remaining 78%, a large part came from fossil sources imported from other countries.

Chile today faces the great challenge of decarbonising its entire energy matrix, and in this, the electrification of consumption with a clean electrical system and the use of green hydrogen and its derivatives are essential for this task, which will also provide a level of autonomy and energy sovereignty crucial for future challenges.

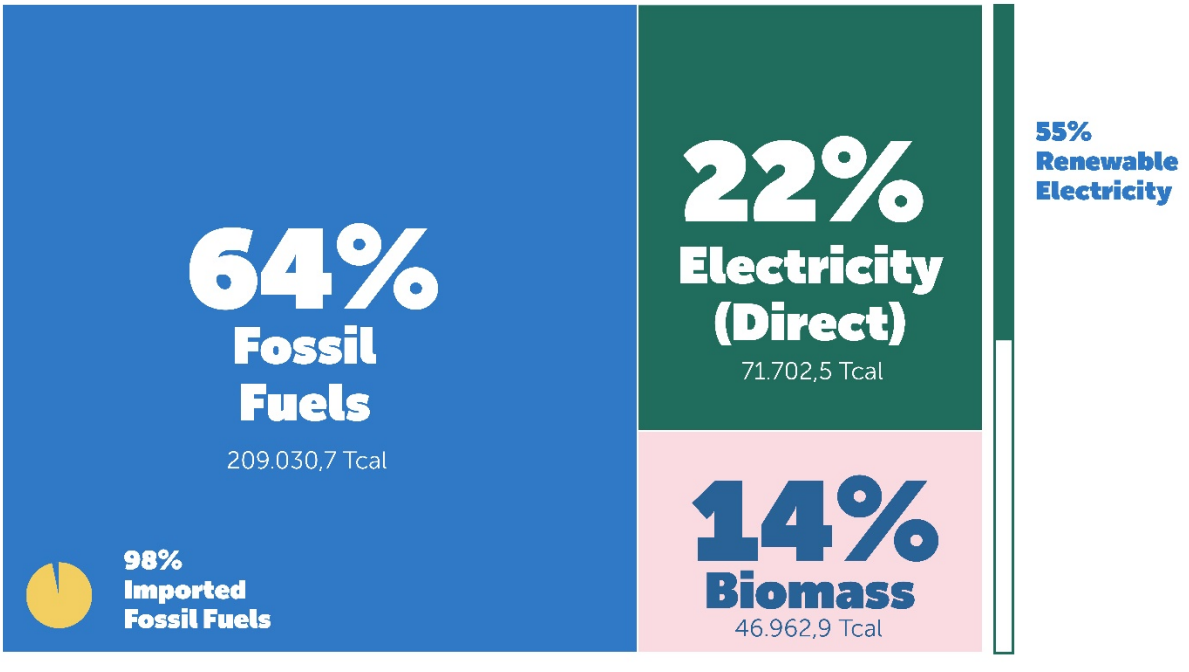



FIGURE 2: FINAL ENERGY CONSUMPTION IN CHILE, 2022. NATIONAL ENERGY BALANCE: 327,696 TCAL

## 3.1.2 Projected Energy Mix up to 2050

According to the energy projections of the Long-Term Energy Planning (PELP) developed by the Ministry of Energy, by the year 2050, the country's energy consumption will undergo a substantial transformation in its composition. The most significant change is the reduction in fossil fuel consumption, driven mainly by increased electrification of consumption, shifting from 22% to a range between 42% and 46% by 2050 (depending on the scenario), and the incorporation of green hydrogen and its derivatives, accounting for a range between 16% and 17% of national energy consumption.

Fossil fuels will decrease their share from 64% in 2022 to a range between 31% and 36% by 2050, allowing Chile to depend less and less on mostly imported fuels. This will develop an industry in the country that will do just the opposite: use ports and the productive infrastructure associated originally with that importation to export clean fuels to the world, such as green hydrogen, green ammonia, green methanol, among others. The opportunity is crucial for restructuring productive activity in Chile, maintaining, and improving the jobs associated today with an inherently polluting industry, to transition to a clean industry that must be developed harmoniously with the environment, territory, and communities.

Below, the final energy consumption projected in the country by the year 2050 is presented for two of the scenarios of the Long-Term Energy Planning (PELP): Carbon Neutrality and Accelerated Transition.

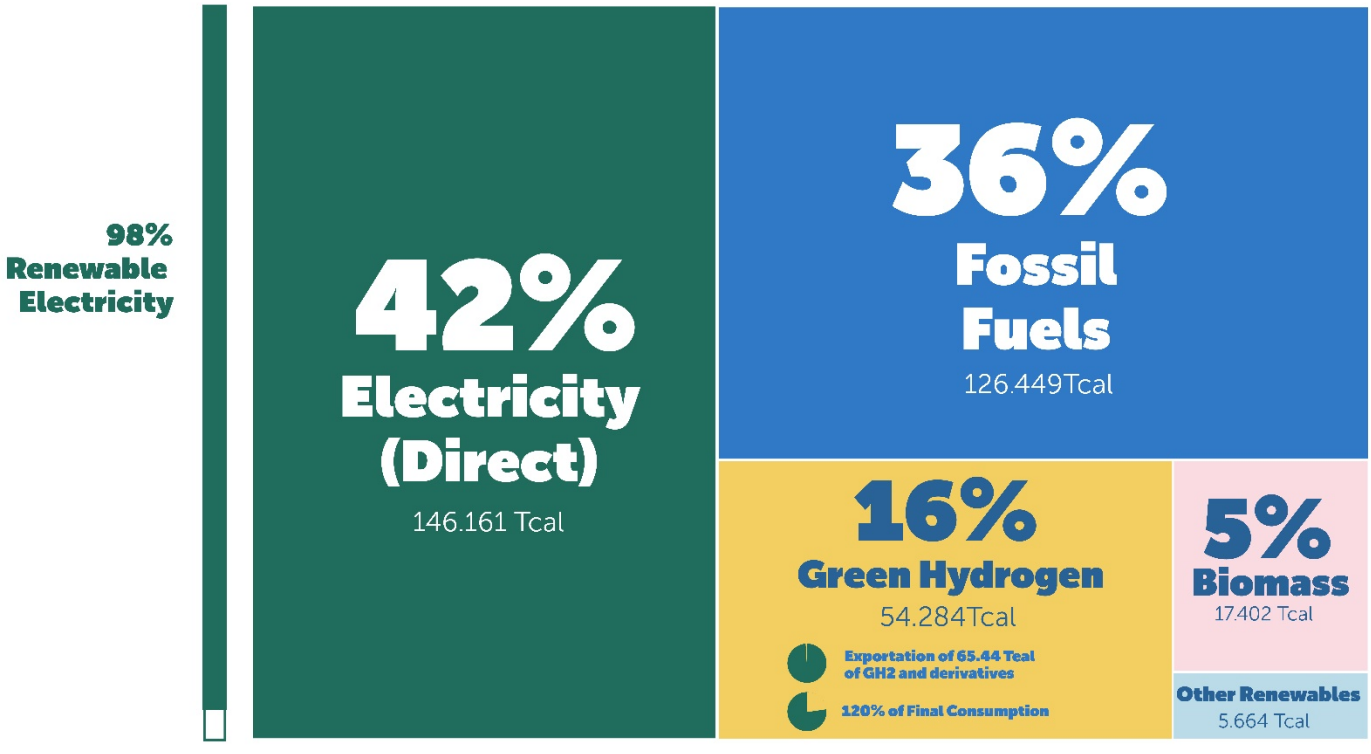



FIGURE 3: FINAL ENERGY CONSUMPTION IN CHILE, 2050. PELP: CARBON NEUTRALITY SCENARIO: 349,959 TCAL

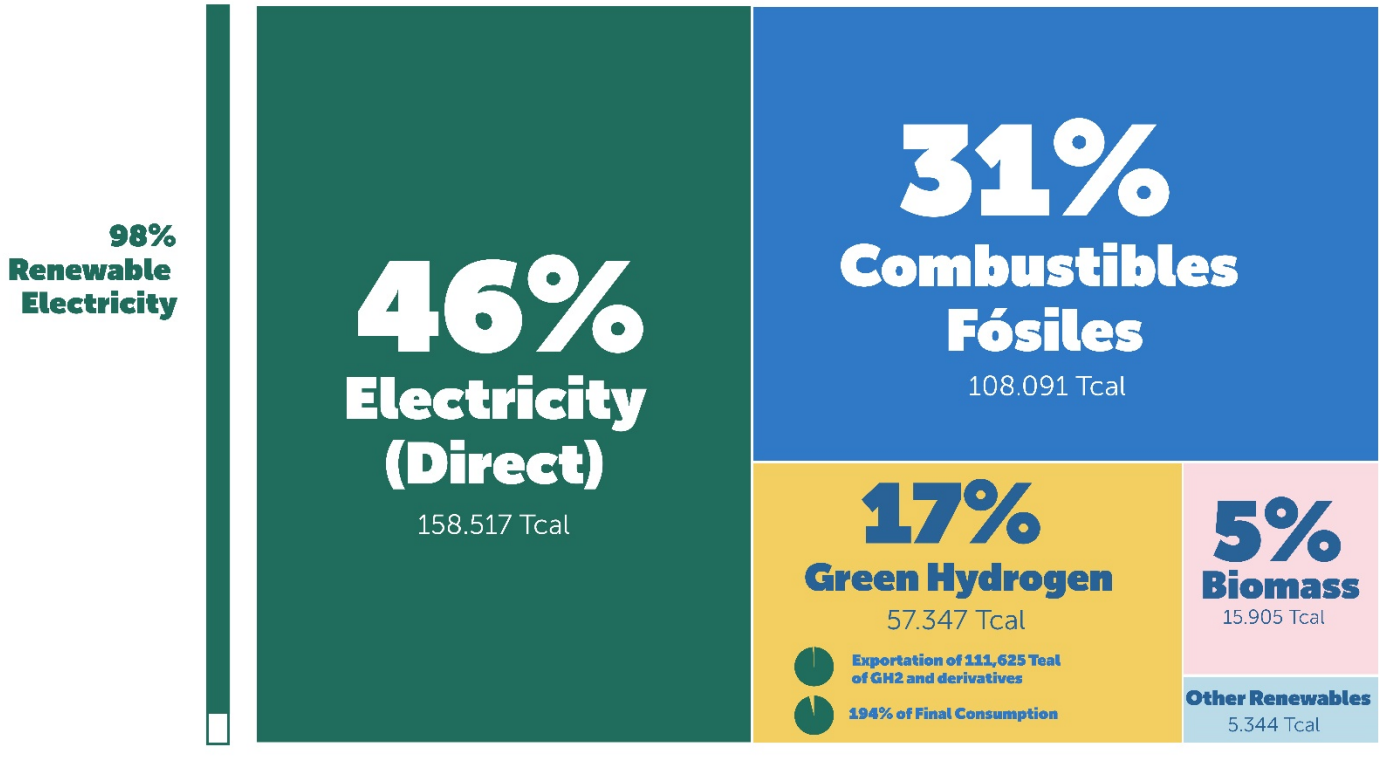



FIGURE 4: FINAL ENERGY CONSUMPTION IN CHILE, 2050. PELP: CARBON NEUTRALITY SCENARIO: 349,959 TCAL

# 3.2 SUSTAINABLE INTERNATIONAL ECONOMY

Green hydrogen and its derivatives will play a substantial role in decarbonising the national economy to achieve the goal of becoming a carbon-neutral and resilient country by 2050, thus complying with the Climate Change Framework Law.

Furthermore, it presents another opportunity associated with the country's productive reconversion, as explained in the previous section. It will allow us to shift from importing polluting fossil fuels to exporting clean fuels to the world, while maintaining and improving productive activities in different territories, such as employment and local development, thus enabling a new productive identity for Chile.

The hydrogen industry also encompasses a value chain that, as a whole, involves a significant number of individual productive activities. Therefore, it requires substantial investments for its competitive production globally, with economies of scale being one of the main criteria to achieve this goal.

As indicated in the National Green Hydrogen Strategy, Chile will be one of the main producers of green hydrogen and its derivatives. This will allow us to decarbonise our productive matrix, but also to export clean fuels to the world and provide the country with an economic activity suitable for the challenges of this century, based on the pillars of the mentioned Strategy:

- Mission-oriented policy
- Efficient pathway to a net-zero country
- Balanced use of resources and land
- Green hydrogen as a catalyst for local growth

- New economy based on clean exports.

Openness to the world the world recognises Chile's potential to be a leader in the production of clean energies, considering its unbeatable conditions in renewable energies and as a country with State policies in the energy sector, developed with consensus among different actors and stable over time.

Thus, various publications highlight the country's global competitive position in this regard, for example:

- Latin America Energy Outlook 2023[5], by the International Energy Agency.
- International Trade and Green Hydrogen 2023[6], by the International Renewable Energy Agency, IRENA.

[5] https://www.iea.org/reports/latin-america-energy-outlook-2023
[6] https://www.irena.org/Publications/2023/Dec/International-trade-and-green- hydrogen-Supporting-the-global-transition-to-a-low-carbon-

# 3.3 POLICY, STRATEGY, AND ACTION PLAN

In light of the emergence of renewable energies in the early 2010s and the need to outline strategic guidelines to better leverage this trend in our country, the first National Energy Policy to 2050 was published in 2015. This policy was built through a deep and extensive participatory process, pioneering for its time, based on the search for consensus among sector stakeholders. Additionally, it is considered the first long-term vision State policy, under which the sector's main actions are subscribed.

Given the significant changes experienced in Chile and the world since 2015 regarding energy transition, it was decided to update the framework of broad consensus provided by the Energy Policy to continue being a useful guide for sector action. At the beginning of 2022, we published the first update of the Policy, again developed through a participatory process. The new document focuses on accompanying the transition process towards the carbon neutrality goal by 2050 and reaffirms commitments related to decontamination, the contribution of energy to the country's productive identity, quality of life, energy system security, and the way to make public policies based on information and participation.

The updated Policy establishes 66 goals, among which the following stand out: (1) 100% zero-emission energy in the electricity sector by 2050; (2) at least 80% renewable energy in the electricity sector by 2030; (3) 2 GW of storage projects in the electricity sector by 2030; (4) 70% zero-emission fuels in non-electrical end-use energy by 2050; (5) Chile is an exporter of energy in the form of green hydrogen, electricity, or other energy sources by 2030. Goals 1 and 4 promote the replacement of fossil fuels with clean fuels in the energy sector, including green hydrogen and its derivatives as synthetic fuels.

Addressing this great challenge regarding green hydrogen and its derivatives and the opportunity it could bring to Chile, we launched the National Green Hydrogen Strategy7 at the end of 2020, defining the first guidelines for boosting this industry in the country, establishing ambitious medium- and long-term goals. The Strategy is based on six pillars to drive this new sustainable green hydrogen and derivatives industry, establishing a first action plan for the period 2020-2023 that preliminarily pushes these goals and connects with the present Action Plan for the period 2023-2030.

Both the Energy Policy and the National Green Hydrogen Strategy provide a strategic framework and instil the ambition that is driving the creation of the green hydrogen industry in our country. To materialise them, it is necessary to have an Action Plan that focuses on and prioritises the actions and measures that must be developed in this decade to ensure the sustainable deployment of green hydrogen, enabling us to meet the decarbonisation objectives of our economy, open international trade opportunities, and foster the country's growth around a new sustainable industry for the following decades.

In this way, the Green Hydrogen Action Plan is directly related to other public policy instruments that, together, allow us to outline a clear path for the energy transition process, such as the Decarbonisation Plan, to be launched during the third quarter of 2024, and the Adaptation and Mitigation Plans for Climate Change currently being developed within the framework of the Climate Change Framework Law.

The following sections present the process of building the Action Plan, which contains key actions to deploy the green hydrogen industry and its derivatives, taking advantage of the current window of opportunity.

7 https://energia.gob.cl/sites/default/files/estrategia_nacional_de_hidrogeno_verde_-_chile.pdf

# NATIONAL ENERGY POLICY

## NEW PRODUCTIVE IDENTITY FOR CHILE

"Green hydrogen and its derivatives represent a historic opportunity to transform Chile into one of the leading exporters of clean energy globally. This will enable job creation and foster new investments that will contribute to local development and decentralisation."

**2030** Chile is an exporter of energy in the form of Green Hydrogen

**2050** 70% of zero-emission fuels in non-electric energy end uses

## NATIONAL STRATEGY FOR GREEN HYDROGEN

**PILLARS:**
Mission-oriented policy | Efficient pathway to a net-zero country | Openness to the world | Green hydrogen as a catalyst for local growth | New economy based on clean exports | Balanced use of resources and land

**2020** Establishing the Foundations of the Industry

**2025** Activating the Industry

**2030** Conquering Global Markets

## ACTION PLAN 2020-2023

**PILLARS:**

1. Domestic market and export promotion.
2. Regulation, safety, and pilot projects.
3. Social and territorial development.
4. Capacity building and innovation.

**2025**
- 5 BUSD: Top 1 of investments in Latin America
- 5 GW electrolysis capacity built and under development
- 200 Kton/year production in at least two hubs.

**2030**
- 2.5 BUSD/year Global export leader.
- <1.5 USD/kg cheapest GH2.
- 25 GW global leading producer of GH2 by electrolysers

## GREEN HYDROGEN ACTION PLAN 2020-2023

**2023 A 2026** Investment signals, standards, buyers

1. Governance and multi-stakeholder participation
2. Information, dissemination, and civic education
3. Economic and financial mechanisms for promotion
4. Environmental management
5. Industry sustainability
6. Regulatory enablement
7. Permitting system
8. Compatibility and territorial integration for projects
9. Enabling infrastructure development
10. Demographic challenge of energy transition
11. Electric transmission and energy costs

**2027 A 2030** Productive Linkages and Decarbonisation

12. Uses for decarbonising the national economy
13. Demonstrative projects
14. Boosting productive linkages
15. Strengthening and development of human capital
16. Gender perspective in the industry
17. Promotion of research, development, and innovation
18. Opening of international markets

# 4

# PLAN DEVELOPMENT PROCESS

## Main Objective:

The Green Hydrogen Action Plan sets out a roadmap between 2023 and 2030 to deploy a sustainable green hydrogen industry, its derivatives, and the entire value chain, through coordinated actions among government ministries and related agencies, in line with regional and local initiatives.

## Specific Objectives of the Plan Development Process:

- Ensure the incorporation of sustainability dimensions through an "Integrated Sustainability Analysis" in the plan development methodology.
- Organise the actions of State agencies that have an impact on the development of the GH2 industry (developed, under development, or scheduled).
- Prioritise actions that require continuity to implement the plan.
- Identify new actions necessary for the deployment of this industry.
- Define roles and responsibilities in State agencies with competence to facilitate the programming and financing of their actions.

# 4.1 PARTICIPATORY

The Green Hydrogen Action Plan was developed through a participatory process that included five levels: (1) Interministerial Working Groups; (2) Civic Workshops; (3) Green Hydrogen Advisory Council; (4) Strategic Committee; (5) Public Consultation.

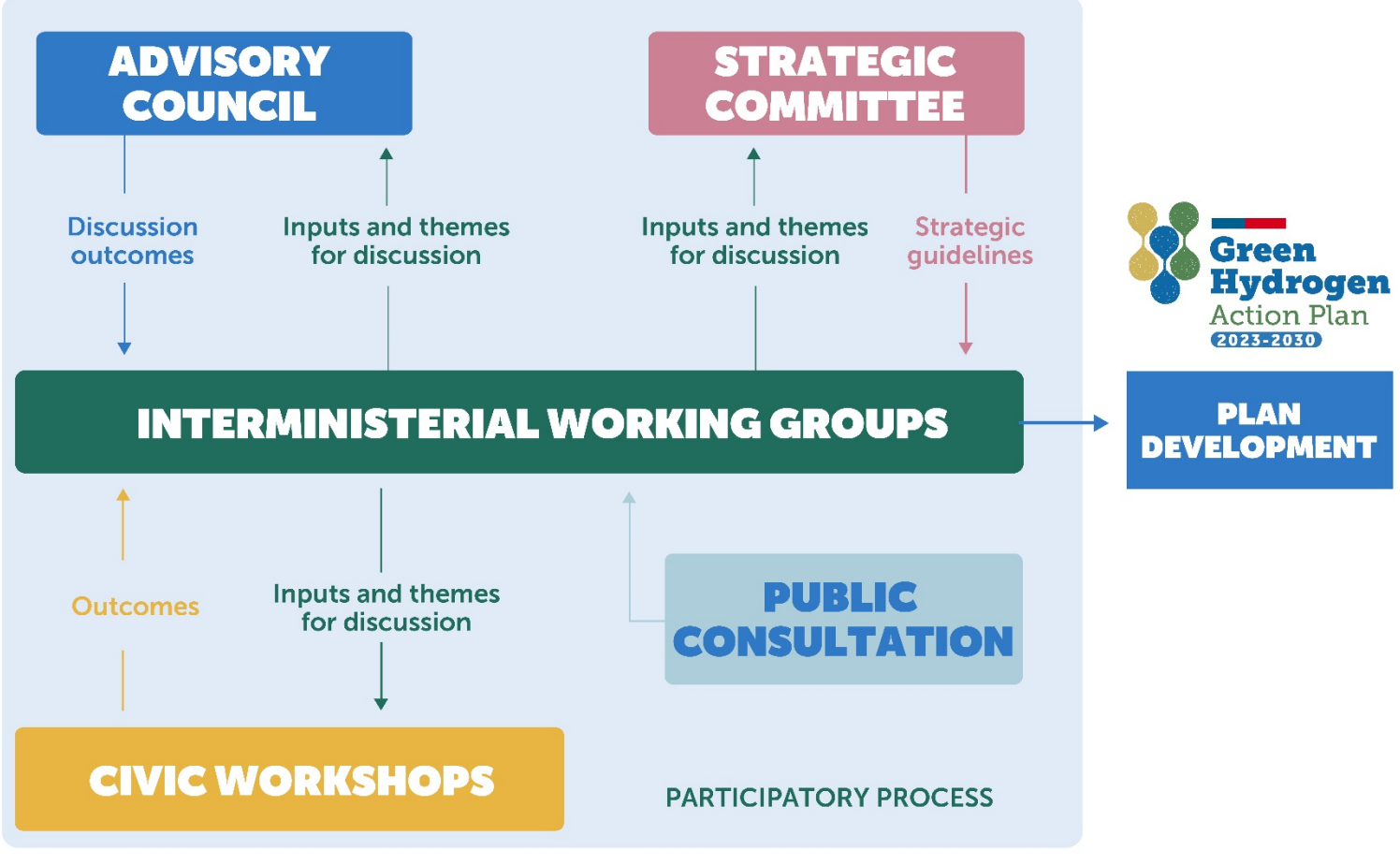



FIGURE 6: PARTICIPATIVE STRATEGY FRAMEWORK

Additionally, we received support from Non-Governmental Organisations (NGOs) in the process of developing the sustainability analysis, through working sessions, surveys, and concrete contributions in the form of proposed measures.

Below are the functions of each of the instances.

## I. Interministerial Working Groups

These working groups served as coordination bodies for the development of the Green Hydrogen Action Plan, coordinating the design of plan initiatives, providing themes and discussion inputs to other participation bodies, and incorporating the results from these instances. The working groups were significant in identifying critical issues, proposing preliminary initiatives, and measures associated with each line of action of the Plan.

Initially, the work of the groups was structured into three interministerial working groups led by the Ministry of Energy and composed of representatives from various public services according to each theme: (1) Investments and Institutional Framework, (2) Sustainability and Local Value, and (3) Infrastructure and Territorial Organisation.

At the end of the process, joint work was conducted with all three groups to give coherence to the proposed measures. Additionally, a cross-sectoral gender working group was formed, which worked iteratively with the other groups, where concrete measures present in the different lines of action of the Plan were identified.

## II. Civic Workshops

These workshops aimed to gather the vision of civil society organisations, the public sector, academia, private sector, Indigenous people, and citizens in general on the development of the green hydrogen industry. The participatory process was carried out in two rounds in Antofagasta, Valparaíso, Metropolitan, Biobío, and Magallanes, along with two remote instances nationwide, with a participation of 1,147 people (34% private sector, 28% public sector, 20% civil society, and 18% academia).

In the first workshop, introductory information on the development of green hydrogen in Chile was presented, addressing its main

concepts, following which perceptions regarding opportunities, uncertainties, and risks of the green hydrogen industry were discussed in working groups. The output of this first workshop was used to define critical issues.

In the second workshop, the identified and systematised critical issues were addressed, proposing and prioritising initiatives to address them in a timeline for the short, medium, and long term. The output of this second workshop was used to define preliminary initiatives.

### III. Advisory Council

This entity was created under the "CORFO Committee for the Development of the Green Hydrogen Industry" with the aim of providing technical advice. In the framework of the Action Plan, the Advisory Council collaborated in refining the critical issues and preliminary initiatives worked on in civic workshops and intersectoral working groups. The Advisory Council met four times during the development of the Action Plan, between April and August 2023.

### IV. Strategic Committee

The purpose of this committee is to provide strategic and policy guidance, with broad consensus among participants, to establish a high-level framework for the Green Hydrogen Action Plan and to build a political narrative that communicates, at the national and international levels, the guidelines of this new industry. For this purpose, work was carried out on the development of "target images" associated with five dimensions: Environmental; International; Economic; Human Capital and Technological Development; Public Engagement. These dimensions reflect the desirable boundaries to promote the green hydrogen industry and its derivatives.

The Strategic Committee is composed of ten cross-sectoral representatives from the political and civil society realms, which allows the instrument to have a cross-cutting perspective, ensuring its relevance beyond the implementation period of the Action Plan 2023-2030.

The members of the Strategic Committee are the former president, Michelle Bachelet; former Minister of Energy, Juan Carlos Jobet; regional governor of Antofagasta, Ricardo Díaz; regional governor of Magallanes and Chilean Antarctica, Jorge Flies; dean at the Universidad de Chile,

Rosa Devés; former Minister of Public Works and Mining, Hernán de Solminihac; director at the Universidad de Concepción in Santiago, Marcela Angulo; researcher and academic from the Universidad de Antofagasta, Cristina Dorador; executive director of Libertad y Desarrollo, Bettina Horst; and researcher and coordinator of the Energy Poverty Network, Anahí Urquiza.

The Strategic Committee met on six occasions between July and November 2023 and officially delivered its strategic guidance to the Minister of Energy in December 2023.

## V. Public Consultation

From December 22nd, 2023, to February 13th, 2024, the draft of the Action Plan was subjected to public consultation to gather the opinion of citizens regarding the proposal.

Around 120 participation forms were received during the consultation, considering about 1900 suggestions and observations (46% private sector, 40% civil society, 9% academia, and 5% public sector).

Based on the received feedback, a new structure of the Plan is presented, considering a new grouping of actions to facilitate the monitoring and follow-up process of the included actions.

# 4.2 PLAN DEVELOPMENT METHODOLOGY

The different participation instances served as inputs to develop a series of intermediate products that establish bases for defining lines of action and measures of the Action Plan, referring to three areas: (1) context and strategic focus (green circle); (2) lines of action and evaluation (blue circle); and (3) monitoring and follow-up (yellow circle).

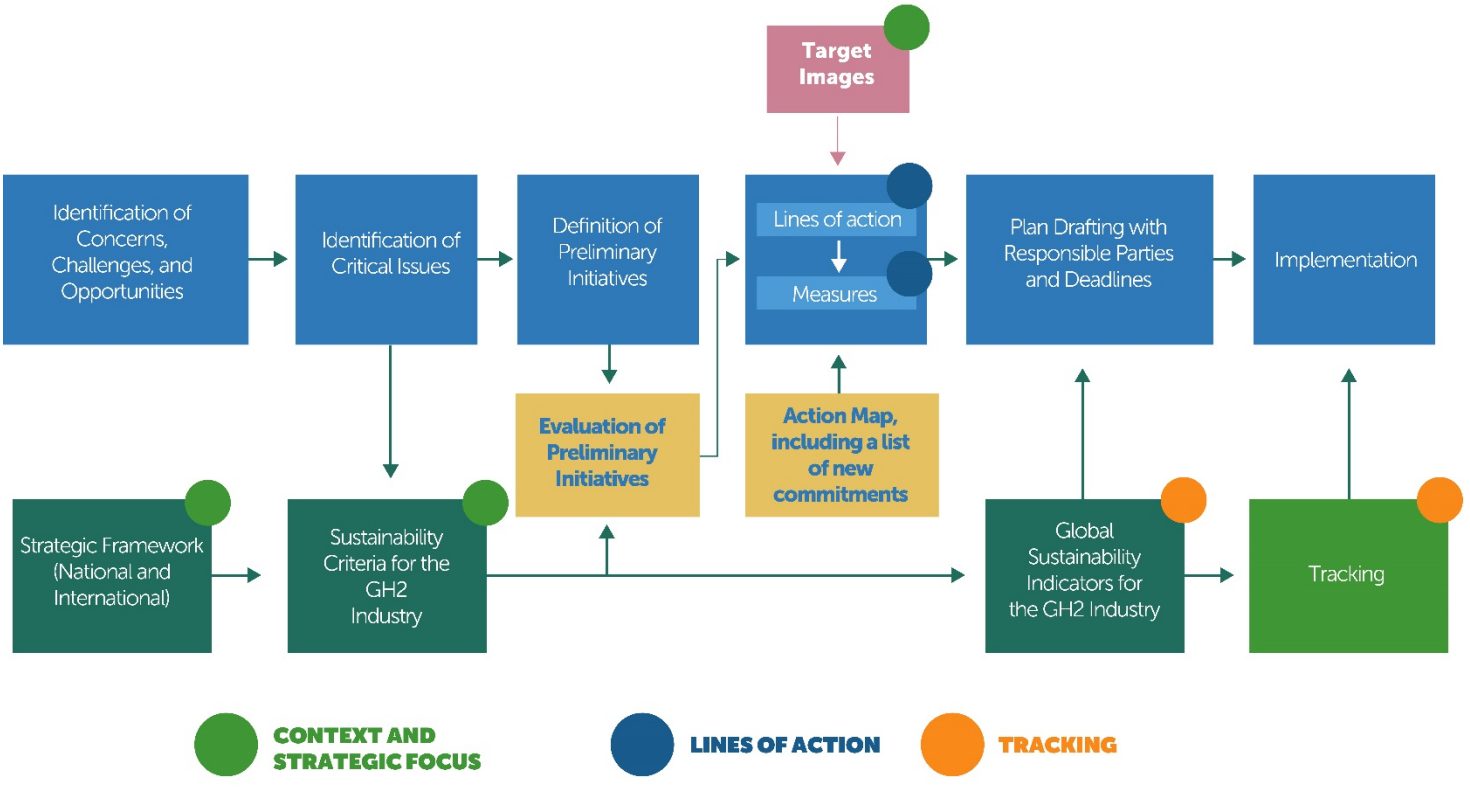



FIGURE 7: FRAMEWORK OF AREAS, PRODUCTS, AND COMPONENTS OF THE PLAN

# 4.2.1 Context and Strategic Focus

The first area includes intermediate products and components that serve as the strategic framework of the Action Plan, allowing focus on critical or essential issues.

As a starting point, concerns, challenges, and opportunities of the development of the hydrogen industry and its derivatives were identified through participatory and technical means[8], which were consolidated into 51 critical issues, summarising those relevant or essential topics to consider in the Action Plan.

Additionally, a strategic framework of sustainable development policies and instruments was constructed to frame the proposal of the Action Plan. This framework, along with the 51 identified critical issues, formed the basis for defining sustainability criteria, rules, or conditions to evaluate the relevance and sustainability of the proposed lines of action, presented to the Strategic Committee.

Finally, target images agreed upon by the Strategic Committee were considered, corresponding to strategic guidelines that served as a framework for defining lines of action and implementing measures.

[8] **The final document from the Strategic Committee is available on the website of the Action Plan.**

# 4.2.2 Lines of Action, Actions, and Milestones

These working groups identified the risks and opportunities that would arise from their implementation, so at the end of the process which included public consultation, they were adjusted and consolidated into 18 lines of action, which will be implemented through a set of actions and milestones such as studies, plans, pilots, instruments, among others.

For the identification of measures, initially, an action map[9] of public services was developed, which was raised within the framework of the interministerial working groups. This map included the actions of the various public services that had direct and indirect impact on the development of the green hydrogen industry. This was contrasted with the lines of action: (1) prioritising those actions most pertinent or strategic for implementation; (2) defining continuity actions for those in development or scheduled; (3) identifying gaps to be filled with new measures.

Based on the defined lines of action and implementing measures, the Plan was structured considering roles and responsible institutions for the actions, and implementation deadlines.

**9 The action map has around 360 actions identified and committed by 20 institutions that have influence in the development of green hydrogen, at different stages of progress (completed, in progress, and scheduled).**

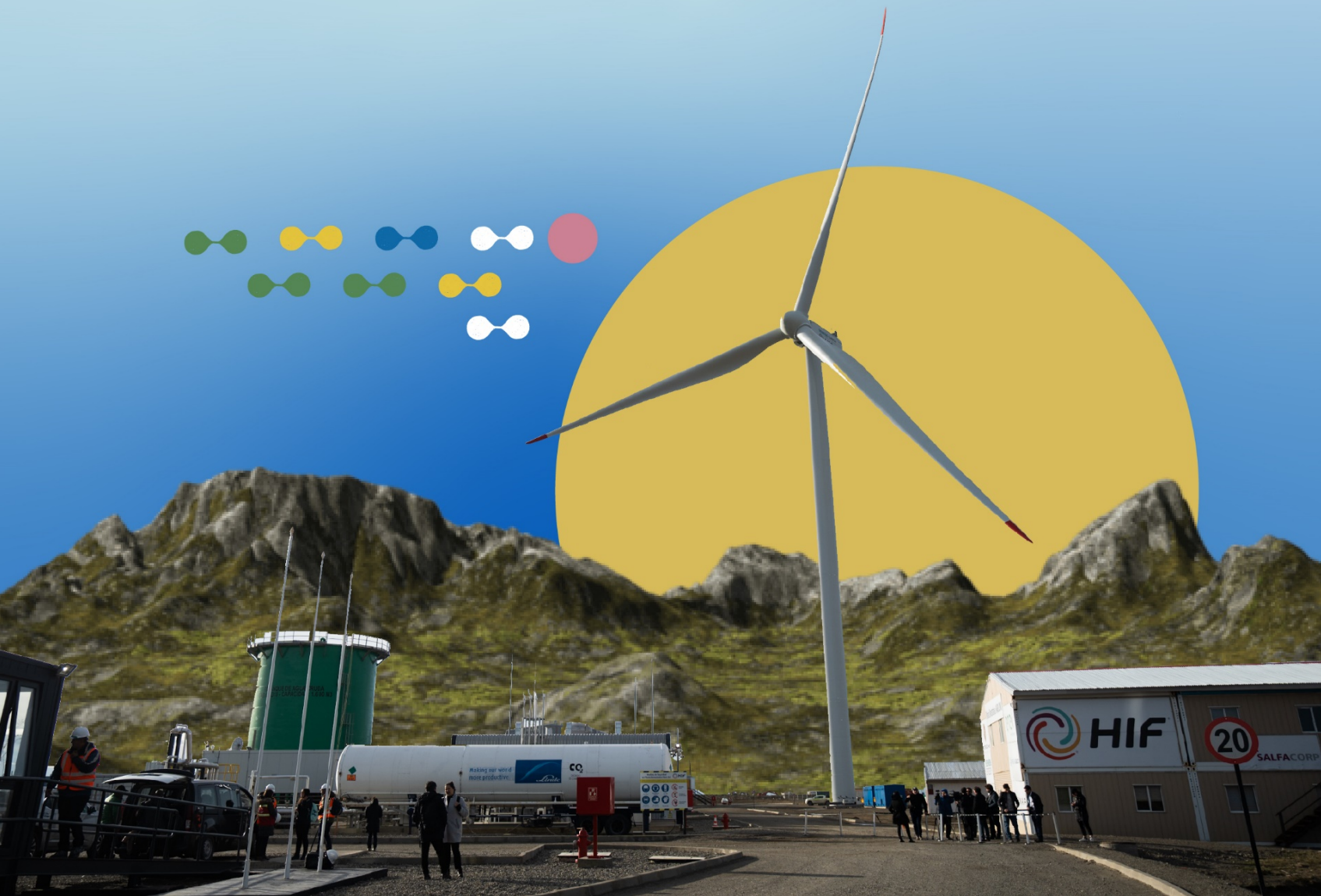
# 4.3 MONITORING AND TRACKING

The implementation of this Plan will require interministerial management and coordination of operational progress, as well as strategic monitoring to evaluate progress in sustainability and within the framework of the target images defined by the Strategic Committee.

This work will be supported by **indicators** that, on one hand, account for progress in strategic areas and address compliance with sustainability criteria, as well as a monitoring process of the implementation of the measures and commitments established.

# 5

# STRATEGIC GUIDELINES OF THE PLAN



# 5.1 AGREED TARGET IMAGES

The Strategic Committee developed a document[10] outlining a strategic vision for the future of hydrogen in Chile. This proposal reflects the desirable boundaries to promote the green hydrogen industry and also to demand attributes of its global performance. Based on this vision, among other relevant strategic inputs, specific measures were established, as presented in this Action Plan document.

The Strategic Committee's vision was developed over six sessions and structured into target images associated with five dimensions: (1) Environmental, (2) International, (3) Economic, (4) Human capital and technological development, and (5) Citizenship.

| DATE | SESSION 1 JULY 31 2023 | SESSION 2 AUGUST 22 2023 | SESSION 3 SEPTEMBER 4 2023 | SESSION 4 OCTOBER 12 2023 | SESSION 5 OCTOBER 19 2023 | SESSION 6 NOVEMBER 14 2023 |
|---|---|---|---|---|---|---|
| **Topics Discussed** | • Introduction to the exercise of desired future boundaries and attributes.<br>• Initial discussion of Human Capital and Environmental dimensions. | • Discussion on the Environmental dimension. | • Conclusion of the objective image for the Environmental dimension.<br>• Discussion on the International dimension. | • Conclusion of the objective image for the International dimension.<br>• Discussion on the Economic dimension.<br>• Further discussion on the Economic dimension. | • Continuation of the discussion on the Economic dimension.<br>• Discussion on the Human Capital and Citizenship dimensions. | • Conclusion of the discussion on Citizenship, Human Capital, and Economic dimensions. |

The gradual construction of target images and a future vision around different dimensions allowed the coordinating team of interministerial

[10] **The final document of the Strategic Committee is available on the website of the Action Plan.**

working groups to integrate these guidelines into the final definition of lines of action and measures included in this Plan.

# 5.2 SUSTAINABILITY CRITERIA FOR INDUSTRY DEVELOPMENT

The sustainability criteria constitute strategic guidelines based on the participatory process and the set of international and national policies and regulations analysed. These criteria ensure the incorporation of sustainability dimensions in the formulation of the Plan, through the definition of rules or conditions to be met in the development of the nascent green hydrogen industry, which will allow for the assessment of the relevance, coherence, and need for adjustment of the proposed courses of action.

## *5.2.1 Strategic Framework*

The analysis of international and national instruments, especially the National Energy Policy and the National Green Hydrogen Strategy, formed the basis for the construction of a strategic framework to define and evaluate sustainability rules for the Plan.

In this review, notable initiatives from the following actors can be highlighted:

**United Nations (UN)**

- International good practice principles for sustainable infrastructure, 2021

- Green hydrogen industrial clusters guidelines, UNIDO, 2023

### European Parliament

- A hydrogen strategy for a climate-neutral Europe, 2020
- European strategy for energy system integration, 2021

### European Commission

- EU energy commitment in a changing world, 2022
- A Green Deal Industrial Plan for the Net-Zero Age, 2023
- European Critical Raw materials, 2023
- Sustainability reporting standards, 2023

### Banking Sector

- Environmental and Social Framework, World Bank, 2017
- Performance standards on environmental and social sustainability, IFC International Finance Corporation, 2012
- Environmental and Social Policy Framework, IDB, 2020
- Guideline on sustainability assessment of environmental, social, and climate aspects: principles and processes, KfW Development Bank, 2023
- Environmental and social standards, European Investment Bank (EIB), 2022

### Associations

- Policy recommendations to accelerate hydrogen deployment for a 1.5°C scenario, World Business Council for Sustainable Development, 2021

The review and analysis of these backgrounds, as well as other elements of the participatory process of the Plan, formed the basis

for the formulation of sustainability criteria. According to their scope, these criteria identify the internal or structural aspects for the development of the industry; the external or systemic components, which are not under the control of the State or the industry; and the role of the State.

## 5.2.2 Description of Sustainability Criteria

*"Timely and transparent governance for decision-making, with the participation of various stakeholders involved and articulated at territorial levels to provide institutional support to a strategic*

- Multi-stakeholder participation at territorial levels throughout the industry's lifecycle, ensuring the right to timely access to information (benefits, costs, and risks), participation, and effective communication for comprehensive, transparent, inclusive decision-making with a gender perspective, thereby preventing conflicts.
- Coordinated, synergistic, and articulated action by relevant actors from both the public and private sectors, always aimed at transparency, efficiency, and sustainability of public and private investment and land use, with adaptive industry management and its long-term consolidation.
- Transition to a clear, robust, efficient, and high-standard system regarding enabling regulation and risk management, permits, certifications, and monitoring, in line with industry challenges, international commitments, and the country's territorial diversity and cultural identity.

*"Competitive industry that generates economic benefits for the country within the global energy transition framework."*

- Enhance domestic demand and industrialisation and transfer benefits to society through the development of productive chains that add value to regions and the national economy, supported by external demand.

- Competitive industry within the framework of international trade standards, transparent in production costs and benefits, along with the development of international partnerships for positioning, technological complementarity, and timely access to financing, inputs, equipment, and raw materials.

- Creation of conditions for certainty, stability, innovation, and development as the basis for boosting investment and market demand towards the consolidation of a sustainable industry in the long term.

*"Industry developed respecting ecosystems and their environmental services and interactions, considering the best available standards, within the framework of the climate crisis, biodiversity loss, and pollution".*

- Development of the industry and its value chain according to the sustainability, preventive and precautionary principle, along with due diligence, reducing the demand for natural resources and energy, preventing, mitigating, or, failing that, compensating for its impacts on ecosystem ecological continuity, and avoiding effects on human safety and health.

- Decarbonised industry that contributes to achieving national and international climate goals and reducing emissions, contributes to the objectives of a just energy transition, and helps drive the country's sustainable industrialisation.

- Timely and coherent environmental management system, based on generating knowledge and public information on origin conditions and their changes (air, water, and soil) to establish requirements (regulation) and international reference standards for ecosystem protection, biodiversity, and maintenance of environmental services, considering cumulative and synergistic effects on the environment.

*"Balanced integration of the industry, compatible with territorial conditions and dynamics, addressing the geographical, cultural, environmental, and economic diversity of the country."*

- Industry, in its value chain, preventing the displacement of local communities and managing the effects of migration and labour commuting, such as demand for transportation, residence, and equipment.
- Demand management and coordinated stage-by-stage management of enabling infrastructure supply under the logic of efficient, shared, and/or multipurpose use, starting from existing resources to derive new requirements.
- Territorial planning and timely energy planning for industry deployment, respecting the sensitivities and interests of its inhabitants, comprehensively addressing hydrogen and its derivatives' value chain components, balance, and synergy with other activities and uses, and the human settlement system.

*"Industry with good practices contributing to social well-being and strengthening local development".*

- Industry that avoids, minimises, compensates for, or repairs the effects on cultural, traditional, gender, and human rights values, as well as livelihoods, providing opportunities for decent work and contributing to social welfare.
- Creation and distribution of benefits in the industry's operating territory, achieving a balance between social and economic priorities, contributing to the reduction of energy poverty.
- Timely development of advanced human capital in an innovation and development environment, oriented towards the requirements of the energy transition, along with the needs of the territory and its inhabitants, to contribute to human development and improve people's quality of life.

these criteria were adapted and supplemented under the logic of specific measures addressing identified opportunities and risks.

# 5.3 GOVERNANCE STRUCTURE

During the year 2021, through a legal amendment to Decree Law 2,224 that creates the Ministry of Energy and the National Energy Commission, "hydrogen and fuels from hydrogen, and other energy sources and energy vectors" were incorporated into Article 3 of said legal body as part of the matters within the energy sector, corresponding "to the Ministry of Energy, to develop and coordinate plans, policies, and standards for the proper development of the sector, ensure compliance, and advise the Government on all matters related to energy."

The proposed governance structure for the Green Hydrogen Action Plan is framed within the Green Hydrogen Industry Development Committee, created in 2022 through CORFO Resolution No. 60, whose objective has been to accelerate the sustainable development of the green hydrogen industry and its derivatives in Chile. The proposed governance includes the entities created under the Committee - the Interministerial Council, the Technical Working Group, the Advisory Council, and administrative coordination through the Executive Directorate - and includes the Ministry of Energy with the role of strategic monitoring of the Action Plan implementation, Regional Governments for the elaboration of regional roadmaps, the formation of regional councils, and a political/strategic level interaction with the Ministry of Energy's standing committee.

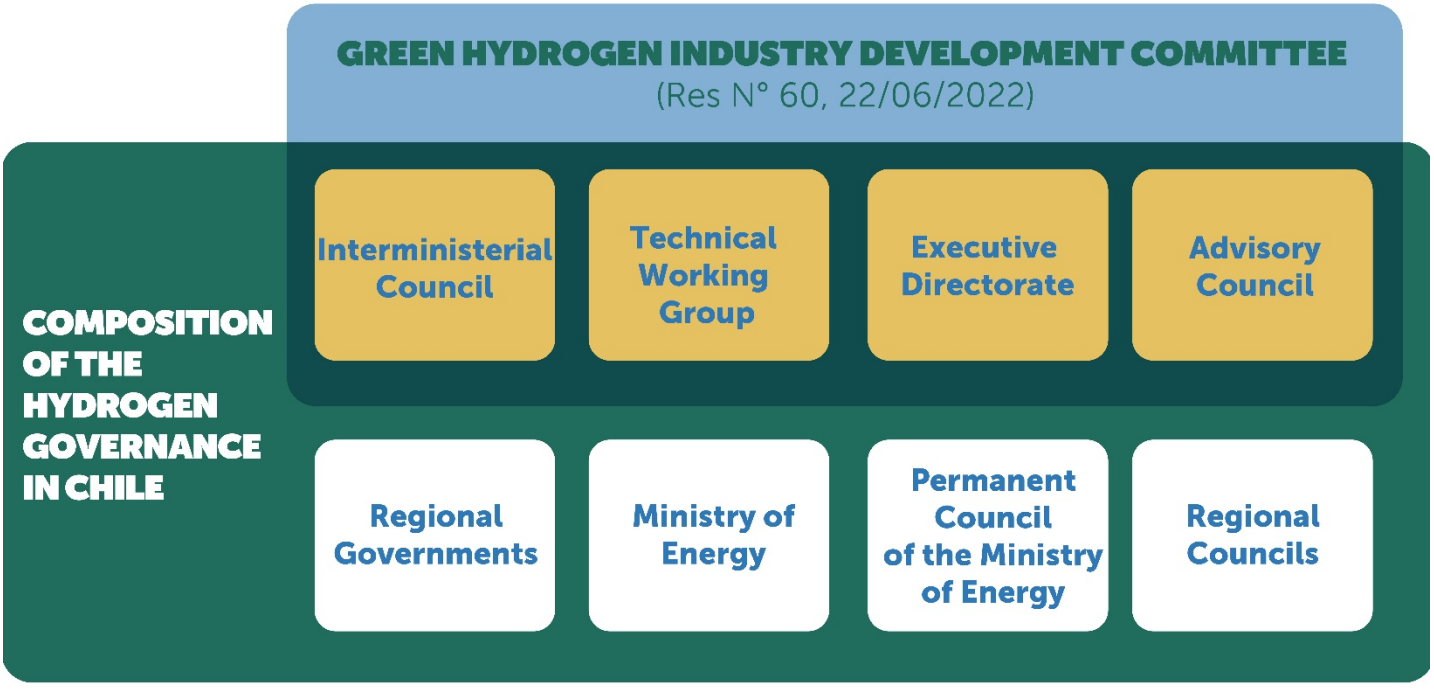



FIGURE 8: GOVERNANCE STRUCTURE FOR THE SUSTAINABLE DEVELOPMENT OF GREEN HYDROGEN IN CHILE

In the figure below, at the top of the section (pink), the bodies or dialogue spaces overseeing the implementation of the Action Plan are mentioned. In the centre (blue), the teams responsible for various aspects of coordination and monitoring are mentioned. Finally, at the bottom (light blue), the dialogue spaces tasked with advising and providing recommendations to the higher levels of the box for decision-making are presented, and in turn, providing relevant information for this purpose.

The interaction between the different bodies and dialogue spaces mentioned in the box is explained below:

# GOVERNANCE OF HYDROGEN IN CHILE

| | | |
|---|---|---|
| IMPLEMENTATION | Interministerial Council | Supports and strategically coordinates decisions of public institutions within the framework of the Action Plan |
| | Technical Working Group | Operationalises decisions related to the implementation of the Action Plan |
| | Regional Governments | Local implementation (Roadmaps - agreements) |
| COORDINATION AND TRACKING | Ministry of Energy | Develops Strategy and Action Plans (Decree Law 2,224) |
| | Executive Directorate | Administrative management of the various Committee instances, incentive programmes, among others (according to Res. Ex No. 60/2022) |
| EXTERNAL ADVISORY AND MULTI-STAKEHOLDER | Permanent Council of the Ministry of Energy | Provides high-level political/strategic recommendations,offers a global vision of the country's energy goals |
| | Advisory Council | Advises the Technical Committee, Interministerial Council, and Executive Secretariat |
| | Regional Councils | Provide recommendations for the development and implementation of regional roadmaps |

## 5.3.1 Green Hydrogen Industry Development Committee

The Committee aims to accelerate the sustainable development of the green hydrogen industry and its derivatives in Chile. It was created by CORFO's Exempt Resolution No. 60 of 2022 and is composed of the Interministerial Council, Technical Working Group, Advisory Council, and the Executive Directorate.

Within the framework of the Action Plan, its role will be to ensure proper implementation and the commitment of the institutions and units responsible for executing it. To fulfil this function, it will be necessary to review and adjust the Resolution that created it.

## 5.3.2 Interministerial Council

The Council leads the previously described Committee. Its function is to support and strategically coordinate the decisions of public institutions within the framework of the Green Hydrogen Action Plan. Currently, it is composed of eleven ministries: Energy; Economy, Development, and Tourism; Finance; Foreign Affairs; Social Development and Family; Public Works; Transportation and Telecommunications; National Assets; Environment; Agriculture; Science, Technology, Knowledge, and Innovation; and CORFO. It is chaired by the Minister of Energy, and its vice-chair is the Executive Vice President of CORFO.

In addition to the powers defined by Resolution 60 of June 2022, the Council is expected to influence all decisions of public institutions related to the allocation of resources, procedures, and commitments to implement the Green Hydrogen Action Plan. Furthermore, those Regional Governments that develop local roadmaps will also participate in the

interministerial council to ensure proper coordination in the implementation of actions.

## 5.3.3 Interministerial Technical Working Group

It will be composed of focal points from the ministries that are part of the Interministerial Council. The role of the Interministerial Technical Working Group is to support, provide background information, and provide rationale to the Interministerial Council for decision-making regarding priorities, strategic public-public coordination, financing of key initiatives, among other matters. In turn, the Technical Working Group will support the operationalisation of public policy, associated with decisions on the implementation of the Green Hydrogen Action Plan.

The Technical Working Group is chaired by a representative of the Ministry of Energy, and the vice-chairmanship is held by a representative of CORFO.

## 5.3.4 Regional Governments

Regional Governments will be responsible for leading regional governance for the deployment of the green hydrogen industry and its derivatives. They, must consider their respective territorial contexts, coordinating with other local authorities and representative actors of the various interests within the regional ecosystem. Additionally, they must establish channels of communication and feedback with national governance through the Interministerial Council.

To do this, they may develop roadmaps that allow them to specify and complement, according to each regional reality, the Green Hydrogen

Action Plan 2023-2030, considering the national guidelines of the Plan.

To design and implement regional roadmaps, Regional Governments will have the responsibility to create regional governance structures with, at least, a Regional Green Hydrogen Council.

## 5.3.5 Ministry of Energy

Based on the Ministry of Energy's mandates regarding hydrogen and its derivatives, as established in Decree Law 2,224, this ministry has the role of coordinating the strategic implementation of the Plan, including:

1. Oversight of its management and interministerial coordination of operational progress, maintaining a close relationship with the Technical Committee of the Green Hydrogen Committee to identify possible synergies and challenges in Plan implementation.

2. Strategic monitoring of the industry, ensuring coherence in associated public policy instruments, such as the Strategy and Action Plan, maintaining a close relationship with the Advisory Council, Permanent Committee, and the Green Hydrogen Interministerial Council. This tracking will evaluate how the deployment of the green hydrogen industry contributes to the goals set out in the Green Hydrogen Strategy and the National Energy Policy.

## 5.3.6 Executive Directorate

Its role will be to execute and implement development instruments included in the Green Hydrogen Action Plan, in addition to convening sessions of the Interministerial Council, among other administrative matters.

Within the framework of the Plan, the executive directorate will administratively coordinate the operation of the Interministerial Council, the Technical Committee, and the Advisory Council, convening meetings and working groups.

## 5.3.7 External Advisory and multi-stakeholder Linkage

### Permanent Council of the Ministry of Energy

The Ministry of Energy will establish a permanent External Council with the participation of high-level political/strategic stakeholders. Its function will be to discuss the progress of the objectives and goals of the energy policy and provide recommendations regarding the strategic direction of the ministry. The Council will advise on potential adjustments to long-term objectives and goals or strategic measures, ensuring proper interaction and coherence between the Green Hydrogen Action Plan, the Decarbonisation Plan, and the Sectoral Plan for Mitigation and Adaptation to Climate Change.

Within the governance framework for hydrogen, this Council will aim to provide strategic and policy guidance associated with the implementation and monitoring of the Plan, considering the objective images developed by the Strategic Committee of GH2 and the interrelationships and impact of the Plan's implementation on the country's long-term energy-related objectives

outlined in the National Energy Policy and the Climate Change Framework Law.

The deliberations of this Council will be informed by information and analysis provided by the Ministry of Energy as part of the Action Plan's monitoring (PMO) and the strategic monitoring of long-term objectives and goals.

## *Advisory Council*

Comprised of stakeholders from the public sector, private sector, academia, business associations, regional governments, and non-governmental organisations with interests related to the green hydrogen and derivatives industry. Its purpose is to provide technical advice, based on its areas of expertise, to the Interministerial Council to facilitate decisions related to potential barriers and opportunities identified during the Plan's implementation.

Given the dynamism in the advancement of the green hydrogen industry in Chile and the various topics to be addressed in line with the breadth of the value chain, the composition of the Advisory Council should be periodically reviewed to ensure that it reflects the diverse perspectives needed for such an advisory body.

# Regional Green Hydrogen Councils

Multi-stakeholder governance for the design and implementation of regional roadmaps for green hydrogen, whose function will be to inform decision-making on green hydrogen from various territorial and sectoral perspectives. Regional Governments will define and lead the formation and operation of these councils, being able to use existing instances whose objectives are compatible with the purpose of this Action Plan and the various regional roadmaps. These councils should bring together representatives from the public sector, the private sector, academia, civil society, as well as representation of Indigenous peoples present in the region.

# 6

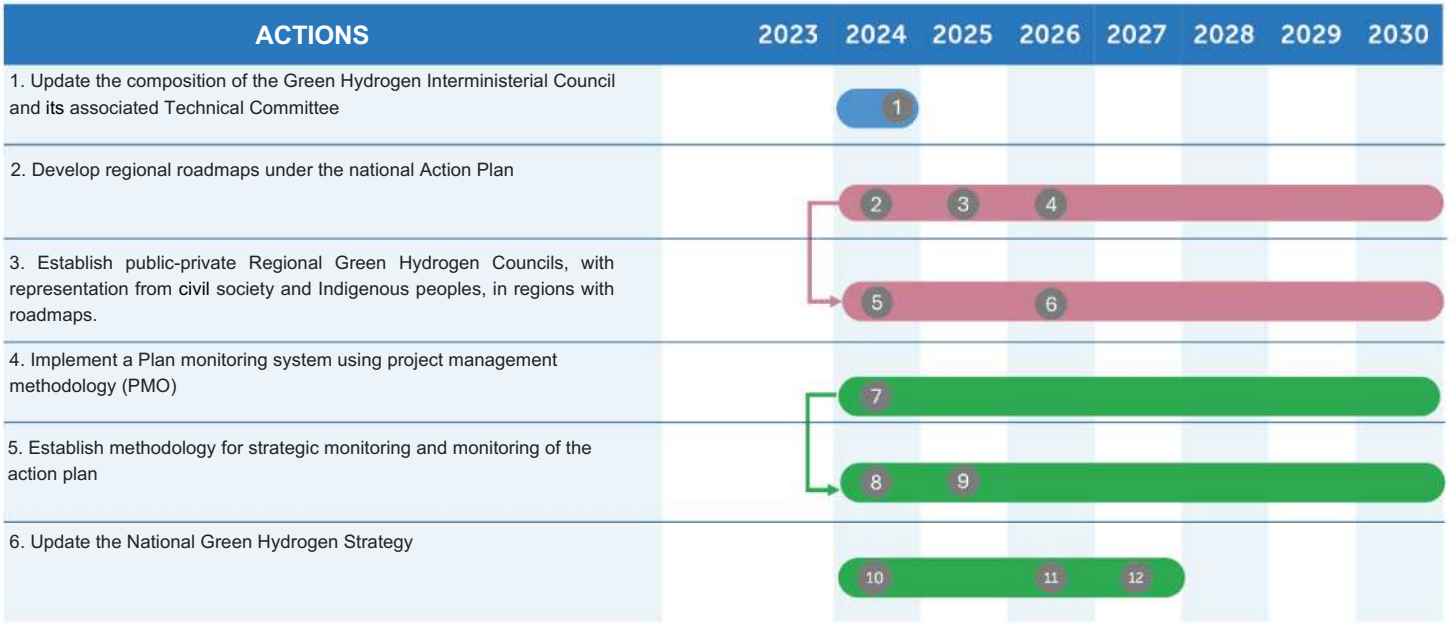
# LINES OF ACTION

# 6.1 GOVERNANCE AND MULTI-STAKEHOLDER

Actions regarding hydrogen and its derivatives must be coordinated and developed with multiple ministries and State agencies, understanding that its value chain requires the concerted effort of different government portfolios, as well as a close and collaborative relationship between the central level and regions. Therefore, robust governance and multi-stakeholder participation are crucial for the implementation of the Green Hydrogen Action Plan 2023-2030. This governance is the vehicle through which the Action Plan is implemented, decisions are made, and progress is monitored. It includes all mechanisms, processes, and institutions - with roles and responsibilities - through which the actions of this Plan are articulated, executed, and monitored.

Below, the actions and milestones necessary to strengthen governance for the implementation of the Action Plan are detailed, allowing for the deployment of the industry in the country's different territories, as well as its respective monitoring through PMO-type management control.

## LINE OF ACTION 1:
# GOVERNANCE AND MULTI-STAKEHOLDER PARTICIPATION




### MILESTONES

1. Modification of Res. Ex. 60, by CORFO, from 2022
2. 3. 4. Documents elaborated: in Biobío (2), in Antofagasta (3), in Valparaíso (4)
5. Establishment of Councils in Magallanes and Chilean Antarctica, Biobío, and Antofagasta
6. Publication of improvement observations documents for respective roadmaps from multi-stakeholder councils
7. Platform loaded with milestones and responsible parties
8. Definition of monitoring indicators for the commitments of this Plan
9. First analysis of Plan progress and recommendation for action updates
10. Validation and update of commitments of the current strategy
11. Update of the National GH2 Strategy aligned with a Sustainable Industrial Development Policy of the country
12. Review of the Green Hydrogen Action Plan according to the updated Strategy

*Note: Bar colours only indicate complementarity of*

# *Action 1. Update the composition of the Green Hydrogen Interministerial Council and its associated Technical Committee to meet current needs for the sustainable deployment of the industry*

***Objective**:* Update the composition and functioning of the Green Hydrogen Committee and its various elements (such as the Interministerial Council and the Technical Committee) to respond to the coordination needs for the sustainable deployment of the industry. This sector has shown great dynamism, with various public institutions participating to ensure sustainable development of the industry. Therefore, it is necessary to evaluate the composition of the Interministerial Council and the Technical Committee and update their members, based on those institutions that are key to the implementation of the Plan. Some necessary changes to be made, among others, include the incorporation of the Ministries of Defence, Education, Housing and Urban Development, and Women and Gender Equality.

Additionally, the roles and functions detailed in CORFO Resolution No. 60 of 2022, which creates the Green Hydrogen Industry Development Committee, will be reviewed, and modified to align them with the plan's lines of action.

***Timeline**: 2024*

***Milestone:***

- 2024: Amendment to CORFO Resolution No. 60 of 2022.

***Responsible Institution:*** CORFO with the support of the Ministry of Energy in its role as chair of the Interministerial Council, in conjunction with institutions related to the Green Hydrogen Committee.

## *Action 2. Develop regional roadmaps under the Green Hydrogen Action Plan*

***Objective:*** Develop regional roadmaps, based on the national guidelines outlined in this Action Plan document. This measure includes establishing regional governance led by Regional Governments, incorporating other local authorities and relevant stakeholders from the regional ecosystem, establishing channels of communication and feedback with national governance through the Interministerial Council. This is expected to promote local productive capacity and social development, in line with the social and environmental reality of the region, making efficient and balanced use of the available resources and maximising the development opportunities provided by the industry in terms of employment, value chains, technological development, etc.

Based on the process and results of the roadmaps, instruments to implement the defined measures will be enhanced, such as voluntary public-private-civil society agreements to achieve adequate management and coordination between the State, regional governments, local actors, and companies, on specific issues. To achieve this, it will be necessary to establish the areas to be addressed, depending on each territory. In this regard, work has already begun on more specific agreements, such as the Collaboration Protocol in Magallanes, signed between the Ministries of Economy, Development, and Tourism; Energy; Public Works; with the Magallanes Regional Government; and the Trade Association of Green Hydrogen Producers and their Derivatives in Magallanes. Similarly, the Magallanes Regional Government, together with the Ministry of Women and Gender Equality, and the Ministry of Energy, signed an agreement to promote the inclusion of women in the

green hydrogen industry, and in training and education initiatives in the region.

Some regions have already begun work on building regional roadmaps, which have been considered by the Action Plan, and must ensure intrinsic coherence between instruments of different territorial scales. For example, the Magallanes and Chilean Antarctic Regional Government and CORFO, through the Regional Transform Programme "Green Hydrogen Magallanes," have developed a roadmap with actions to address various identified, prioritised, and validated gaps[11]. Based on the identified gaps, five strategic axes were defined for effective and structured roadmap development, taking into account the principles of the National Green Hydrogen Strategy. Similarly, in the Antofagasta Region, a Regional Green Hydrogen Commission led by the Regional Government was established, where work axes were also defined. Finally, the Biobío Region is also developing its regional roadmap, supported by CORFO's Regional Transform Programme.

***Timeline:*** From 2024.

***Milestones:***

Definitive version of regional roadmaps developed for - at least - the following regions:

- 2024: Biobío Roadmap.
- 2025: Antofagasta Roadmap.
- 2026: Valparaíso Roadmap.

***Responsible Institution:*** Regional Governments.

[11] Link to document (year 1): https://energia.gob.cl/sites/default/files/documentos/resumen hoja de ruta programatransformaGH2 rev. 0.pdf

# *Action 3. Establish public-private regional councils for Green Hydrogen, with representation from civil society and Indigenous peoples, in regions where regional roadmaps are being developed*

***Objective:*** Create regional governance, or adapt an existing governance structure, to strengthen the participatory and sustainability dimensions in the energy transition, considering the implications of green hydrogen industry development on the productive, socioeconomic, and territorial reconversion of regions, seeking to balance the transition and industry development with the safeguarding of cultural and traditional values, as well as livelihoods, providing opportunities for decent work and contributing to social well-being throughout its life cycle.

This regional and multi-stakeholder governance, which will incorporate representation from the public sector, private sector, academia, civil society organisations (local, environmental organisations, guilds, unions), and indigenous peoples present in the region, must inform decision-making on green hydrogen from different territorial and sectoral perspectives, transparently disclosing the benefits, externalities, and risks of the industry, for which it must consider a methodology and operation specially designed to ensure effective and balanced dialogue among diverse actors with information, knowledge, and influence asymmetries. In this framework, it is suggested that, to respect the collective rights of Indigenous peoples present in the region, additional and differentiated dialogue spaces be established, so that these interests can be represented in the Regional Green Hydrogen Council. This will be reflected in the development of regional roadmaps under the Green Hydrogen Action Plan 2023-2030.

In regions where progress has been made in this area, governance will be built on existing structures, expanding their scope and representation with the incorporation

of diverse actors and a gender focus. Currently, there is progress in Magallanes (Transforma Magallanes), Antofagasta (Regional Green Hydrogen Commission), and Biobío (Transforma Biobío), among others, and it is suggested that they review and coordinate their governance spaces to ensure the incorporation of different actors with interests that could be affected, and stakeholders interested in industry development.

***Timeline***: Starting from 2024.

***Milestones:***

- 2024: Establish councils or modify existing structures, through administrative action, in at least the following regions: Magallanes and Chilean Antarctica, Biobío, and Antofagasta.

- 2026: The three indicated regions have published documents with improvement observations for their respective regional green hydrogen roadmaps, from the multi-stakeholder GH2 council.

***Responsible Institution***: Regional Governments.

# *Action 4. Implement a Plan Tracking System using Project Management Methodology (PMO)*

***Objective**:* As part of the role established in this governance for the Ministry of Energy, mechanisms for tracking and monitoring commitments outlined in this document will be established. For tracking the fulfilment of milestones defined in each line of action, a Project Management Methodology (PMO) will be established, led by the Planning and Management Control Unit of the Ministry of Energy. The methodology will require specific responsibilities (working teams within each responsible institution), measurable milestones, and clear deadlines. This methodology will contribute to visualising progress to prioritise necessary coordination, as well as raising alerts about possible deviations from the planned activities.

***Timeline**:* 2024-2030

***Milestones:***

- 2024: Platform loaded with milestones and responsible parties (specific working teams within the institutions).
- 2024-2030: Continuous monitoring of the implementation of specific actions with quarterly reporting to the Interministerial Council of the Green Hydrogen Industry Development Committee.

***Responsible Institution**:* Ministry of Energy.

# *Action 5. Establish methodology for the strategic monitoring and tracking of commitments in this Action Plan*

***Objective:*** As part of the role established in this governance for the Ministry of Energy, mechanisms for monitoring and tracking both the commitments outlined in this document and the evaluation and measurement of the industry's impact through several types of indicators, including sustainability indicators, will be defined.

The strategic monitoring will be crucial for periodically assessing whether the development of green hydrogen and its derivatives is contributing to the country's achievement of the goals set forth in the Green Hydrogen Strategy, as well as the long-term objectives established in guiding documents, such as the National Energy Policy (set of goals for various energy areas), the Climate Change Framework Law (national carbon neutrality legal target by 2050), and decarbonisation commitments. The strategic monitoring analyses will be a key input for the deliberation and eventual recommendations emanating from the Permanent Council of the Ministry of Energy, tasks that are the responsibility of the Ministry of Energy's Policy and Strategic Monitoring Unit.

Based on the results of the Plan implementation monitoring, and the dynamism evidenced around the green hydrogen industry, it is anticipated that it will be necessary to analyse an update of the planned actions and/or milestones in the short term and complement them with those that arise, maintaining close inter-institutional collaboration within the proposed governance framework.

***Timeline***: 2024-2030

### *Milestones:*

- 2024: Define tracking indicators for the commitments of this Plan, including those related to sustainability.
- 2025: First progress analysis of the Plan and recommendations for action updates.
- 2025-2030: Continuous strategic monitoring and tracking of the commitments of the Action Plan.

***Responsible Institution:*** Ministry of Energy.

# *Action 6. Update of the National Green Hydrogen Strategy*

***Objective**:* In line with the commitments made in the current strategy, an update of the National Green Hydrogen Strategy must be carried out when 5 years have elapsed since its publication. This update will focus efforts on developing a National Sustainable Industrial Development Policy, with a focus on the green hydrogen industry, ammonia, and various derivatives and vectors derived from hydrogen (2025-2026). Thus, upon having a new Strategy or Industrial Policy, the Action Plan must be reviewed and updated accordingly (2026-2027).

***Timeline:*** *2024:* Initiate the process to update the National Green Hydrogen Strategy for publication in 2026.

***Milestones:***

- 2024: Validation and updating of assumptions of the Strategy (commitment of the current strategy).
- 2026: Update the National Green Hydrogen Strategy, in line with a sustainable industrial development policy for the country.
- 2027: Review of the Green Hydrogen Action Plan according to the updated Strategy.

***Responsible Institution:*** Ministry of Energy, in coordination with all institutions that are part of the Green Hydrogen Industry Development Committee.

# 6.2 INFORMATION, DISSEMINATION, AND CIVIC EDUCATION

Information, education, and the provision of clear and centralised consultation channels are fundamental for the emerging green hydrogen industry and its derivatives to involve as many perspectives and experiences from different fields as possible, contributing to its sustainability over time, following the guidelines for access to information and information generation and dissemination established in the Escazú Agreement.

Having relevant information available to various stakeholders is crucial for harmonious coexistence in territories. In particular, people's access to timely, secure, and updated information implies reducing information gaps and asymmetries, allowing greater transparency in holding the state accountable for its decisions and actions, serving as a tool to build trust, and having the potential to prevent conflicts among diverse groups of stakeholders.

Within this line of action, commitments are made both to provide information to diverse types of audiences, including experiences that bring hydrogen closer to the public, and to advance education related to hydrogen.

## LINE OF ACTION 2:
# INFORMATION, DISSEMINATION, AND CIVIC EDUCATION


### MILESTONES

1. Material available in the first region of the country
2. Material developed and available nationwide
3. Launch of the Green Hydrogen Explorer
4. First version of the platform
5. Educational material developed and available

*Note: Bar colours only indicate complementarity of measures.*

# *Action 7. Develop informational and educational material for citizens about green hydrogen*

***Objective:*** Develop content for communication and educational campaigns regarding green hydrogen and its development nationwide. This material will include graphical and/or visual content that can be disseminated through various channels, such as social media, government agency websites, and distribution through municipalities, regional ministries, among others.

The goal is to educate the population about the impacts, challenges, and benefits of the green hydrogen industry, thereby reducing information asymmetries that may exist among different societal actors.

***Timeline***: 2023-2030.

***Milestones:***

- 2024: Material available in a first region in the country.
- 2025: Material developed and available nationwide.

***Responsible Institution:*** Ministry of Energy with support from the Ministry of Education and the Spanish Agency for International Development Cooperation (AECID from its acronym in Spanish).

# *Action 8. Develop and maintain the Green Hydrogen Explorer*

***Objective:*** Make available a tool that presents information and visualisation associated with the development potential for green hydrogen projects based on renewable resources in the continental Chilean territory. This tool aims to complement the delivery of specialised information related to the green hydrogen industry. The explorer will have three main functions: a visualiser of green hydrogen production potential according to its Levelised Cost of Hydrogen (LCOH), a calculator for users to calculate the LCOH according to their parameters, and a project visualiser.

***Timeline:*** 2023-2030

***Milestone:***

- First half of 2024: Launch of the Green Hydrogen Explorer.

***Responsible Institution:*** Ministry of Energy.

# *Action 9. Develop a general and centralised information and consultation system on green hydrogen*

***Objective:*** A centralised information system for the green hydrogen industry will be developed to facilitate the delivery of information in a simple and understandable manner for various stakeholders. This information will be available through a platform for general access.

The platform will contain consolidated information for different dimensions, territorial scales, project life cycles, and other aspects such as gender and human rights standards. It will serve as a fundamental tool for industry transparency in costs and benefits, civic participation, and community involvement in matters of their interest. The development of this system will be in line with the Participatory Implementation Plan of the Escazú Agreement (PIPE).

To achieve this, the development and implementation of a dynamic website is proposed, which will preliminarily include:

- A viewer containing public information at a regional scale on the location and status of projects associated with green hydrogen and derivatives, including official information and data from public baselines.
- Periodic reporting systems from green hydrogen project holders, displaying prevention, mitigation, and compensation measures, including information on job positions and employment generation estimates (distinguishing between direct and indirect jobs).
- Transparent visualisation of data resulting from standards indicators for different green hydrogen projects in the territories.
- Information on greenhouse gas emissions from the industry across its production chain, allowing for detailed monitoring of contributions in this area.

- Information on the implementation progress and sustainability indicators of the Green Hydrogen Action Plan.

- Information on the actions of various instances related to the governance of green hydrogen, such as minutes of the Green Hydrogen Committee, among others.

- Information on the bidding of public lands.

- Information on development potential and costs.

- Information on norms and regulations associated with the industry's development.

- Integration of public information from sources such as Open Energy, the Green Hydrogen Explorer, the Superintendency of Electricity and Fuels, the Environmental Impact Assessment System, the National Environmental Inspection Information System, the Pollutant Release and Transfer Register, among others.

- Provision of a general civic consultation system on the industry.

- Information on funding opportunities and other types of support from CORFO or other institutions.

***Timeline**:* 2024-2030

***Milestone**:*

- First half of 2025: First version of the platform.

***Responsible Institution**:* Ministry of Energy.

# *Action 10. Promote education on green hydrogen through the Sustainable Education Programme*

***Objective:*** Incorporate the topic of green hydrogen into the educational materials and didactic resources of the Sustainable Education Programme, promoting energy education that enables educational communities to understand advances in the energy sector towards sustainable development, targeting most educational levels, with a focus on technical-professional secondary education.

***Timeline***: 2024-2025

***Milestone***:

- First half of 2025: Educational material developed and available.

***Responsible Institution***:

- Ministry of Energy.
- Ministry of Education.

# 6.3 ECONOMIC AND FINANCIAL MECHANISMS TO BOOST THE INDUSTRY

The green hydrogen and derivatives industry represents an opportunity for the economic transformation of the country and its regions through productive and energy diversification.

It is relevant to leverage Chile's advantages in renewable energy resources and global energy transition to position the country as an exporter of clean fuels and to sophisticate the export basket of goods and services with sustainability attributes.

For the green hydrogen and derivatives industry to develop in Chile and for projects of different scales to materialise, the State must create conditions of certainty and stability, facilitate competitiveness, and leverage private investments through financial support from public policy to decrease costs and mitigate financial risks.

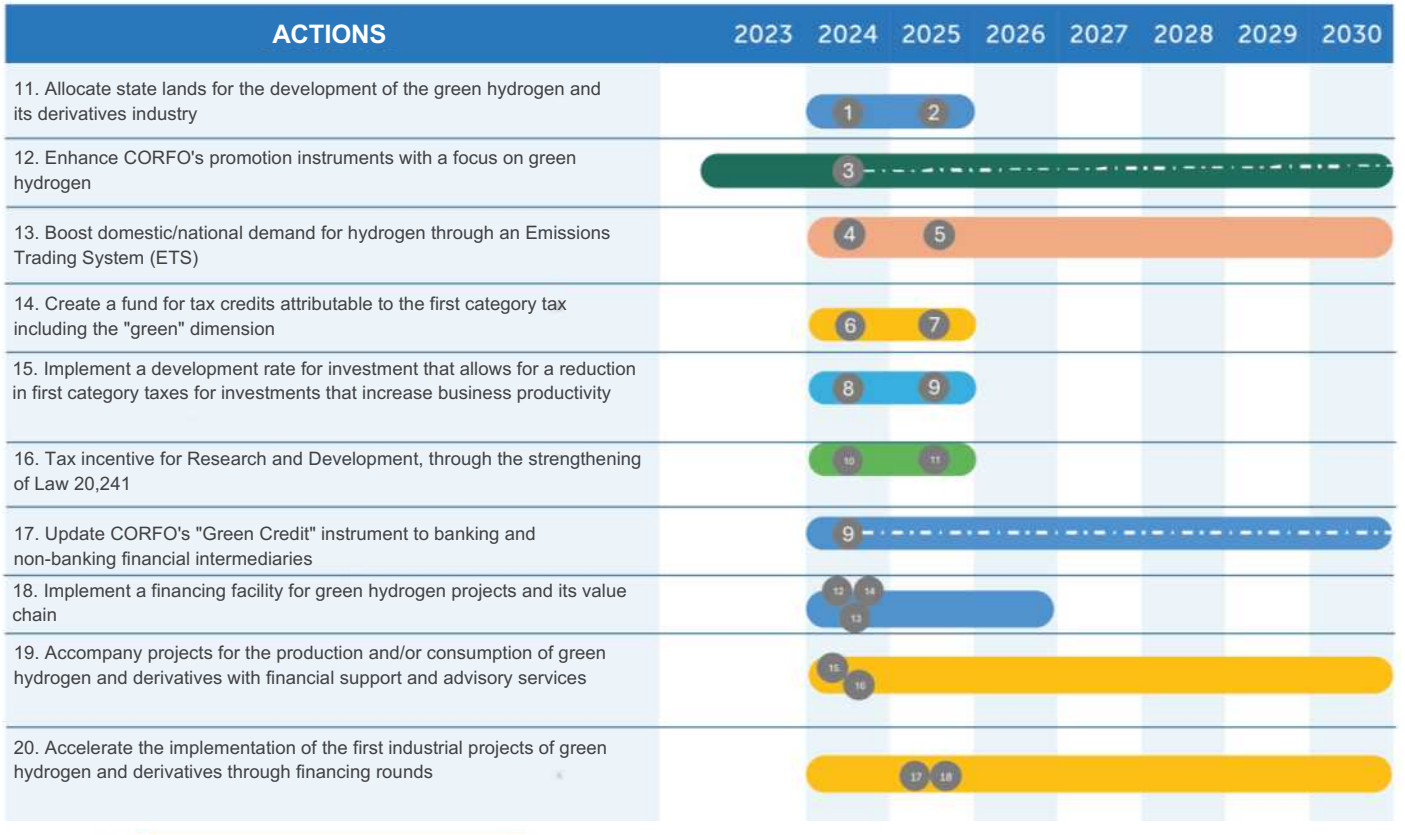
Currently, green hydrogen and ammonia projects have not yet reached their breakeven point in profitability, so it is important that they can be accompanied by different incentives for the early start of the industry, with all the opportunities that this will bring to the country. This implies a relevant public-private role to mitigate risks that allow obtaining profitability from early hydrogen and ammonia projects, or first movers.

Initiatives aimed at supporting the first industrial projects of green hydrogen and derivatives, and improving competitiveness against fossil fuels, will initiate the operation of a market, in addition to reducing various uncertainties, risks, and enabling economies of scale and scope.

The State, through its institutions, promotes and seeks to catalyse private investment in green hydrogen and derivatives production and demand projects through financial instruments aimed at mitigating financial risks, reducing costs, and providing positive signalling that accelerates the materialisation of investments for the development of the GH2 industry in Chile.

Below are the actions and milestones aimed at economically and financially supporting the green hydrogen and derivatives industry throughout its value chain.

## LINE OF ACTION 3:
# ECONOMIC AND FINANCIAL MECHANISMS TO BOOST THE INDUSTRY




### MILESTONES

1. Closure of the first process of allocation of state lands (Window to the Future)
2. Publication of the call for the second process of allocation
3. Annual call for each CORFO instrument
4. Design of the pilot ETS programme for the energy sector
5. Implementation of the pilot ETS programme
6. 8. 10. Submission of the bill to Congress (specific to each case)
7. 9. 11. Approval of the bill (specific to each case)
9. Update and operation in the first semester of 2024
12. Prospecting work for Green Credit placement
13. Constitution of the Green Hydrogen Guarantee Fund
14. Formal opening and start of the "Facility GH2" Desk with Green Credit
15. Opening of the FSA call (Financial Assistance Mechanism)
16. Start of public-private working group sessions
17. Closure of the first call of the financing round initiated in 2021
18. Evaluation of opening new financing rounds

Note: Bar colours only indicate complementarity of measures.

# *Action 11. Allocation of state lands for the green hydrogen industry and its derivatives. Closure of the current process and initiation of a new process for first projects*

***Objective***: Allocate and manage state lands for the development of the green hydrogen industry and its derivatives, considering the territorial compatibility of the requests, within the framework of the "Ventana al Futuro" (Window to the Future) initiative (Exempt Resolution No. 998/2021 and No. 827/2022, of the Ministry of National Assets approving the National Plan for the Promotion of Green Hydrogen Production on State Land). In this sense, the closure of this process will be accelerated to implement the projects that will trigger the industry in the northern macrozone (first movers), mainly in the Antofagasta Region, and provide certainty to other projects seeking to settle in the coming years.

Additionally, a second process for the allocation of state lands for the development of the green hydrogen industry and its derivatives will be developed, considering criteria of economic feasibility, location in areas with a high presence of projects associated with the value chain of green hydrogen, and compliance with requirements for the real advancement of each project (time to market), territorial compatibility, and sustainability criteria. In this process, incentives in terms of concessional rent, guarantees, and/or coordination of the allocation of lands and easement strips will be evaluated, prioritising early projects of industrial scale.

***Timeline***: 2024-2025

***Milestones***:

- 2024: Closure of the first process of allocation of state lands "Ventana al Futuro" (Window to the Future).

- 2025: Publication of the call for the second process of direct allocation of state lands for first hydrogen, ammonia, or other derivative projects.

***Responsible Institution***: Ministry of National Assets, with support from the Ministry of Energy and Ministry of Economy, Development, and Tourism.

## *Action 12. Strengthening CORFO's promotion instruments with a focus on green hydrogen*

***Objective***: CORFO's promotion instruments allow, among other things, to solve financing access problems for activities associated with technological and/or productive development. The purpose of this action will be to focus some of CORFO's instruments to address the various technological development challenges of green hydrogen throughout the value chain. Several of these instruments are being supported by the Sustainable Productive Development Programme of the Ministry of Economy. It includes:

a. Strategic Technological Programmes (PTEC from its acronym in Spanish): PTECs aim to increase the rate of technological innovation in products and processes of companies in specific productive and/or economic sectors, through the articulated execution of portfolios of technological development projects that allow reducing and/or closing the identified gaps, improving the sector's productivity, and contributing to its diversification and/or sophistication. In 2023, 5 hydrogen PTECs were awarded with the objective of promoting demand in the industry. During 2024, a new call will be made for green hydrogen demand and another for manufacturing in the value chain. Projects can access financing of up to 3.5 billion Chilean pesos each. This program is supported by the Ministry of Economy through the Sustainable Productive Development Programme (DPS from its acronym in Spanish).

b. Human Capital Instrument for Innovation: Developing instruments that stimulate and improve the technological capacity of companies, through the incorporation, within the company, of expert professionals (advanced human capital or with extensive level of experience in the required professional and/or technical area) in R&D&I, who identify opportunities for companies in terms of productivity and/or competitiveness and address them through an innovation or R&D process. This instrument is supported by the Ministry of Economy through the Sustainable Productive Development Programme (DPS).

c. Create and Validate Instrument: To support the development of new or improved products, processes, and/or services based on technology, from prototypes to their technical validation on an industrial and commercial scale that solve problems and/or challenges of the productive sector or address a market opportunity, through research and development (R&D&I). The programme has two modalities: Business and Collaborative, meaning that development can be carried out with the company's own capabilities (Business) or with external capabilities (Collaborative). This instrument is supported by the Ministry of Economy through the Sustainable Productive Development Programme (DPS).

d. High Technology Innovate Instrument: Focused on supporting R&D&I projects with high technological risk to scale globally. The specific objectives of this instrument include: (a) Supporting the development of new products, services, and/or processes of high technological sophistication; (b) Supporting the design and development of a strategy for the protection and commercialisation of the results obtained, and (c) Strengthening R&D&I capabilities in companies. This instrument is supported by the Ministry of Economy through the Sustainable Productive Development Programme (DPS).

e. Viralise Instrument: Aims to promote the reinforcement of the entrepreneurial and innovation environment/culture, and thus contribute to improving the conditions under which entrepreneurial activity takes place. This is developed through programmes of broad scope that validate and promote the option of entrepreneurship and the use of innovation as privileged tools for economic and social development. This instrument is supported by the Ministry of Economy through the Sustainable Productive Development Programme (DPS).

f. Power Instrument: With the aim of providing support and specialised services of incubation, collaborative workspace, mentoring, and acceleration to dynamic ventures in their gestation process, to strengthen and develop them, thereby increasing their chances of success in high-risk commercial stages, to their growth and internationalisation.

g. Scaling Instrument: To support the development of high-growth potential ventures that have completed the creation and start-up stages, by co-financing activities for the design and execution of business plans on a global scale. This instrument is aimed at supporting innovative ventures, i.e., projects whose proposed solution to a relevant problem represents a new or improved product or service, with a national scope and, additionally, potential for internationalisation. This instrument is supported by the Ministry of Economy through the Sustainable Productive Development Programme (DPS).

h. Innovation Challenges: This instrument seeks to provide a solution to a public interest challenge affecting a group of companies belonging to a productive sector and/or value chain. To this end, innovative, technology-based solutions are sought, with co-financing provided for activities such as technical and commercial validation, feasibility studies, protection strategy, and strengthening of scaling and commercialisation strategy, among others. In 2024, a new call is expected to finance specific problems of the emerging hydrogen industry, such as integrating electrolysers with variable renewable energies, blending systems with other gases for distribution, and optimising materiality and inputs of electrolysers on a national scale. This instrument is supported by the Ministry of Economy through the Sustainable Productive Development Programme (DPS).

i. Quality Promotion Programmes - Focal: This instrument allows supporting companies to improve their productivity and competitiveness, through an incentive for the implementation and certification of technical standards of management systems and products, or protocols, recognised by CORFO as enabling to access more sophisticated or export markets. This programme co-finances consultancy and/or technical

assistance costs, including both obtaining certificates and the necessary implementation process.

j. Subsidy for green hydrogen demand: CORFO will issue a call to provide direct subsidy to initiatives associated with the demand for green hydrogen in Chile, with an R&D component in the projects.

***Timeline***: 2023-2030 (annual and permanent process, depending on the deadlines of each instrument)

***Milestone***:

- 2023-2030: Annual call for each CORFO instrument.

***Responsible Institution***: CORFO, with support from the Ministry of Economy, Development, and Tourism and the Ministry of Energy.

# *Action 13. Boost domestic/national demand for hydrogen in key sectors through an Emissions Trading System (ETS)*

***Objective**:* Implement an Emissions Trading System based on a cap-and-trade framework in the energy sector to trigger domestic demand for hydrogen. A pilot programme will be developed to facilitate the replacement or use of new hydrogen-based technologies to decarbonise emissions-intensive sectors that currently face multiple challenges by setting cost-effective emission limits.

This instrument promotes the execution of projects for the consumption of green hydrogen and its derivatives in the economy, as zero-emission alternatives for energy supply and as raw materials for various economic activities in the country. This pilot can be implemented to comply with the Climate Change Framework Law, which instructs the development of economic instruments for climate change management. The implementation of an ETS, along with a carbon tax, creates a conducive ecosystem for the adoption of decarbonisation technologies such as those provided by green hydrogen, as it increases efficiency in emission reduction by allowing companies to adapt their strategy to seize the opportunities offered by both approaches.

***Timeline**:* 2024-2025. Design – 2024-2025. Implementation – 2025 onwards.

***Milestones***:

- 2024: Design of an ETS pilot programme for the energy sector.
- 2025: Implementation of an ETS pilot programme.

***Responsible Institution:***

- Ministry of Energy
- Ministry of Environment
- Ministry of Finance

## *Action 14. Create a fund for tax credits attributable to first category tax for investments with high multiplier effect, including the "green" dimension*

***Objective***: Under the Income Tax Reform Law, part of the Fiscal Pact, a tax incentive will be created that companies developing productive investment projects promoting the transfer and development of new technologies and/or the decarbonisation of the productive matrix, such as electromobility, renewable energy industry, and green hydrogen, can opt for.

***Timeline***: 2024-2025

***Milestones***:

- 2024: Submission of the bill to Congress.
- 2025: Approval of the bill.

***Responsible Institution:*** Ministry of Finance.

# *Action 15. Implement a development tax rate for investment, allowing companies to reduce first category tax through investments that increase business productivity*

***Objective**:* Under the Income Tax Reform Law, part of the Fiscal Pact, the first category tax will be reduced to 25%, and a 2% tax will be established for companies in the general taxation regime that can be deducted through investments that increase business productivity, such as the acquisition of high-tech equipment.

The fiscal resources from this tax will be allocated to key activities related to decarbonisation strategies, adaptation to climate change, biodiversity protection, among others.

***Timeline**:* 2024-2025

***Milestones:***

- 2024: Submission of the bill to Congress.
- 2025: Approval of the bill.

***Responsible Institution**:* Ministry of Finance.

# *Action 16. Tax Incentive for Research and Development, through Strengthening of Law 20241 (R&D Law)*

***Objective**:* Within the framework of the Income Tax Reform Law, part of the Fiscal Pact, the current Research and Development (R&D) Law will be prioritised for updating. This instrument offers an incentive of up to 35% tax credit against the First Category Tax on the amount invested in R&D, and the remaining 65% can be considered as necessary expense to generate income. Available throughout the year.

In this regard, the R&D law will be strengthened by tripling its upper threshold for tax credit, and the tax credit amount for certain projects consistent with sustainable development, such as those related to green hydrogen and its derivatives, will be increased to 50%.

***Timeline***: 2024-2025

***Milestones***:

- 2024: Submission of the bill to Congress.
- 2025: Approval of the bill.

***Responsible Institutions**:* Ministry of Finance, with support from CORFO, Ministry of Economy, Development, and Tourism, and Ministry of Energy.

# *Action 17. Update the "Green Credit" instrument of CORFO to include banking and non-banking financial intermediaries, to finance green hydrogen projects*

***Objective:*** CORFO's "Green Credit" instrument provides financing for operations granted by banking and non-banking financial institutions to companies (through loans or leasing), for investments in the construction, operation, and commissioning of projects, initiatives, and/or measures in the field of sustainability. Currently, through this instrument, it is possible to finance projects in renewable energies, electromobility, energy efficiency, climate change, storage, and circular economy. Additionally, this credit will be available to finance additional projects related to green hydrogen and its derivatives.

***Timeline***: 2024-2030

***Milestone***:

- First half of 2024: Update and implementation.

***Responsible Institution***: CORFO and Ministry of Economy, Development, and Tourism. Initiative developed with the support of the Ministry of Economy through the Sustainable Productive Development Programme (DPS).

# *Action 18. Implement a financing facility for green hydrogen projects and its value chain, with state backing and support from multilateral banks*

***Objective:*** Through CORFO, a financial facility (Facility) will be established to catalyse private investment primarily by providing State backing to reduce and mitigate financial risks of projects that meet certain technical, economic, environmental, and social requirements. This instrument will finance projects in different stages of development, focusing on green hydrogen production (including renewable electricity generation and derivative production), demand for green hydrogen, and the acquisition of components for green hydrogen (such as wind turbine blades and towers, solar panels, electrolysers, etc.).

As part of this facility, CORFO will develop an Environmental and Social Management System (ESMS). The ESMS is a system for assessing environmental and social risks, aimed at supporting the evaluation of associated risks to ensure that projects comply with high environmental and social standards, as well as related requirements demanded by international financial institutions. The ESMS should therefore be developed in coordination with all existing environmental and social institutions.

The Facility will have an initial size of around US$1,000 million, largely financed by International Development Banks (IDB, World Bank, KfW, EIB, CAF, among others), in addition to CORFO's own resources. The preparation of this platform is ongoing, including the definition of standards required for applicant projects. It is expected to be operational from the second half of 2024.

***Timeline***: 2023-2026

Design and implementation: 2023-2025, with significant importance to support the financing of hydrogen projects during 2025 and 2026, which will be developed through a strategy that allows for the gradual availability of resources for this purpose.

***Milestones***:

- Third quarter 2024: Initiate work on prospecting for green credit placement, involving commercial, prospecting, and project structuring activities for potential financing.

- September - October 2024: Establishment of the Hydrogen Guarantee Fund (GH2) where GH2 coverage will be provided for projects with financing under a "Structured Financing" modality.

- End of 2024: Formal opening of the Facility GH2 Window with Green Credit and commencement of work with projects for financing from 2025 onwards

***Responsible Institutions:*** CORFO, with the support of the Ministry of Finance, Ministry of Energy, Ministry of Economy, Development and Tourism, and Ministry of the Environment, among others.

# *Action 19. Support for green hydrogen production and/or consumption projects regarding financing instruments*

***Objective***: Comprehensive and individualised Financial Service Assistance (FSA) for green hydrogen and derivative projects throughout the value chain to ensure their bankability and financial sustainability.

The initiative is developed by the GIZ's RH2 programme and will involve supporting companies and green hydrogen projects with financial advisors specialising in renewable energy and hydrogen markets. It also includes the development of a public-private working group aimed at preparing a proposal to implement in Chile a financing model based on the H2Global[12] mechanism, which enables investment and development of the green hydrogen industry considering mechanisms that promote competition to encourage timely and effective increase of clean technologies associated with the green hydrogen value chain, through the link between green hydrogen producers and demanders, by addressing the price gap between production and commercialisation existing today.

To complement these objectives, the potential development and implementation of new, modified, or used financial instruments in international markets to support and enable the financing and investment of green hydrogen and derivatives projects are considered, under the current national legal financial framework, and considering the regulations established regarding information, environmental, social, and governance (ESG) criteria.

[12] **H2 Global: This corresponds to an instrument created in Germany with the aim of boosting the green hydrogen market. It consists essentially of compensating for the difference between supply and demand prices. Specifically, ten-year purchase agreements for hydrogen are made with producers before conducting auctions to sell the hydrogen and cover the price difference through a subsidy from the German government (resources whose origin may change in subsequent auctions).**

***Timeline***: 2024-2030

FSA and working group, in development from 2024.

***Milestones***:

- 2024: Opening of the FSA call for proposals
- 2024: Commencement of public-private working group sessions

***Responsible Institution***: Ministry of Energy, with support from the GIZ RH2 Programme.

# *Action 20. Accelerate the implementation of the first industrial projects of green hydrogen and its derivatives through financing rounds*

***Objective:*** Support the construction and realisation of industrial-scale projects for green hydrogen and its derivatives through a subsidy that supports final investment decisions, and whose implementation allows for understanding the full costs of producing green hydrogen and its derivatives in Chile.

This entails closing the process associated with the first call made during 2021 and the possible opening of new calls that meet the objectives established in the National Green Hydrogen Strategy and the current Action Plan, in accordance with industry conditions, timing, and evaluation of the instrument.

***Development timeline****:* 2023-2026

***Milestones****:*

- 2025: Closure of the first call for financing initiated in 2021.
- 2025-2030: Evaluation of opening new financing rounds

***Responsible Institution****:* CORFO.

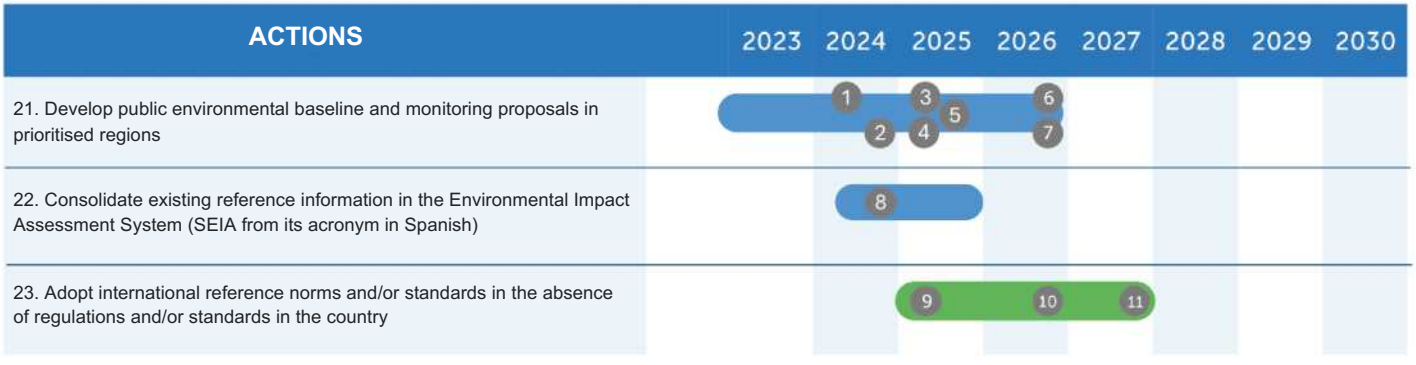
# 6.4 ENVIRONMENTAL MANAGEMENT

The development of the green hydrogen industry, its derivatives, and its entire value chain will require the adaptation and installation of new infrastructure in various territories of the country. Therefore, it will be crucial to reinforce environmental management related to project development to provide certainty and ensure harmony with the environment.

In this regard, the State will work on different fronts to provide certainty regarding the assessment of environmental impacts of projects. There will be improvements in baseline information for project environmental assessment, including the development of public environmental baseline data. Additionally, progress will be made in updating and generating technical criteria for the environmental assessment of different types of projects related to the green hydrogen value chain in unregulated areas.

Below are the actions and milestones committed in this plan to support the environmental management of green hydrogen and its derivatives projects.

## LINE OF ACTION 4:
# ENVIRONMENTAL MANAGEMENT




### MILESTONES

1. Magallanes public environmental baseline available on the Platform (with existing secondary information)
2. Launch of a technological platform with baseline and other information
3. Antofagasta public environmental baseline available on the Platform (existing secondary information)
4. Metropolitan Region public environmental baseline available on the Platform (existing secondary information)
5. Magallanes public environmental baseline available on the Platform (with existing secondary information)
6. Antofagasta public environmental baseline developed and available on the Platform (primary information collected from the field)
7. Magallanes public environmental baseline available on the Platform (with existing secondary information)
8. Study conducted by the end of 2024 to standardise SEIA reference information
9. Document prepared with a selection of international reference norms and standards
10. Analysis of applicability and standardisation applicable in project evaluation
11. Commencement of the procedure to adopt norms into the national legal framework

Note: Bar colours only indicate complementarity of measures

# *Action 21. Develop public environmental baselines and monitoring proposals in prioritised regions*

***Objective**:* The objective is to build public environmental baselines and a proposal for a long-term monitoring network, facilitating environmental assessment processes in strategic sectors and standardising information in formats required by environmental institutional systems and platforms.

This work will advance the standardisation of the contents that must be included in the baselines of investment projects to complement what is required by environmental regulations in environmental impact assessment processes.

The scope of the action will be the construction of a system for developing public baseline data that will provide information on the current quantity and quality of terrestrial and marine ecosystems.

The Ministry of the Environment has already started developing public environmental baselines in the Magallanes and Chilean Antarctic Region. It is expected to start developing baselines in other regions, prioritising those where the highest volume of projects is projected to be submitted in the short term, such as the Antofagasta and Metropolitan regions.

To centralise and make this information available, a technological platform for baseline data will be developed as part of the architecture of the National Environmental Information System (SINIA from its acronym in Spanish), which will also integrate data from the Pollutant Release and Transfer Register (RETC from its acronym in Spanish) to centralise the country's environmental information in a modern and easily updatable manner, as well as other sources of relevant information.

***Timeline**:* 2023-2026

***Milestones***:

- Mid-2024: Magallanes public environmental baseline available on the platform (existing secondary information).
- Second half of 2024: Launch of a technological platform with baseline and other information
- Mid-2025: Antofagasta public environmental baseline available on the platform (existing secondary information).
- Mid-2025: Metropolitan Region public environmental baseline available on the platform (existing secondary information).
- End of 2025: Magallanes baseline developed and available on the platform (primary information collected from the field).
- End of 2026: Antofagasta public environmental baseline developed and available on the platform (primary information collected from the field).
- End of 2026: Metropolitan Region baseline developed and available on the platform (primary information collected from the field).

***Responsible Institutions:*** Ministry of the Environment and Ministry of Economy, Development, and Tourism, with support from the Sustainable Productive Development Programme (DPS).

# *Action 22. Consolidate existing reference information in the Environmental Impact Assessment System (SEIA)*

***Objective**:* Compile and standardise existing environmental reference information in the Environmental Impact Assessment System (SEIA from its acronym in Spanish), valuing the information present in environmental impact studies conducted, which will serve as a reference for future processes.

The Environmental Assessment Service will generate an information system of baseline data for the various relevant environmental components that arise in the environmental impact assessment process of projects submitted to the SEIA, based on the development of a study for this purpose.

***Timeline**:* 2024-2028

***Milestone***:

- End of 2024: Study conducted to standardise reference information from the SEIA.

***Responsible Institution:*** Environmental Evaluation Service.

# *Action 23. Adopt international reference norms in the absence of regulations in the country for project environmental assessment*

***Objective***: Select international standards and/or regulations for aspects not regulated and considered relevant in the construction and operation of the industry and its sustainable management and apply them until they are replaced by national regulations.

To achieve this, the following aspects need to be developed:

Selection of international reference norms: A list with criteria for the use of international norms will be prepared, prioritising those most validated within the framework of environmental impact assessment of projects.

Analysis of the applicability of the selected norms or standards, justifying their compatibility based on standardisation and verifiable uniformity in project evaluation.

According to the applicability of the measures adopted, the process of formulating standards for priority aspects considered fundamental for the sustainable development of the green hydrogen industry will begin.

***Timeline***: 2025-2027

***Milestones***:

- First half of 2025: Document with criteria for the use of reference norms within the Environmental Impact Assessment System.
- End of 2026: Analysis of applicability and standardisation for project evaluation.

- End of 2027: Initiation of the procedure for adopting standards into the national legal framework.

***Responsible Institutions***: Environmental Evaluation Service, Ministry of the Environment, and Ministry of Energy.

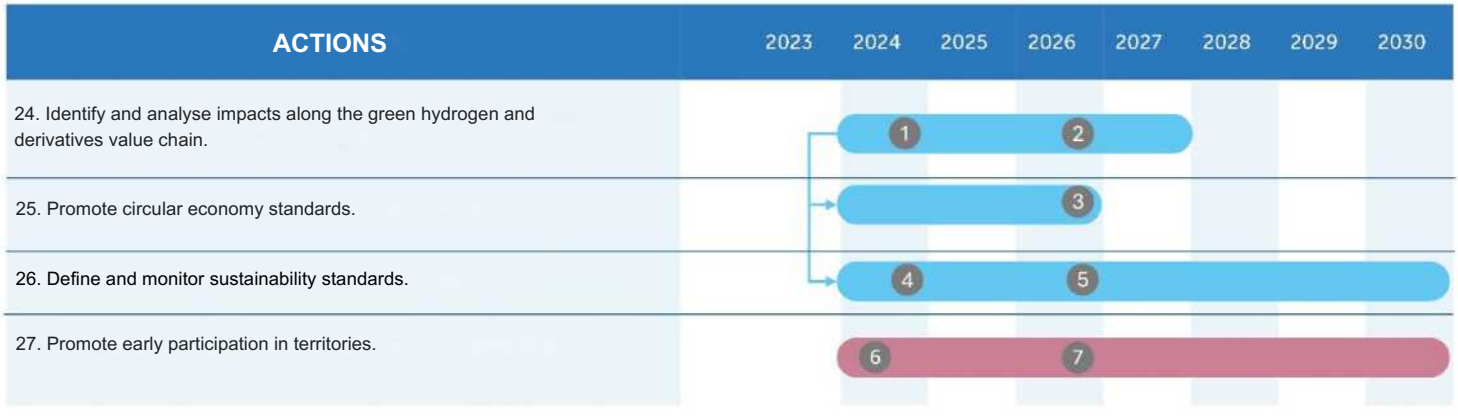
# 6.5 INDUSTRY SUSTAINABILITY

In this line of action, the aim is to have appropriate and consistent sustainability standards applied to the industry for the future, positioning the industry as an example and laying the groundwork for a proper relationship with local communities.

Clearly defining these standards, their monitoring, as well as promoting mechanisms to address concerns of local communities early on, is key to achieving lasting decisions in territories, seeking, in turn, continuous improvement of the industry through the adoption of cleaner technologies and strategies.

Below are the actions and milestones committed in this Plan to promote the sustainability of the green hydrogen and derivatives industry.

## LINE OF ACTION 5:
# INDUSTRY SUSTAINABILITY




### MILESTONES

1. Published study on the identification of socioeconomic impacts derived from renewable hydrogen projects in Chile.
2. Publicly available study on life cycle analysis of the green hydrogen industry, derivatives, and its value chain.
3. Guide on best practices in circular economy associated with the green hydrogen and derivatives industry and value chain.
4. Identification of critical processes in the green hydrogen value chain.
5. Document outlining key performance indicators for the green hydrogen industry, derivatives, and its value chain.
6. At least two projects have initiated the early participation process.
7. At least two projects have completed their early participation processes.

*Note: Bar colours only indicate complementarity of*

# *Action 24. Identify and analyse impacts along the green hydrogen and derivatives value chain*

***Objective***: Identify the environmental and socioeconomic impacts of the industry and its value chain, in areas such as resource use, waste, biodiversity, social and cultural components, or infrastructure, seeking continuous improvement of the industry, with emphasis on the particular characteristics of the territories where the industry will be located. These analyses will serve as input for actions related to promoting circular economy and sustainability standards.

***Timeline***: 2024-2027

***Milestones***:

- Second half of 2024: Published study on the identification of socioeconomic impacts derived from renewable hydrogen projects in Chile.
- End of 2026: Publicly available study on life cycle analysis of the green hydrogen industry, derivatives, and its value chain.

***Responsible Institution***: Ministry of Energy.

# *Action 25. Promote circular economy standards*

***Objective***: Promote comprehensive waste management, including valorisation and disposal through circular economy agreements, plans, or programmes between private entities in areas where the industry develops, thus leveraging production chains. Mechanisms such as clean production agreements will be encouraged. Critical waste points will be identified through a life cycle analysis study to drive this measure.

***Timeline***: 2024-2026

***Milestone***:

- End of 2026: Guide on best practices in circular economy associated with the green hydrogen and derivatives industry and value chain.

***Responsible Institution***: Ministry of the Environment, Ministry of Energy, and Ministry of Health.

# *Action 26. Define and monitor sustainability standards*

***Objective***: Based on the identification of critical points from the life cycle analysis and socioeconomic impacts, standards with key performance indicators will be defined to monitor projects in environmental, social, and economic areas. To ensure verification, these indicators will be built with public data, including already available open data from sources such as the Pollutant Release and Transfer Register, the National Environmental Inspection Information System, the Environmental Impact Assessment System, among others.

Sustainability standards may be implemented through public-private-civil society agreements under regional roadmaps and will serve as a basis for progressively strengthening institutions and regulations in these areas.

***Timeline***: 2027-2030

***Milestones***:

- 2024: Identification of critical processes in the green hydrogen value chain.
- End of 2026: Document with definition of key performance indicators for the green hydrogen industry, derivatives, and its value chain. These indicators will be discussed in civic workshops.

***Responsible Institutions:*** Ministry of Energy, Ministry of the Environment, Ministry of Social Development and Family, and Ministry of Labour and Social Welfare.

# *Action 27. Promote early participation in the territories*

***Objective***: Provide project developers with tools to involve interested communities early in project design, providing methodological support and accompaniment in multi-stakeholder dialogue processes, and promoting the adoption of participation and human rights standards. Through this action, we aim for high socio-environmental standards to be sought out by companies, providing facilitation and monitoring of the agreements reached. It also aims to generate harmonious, constructive long-term relationships between companies, local communities, and other interested parties to minimise impacts, prevent and/or resolve conflicts, provide information on potential environmental impacts, and legitimise the decisions made.

In November 2023, the Environmental Assessment Service of Chile (SEA from its acronym in Spanish) published a guiding document on Early Civic Participation (PCT from its acronym in Spanish). The main objective of the guide is to unify minimum criteria for planning and implementing PCT processes, enhancing trust among the involved actors and strengthening projects or activities entering the SEIA process.

Currently, there are various State instruments available to project developers that provide methodologies for early involvement of interested communities. The Ministry of Energy, through the Participation and Social Dialogue Division, promotes stakeholder participation in GH2 projects and derivatives throughout their life cycle and, for this purpose, provides methodological support and accompaniment in multi-stakeholder dialogue processes to promote the adoption of participation and human rights standards and associativity. In addition, the Sustainability and Climate Change Agency (ASCC from its acronym in Spanish) has the Voluntary Early Participation Agreement (AVPT from its acronym in Spanish) instrument, which seeks to adopt high socio-environmental standards by companies. The Agency administers and guides the process, provides facilitation, and monitors the agreements reached.

Through methodologies like these, agreements are promoted among different stakeholders, which can later be formalised in the environmental assessment process. Moreover, if there is interest among the various actors related to GH2 in the regions, voluntary social and environmental standards could be developed, with a territorial scope, shared by the entire industry.

***Timeline***: From 2024.

***Milestones***:

- 2024: At least two projects have started early participation processes.
- 2026: At least two projects have completed their early participation processes.

***Responsible Institution***: Ministry of Energy, Sustainability and Climate Change Agency (ASCC), or Environmental Assessment Service (SEA), as appropriate.

# 6.6 REGULATORY ENABLEMENT

The green hydrogen industry requires regulations and norms that provide legal certainty to facilitate its deployment. Establishing a regulatory framework for the deployment of green hydrogen and its derivatives is crucial to safeguard aspects of safety throughout the value chain.

In 2020, under the framework of the Green Hydrogen Strategy, a first work plan for the regulation and norms of green hydrogen was developed. However, given the advances in the industry and new available information, it is necessary to update this work plan so that it is harmonious with current development perspectives, in addition to considering regulation for other aspects of the value chain, such as desalination.

In this context, a new version of the regulatory work plan is proposed for the creation of an appropriate, clear, and timely normative framework that guarantees high standards of safety and defines clear rules for the execution of hydrogen projects and its value chain. Notwithstanding the foregoing, the regulations to be developed consider transitional articles applicable to projects that are being developed or have been installed under the current normative framework. The elaboration of this work plan incorporated a process of public-private feedback, a regulatory impact report for each elaboration or modification considered, and a public consultation process.

This line of action includes the following actions and milestones, aiming to generate conditions of certainty and stability in regulatory matters, facilitating the installation of the industry and the materialisation of projects of various scales.

## LINE OF ACTION 6:
# REGULATORY ENABLEMENT

| ACTIONS | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|
| 28. Launch and implement the enabling regulatory work plan for the industry | | 1 2 3 | 4 | | 5 | | | |
| 29. Promote specific and enabling regulation for seawater desalination | | | 6 | | | | | |

### MILESTONES

1. Launch of the Regulatory Work Plan
2. Registration of the Hydrogen Installation Safety Regulation
3. Initiation of a study to generate a proposal for hydrogen quality regulation and hydrogen refuelling station regulations
4. Presentation of the regulatory strategy for hydrogen derivatives
5. Update of the regulatory work plan
6. Advocacy for a bill on seawater desalination for publication

*Note: Bar colours only indicate complementarity of measures.*

# *Action 28. Launch and implement the enabling regulatory work plan for the hydrogen and derivatives industry*

***Objective***: According to the regulatory work plan developed in 2023 under the leadership of the Ministries of Energy and Economy, in coordination with the Ministries of Transport and Telecommunications, Health, and Mining, each ministry or competent authority will be responsible for drafting or amending the respective regulations. A schedule of execution for critical regulations identified until 2030 has been defined.

In particular, this regulatory work plan addresses regulations associated with hydrogen installations, transportation, hydrogen usage applications, quality aspects, commercialisation, among others. The first regulations to be developed will focus on the safety of installations, fuelling stations, hydrogen quality specifications, freight transportation in its various modes, among others. Additionally, this plan includes a review every 3 years to prioritise and address the industry's development and maturity.

For the implementation of this work plan, the development of studies and guidelines, training, and technical support for the preparation and updating of regulations are considered.

***Timeline***: 2024-2030

***Milestones***:

- Second half of 2024: Launch of the plan.
- 2024: Regulation on Hydrogen Installation Safety.
- 2024: Initiation of studies to generate proposals for hydrogen quality regulation and hydrogen fuelling station regulations.

- 2025: Presentation of the regulatory strategy for hydrogen derivatives, which will begin development during 2024.
- 2027: Update of the regulatory work plan.

***Responsible Institution***: Ministry of Energy in coordination with the Ministry of Transport and Telecommunications, Ministry of Mining, Ministry of Health, and other relevant public services responsible for each regulation. Initiative developed with the support of the Ministry of Economy through the Sustainable Productive Development Programme (DPS).

# *Action 29. Promote specific and enabling regulation for seawater desalination*

***Objective***: Establish a clear and unified regulatory framework and administrative procedures, legally enabling the Ministry of Public Works to provide or concession, multipurpose infrastructure that includes industrial use and shared use by projects, such as green hydrogen production and its derivatives in a planned manner, optimising the water resource, and in accordance with available studies—including those related to brine.

The aim is to promote the use of desalinated water and/or water reuse for activities such as industrial use, thereby contributing to safeguarding and prioritising the use of continental water sources for human consumption.

***Timeline***: 2024-2025

***Milestone***:

2024-2025: Advocate for the publication of the Law on the Use of Seawater for Desalination

***Responsible Institution***: Ministry of Public Works, with the support of various related agencies.

# 6.7 PERMITTING SYSTEM

Our country's aspiration to lead in the green hydrogen industry internationally imposes the need to enable the market in a timely manner, with an agile and efficient permit acquisition protocol, without relaxing the requirements. However, some stakeholders estimate that the processing of such projects may take up to ten years under the current regulations, including the environmental evaluation process.

On the one hand, there is a challenge for public institutions, as this is a new industry with some processes different from those that have been evaluated so far. While some projects that make up the extensive green hydrogen value chain and derivatives already exist in our regulations and the new components (such as hydrogen production itself) are only part of the chain, the challenge arises from the scale of the projects and the combination of them into a complex value chain. Public institutions will need to address this challenge to streamline certain evaluation or permitting processes.

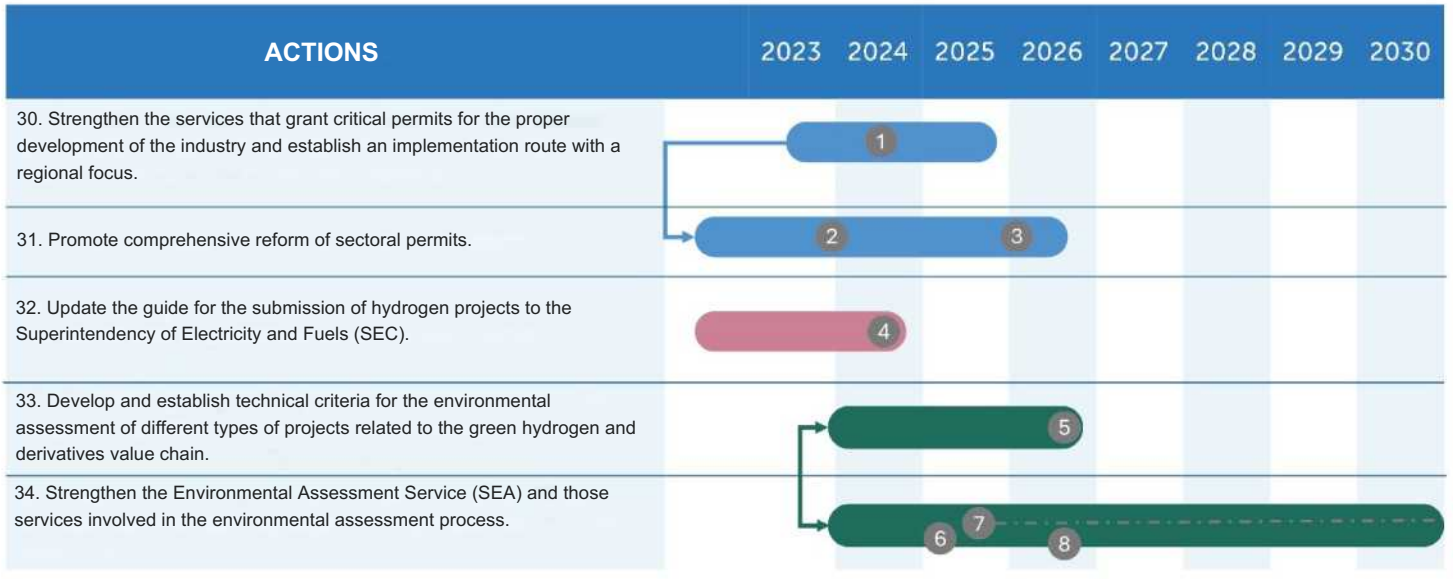
On the other hand, there is a challenge for the permit processing and delivery system, which is not designed and optimised for the current reality, resulting in lengthy processing times, generating uncertainty. This poses a challenge for the timely development of green hydrogen projects in the country.

The above reveals significant gaps for speeding up permits considering aspects such as: lack of knowledge of the processes involved in the industry and the value chain, lack of human capital for evaluation and permitting, lack of appropriate techniques and methodologies to evaluate the impact of these projects, and identifying improvable aspects of the permit processing processes in order to reduce their timelines.

It is important to highlight, in this context, that the Office of Large Projects and the Division of Sustainable Productive Development, of the Ministry of Economy, Development and Tourism, and the Division of Sustainable Energy Infrastructure, of the Ministry of Energy, jointly and with close public-public coordination, offer a coordination instance between different institutions of the State administration linked to the granting of authorisations and permits for energy projects. These teams are also responsible for actively monitoring the development of green hydrogen projects and their derivatives, such as ammonia and methanol, among others in the value chain.

This particular line of action consists of the following actions and milestones listed below.

## LINE OF ACTION 7:
# PERMITTING SYSTEM




### MILESTONES

1. Services linked are trained
2. Bill is submitted
3. Bill is approved
4. Update of the guide is published
5. Technical criteria are published
6. Projection of staffing strengthening requirements
7. Progressive implementation of strengthening and modernisation of services
8. Services are trained in strategic regions

# *Action 30. Strengthen the services that issue critical permits for the proper development of a green hydrogen industry in Chile and establish an implementation route with a regional focus*

***Objective***: The aim of the plan to reinforce the organs of the State administration that issue critical permits is to solve problems related to the agility of permit processing while the bill to reform sectoral permit processing, led by the Ministry of Economy, is approved.

The reinforcement considered the following actions: (1) hiring personnel for file evaluation; (2) technical training on green hydrogen projects; (3) technical support for developing guides, admissibility review guidelines, and evaluation; and (4) external technical support through resource transfer agreements between institutions.

Currently, the Ministry of Economy, through the DPS programme, is supporting the reinforcement of services in the Magallanes region.

***Timeline***: 2023-2025

***Milestone***:

- 2024: Related services are trained, especially in regions where the green hydrogen industry will be developed.

***Responsible Institution:*** Ministry of Economy, Development and Tourism, in coordination with the Ministry of Energy and related services. The initiative is supported by the Sustainable Productive Development Programme (DPS)

# Action 31. Promote comprehensive reform of sectoral permits

***Objective***: The bill entitled "Framework Law for Sectoral Authorisations" will improve the standardisation, efficiency, proportionality, predictability, and institutional framework of permits for investments, aiming to reduce authorisation deadlines for projects by 30%.

The reform includes a framework law for sectoral authorisations. For the purposes of this law, sectoral authorisations will be classified, according to their purpose, into the following types:

a. Administration or disposal authorisation: administrative act that enables the exploitation or development of public interest services or the use, enjoyment, or disposal of State or national public use assets.

b. Location authorisation: administrative act approving the location of a project or activity.

c. Project authorisation: administrative act approving the design or programme of a project or activity, prior to its construction, installation, development, or execution.

d. Operation authorisation: administrative act approving the operation of a project or activity.

e. Professional or service authorisation: administrative act enabling individuals, companies, or teams to carry out an activity or provide a service.

f. Other authorisations: administrative acts enabling the development or execution of a project or activity not covered by the above types.

Also, a Unified Permit Information System is included through unique forms provided by the sectoral body for each authorisation within its competence. These forms must be available in the Unified Sectoral Permit Information System aimed at

streamlining and simplifying administrative processes for obtaining permits.

It is important to note that all authorisations granted under the Environmental Impact Assessment System (SEIA from its acronym in Spanish) are excluded, as well as the pronouncements issued by sectoral bodies regarding environmental sectoral permits within said system.

***Timeline***: 2023-2026

***Milestones***:

- January 2024: Bill is submitted.
- First quarter of 2026: Bill is approved.

***Responsible Institution:*** Ministry of Economy, Development and Tourism.

# *Action 32. Update the guide for the submission of hydrogen projects to the Superintendency of Electricity and Fuels (SEC)*

***Objective**:* Update the current guide to incorporate the experience of the Superintendency as well as actors who have submitted projects previously, with the aim of improving information delivery, clarifying parts of the process associated with registration, and requesting clearer information from stakeholders to facilitate the evaluation process and make associated times more efficient.

***Timeline**:* 2023-2024

***Milestones***:

- End of 2024: Update of the special hydrogen project submission guide is published.
- Responsible Institution: Superintendency of Electricity and Fuels, with support from the Ministry of Energy.

# *Action 33. Develop and establish technical criteria for the environmental assessment of different types of projects related to the green hydrogen and derivatives value chain*

***Objective**:* Update and generate technical criteria for the environmental assessment of different types of projects related to the green hydrogen value chain. For this purpose, various public bodies will co-ordinately develop guides, instructions, and criteria for the environmental assessment of projects in the Environmental Impact Assessment System related to green hydrogen and its value chain[13].

Initially, studies will be conducted to determine the gap and subsequently evaluate how to address it within the environmental assessment process.

***Timeline**:* 2024-2026

***Milestone***:

- End of 2026: Publication of technical criteria

***Responsible Institution:*** Environmental Evaluation Service.

[13] For example, the Environmental Guide for Birds within the framework of the Renewable Hydrogen TEI Project by GIZ.

# *Action 34. Strengthen the Environmental Assessment Service and those services involved in the environmental assessment process to address green hydrogen projects*

***Objective:*** This measure includes, on the one hand, increasing staffing at the Environmental Assessment Service (SEA) at the national and regional levels to better address the evaluation of projects the size of green hydrogen, complementary to the strengthening of institutions that issue critical permits.

On the other hand, intensive training will be provided to green hydrogen project evaluators at the SEA in regions and professionals from Regional Ministerial Secretariats and other public services that may require it, in order to strengthen skills and knowledge in areas of the green hydrogen value chain.

***Timeline***: 2024-2030

***Milestones***:

- 2025: Projection of staffing strengthening and modernisation requirements for services associated with project evaluation.
- 2025-2030: Progressive implementation of strengthening and modernisation of services.
- End of 2026: Services are trained in strategic regions.

***Responsible Institution***: Environmental Assessment Service (SEA) and Ministry of Energy, with support from the Spanish Agency for International Development Cooperation (AECID) for the development of training for SEA personnel.

# 6.8 COMPATIBILITY AND TERRITORIAL INTEGRATION FOR

The development of the green hydrogen industry and its derivatives poses challenges in terms of territorial integration and deployment, in line with the particularities of each territory and the need for synergies between the different components of its value chain. Therefore, it is necessary to address this at the regulatory level to provide certainty for current project development, and instrumentally through territorial planning, management, and organisation, as well as through territorial-focused energy planning.

Firstly, and considering that this is a new industry for the country and the recent advances in regulatory matters, the aim is to progress in providing regulatory certainty regarding siting, addressing the land uses applicable to green hydrogen projects, their derivatives, and their value chain, as well as regarding their industrial qualification, regulation that must also be incorporated into the corresponding instruments.

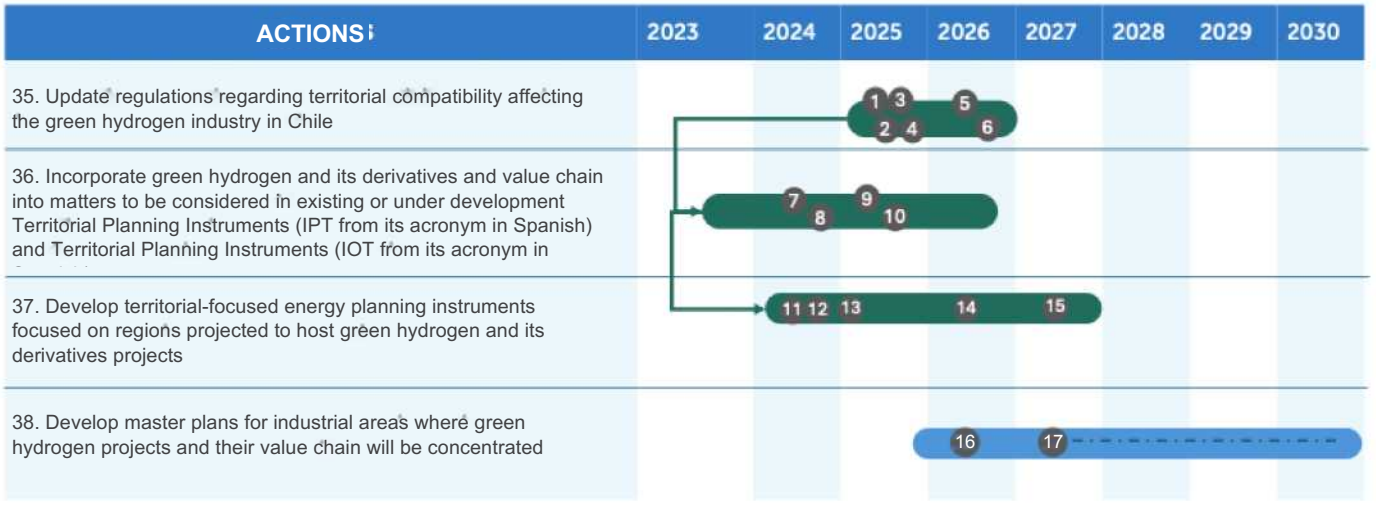
In this regard, it is also proposed to work on the consideration of green hydrogen, its derivatives, and its value chain in the development of inter-communal and communal territorial planning instruments, in accordance with current regulations, all of which are subject to the Strategic Environmental Assessment (SEA) procedure, taking into account the requirements of this industry. Thus, within the framework of the SEA, among other aspects, the instruments must consider environmental and sustainability policies that impact the instrument, and environmental considerations for sustainable development related to mitigation and

adaptation to climate change according to Article 43 of the Climate Change Framework Law. It also considers coordination with key State Administration bodies and community representatives essential for the process.

Additionally, the aim is to address green hydrogen and its derivatives in territorial-focused energy planning, which serves as input for sectoral decision-making, for other services that plan and intervene in the territory, and as a basis for an intentional management of public lands that allows for a coordinated and compatible allocation of lands and easements necessary.

The following are the actions and milestones aimed at ensuring the compatibility and integration of green hydrogen projects, derivatives, and their entire value chain.

## LINE OF ACTION 8:
# COMPATIBILITY AND TERRITORIAL INTEGRATION FOR PROJECTS




### MILESTONES

1. Update Circular NTB32/D4 of 2020 - Instruct technical criteria for the qualification of productive activities and infrastructure
2. MINVU DDU Circular on land use applicable to desalination projects for industrial use
3. Methodological design study for the development of Energy Infrastructure Studies" of IPTs
4. Base study for the update of the OGUC regarding Energy Infrastructure
5. Update of the General Ordinance of Urbanism and Construction regarding energy infrastructure
6. Modification of MINVU DDU Circular No. 481 instructing on the methodology for Energy Infrastructure Studies in IPTs
7. Registration of PROT Regulation
8. Working group on IPT for areas with projected development of the GH2 industry and its derivatives
9. Zoning of the coastal edge of the Magallanes Region
10. PROT Methodological Guide
11. PELP Decree with Tocopilla and Antofagasta PGE
12. Publication of PEER Magallanes with EAE
13. Publication of PEER Biobío
14. PEER Publication Antofagasta with EAE
15. PEER Publication Valparaíso
16. Evaluate application areas
17. Begin development of the first Master Plan

# *Action 35. Update regulations regarding territorial compatibility affecting the green hydrogen industry in Chile*

***Objective:*** This action focuses on the scope defined by the General Ordinance of Urbanism and Construction, aiming to update the treatment of components of the green hydrogen industry and its derivatives. This update should provide greater certainty for project development and establish a clear regulatory framework for territorial planning instruments.

In the short term, the goal is to conduct a detailed analysis of the variables and technical criteria to be considered in the industrial classification of projects (harmless, annoying, dangerous), in accordance with the provisions of Article 4.14.2 of the General Ordinance of Urbanism and Construction (OGUC from its acronym in Spanish). This analysis will specifically focus on the application of Circular No. B32/04 of 2020 issued by the Sub secretariat of Public Health. If necessary, this circular will be reviewed and updated to ensure alignment with current standards and requirements.

Within the framework of the General Ordinance of Urbanism and Construction (OGUC), the aim is to ensure coherence in defining energy infrastructure in line with sectoral energy regulations. This involves reviewing the treatment of energy infrastructure and its value chain in accordance with the nature of this industry. The objective is to provide clarity regarding land use and other applicable urban planning regulations, both at the regulatory level and through circulars as stipulated in Article 4 of the General Law of Urbanism and Construction (LGUC from its acronym in Spanish). Additionally, it is identified as relevant to review and, if necessary, refine the methodology of the Technical Study of Energy Infrastructure required by the General Law of Urbanism and Construction (LGUC) and the General Ordinance of Urbanism and Construction (OGUC) for communal and intercommunal level territorial planning instruments. This aims to ensure that the challenges of this industry are adequately considered in these instruments, while also ensuring consistency with sectoral policies in the field.

***Timeline***: 2025-2026

***Milestones***:

- 2025: Update Circular No. B32/04 of 2020 instructing technical criteria for the qualification of productive activities and infrastructure.
- 2025: MINVU DDU Circular on land use applicable to desalination projects.
- 2025: Methodological design study for the development of "Energy Infrastructure Studies" of Territorial Planning Instruments.
- 2025: Base study for the update of the General Ordinance of Urbanism and Construction regarding energy infrastructure.
- 2026: Update of the General Ordinance of Urbanism and Construction regarding energy infrastructure.
- 2026: Modification of MINVU DDU Circular No. 481 instructing on the methodology for developing Energy Infrastructure Studies in Territorial Planning Instruments.

***Responsible Institution***: Ministry of Housing and Urban Planning, Ministry of Health, with support from the Ministry of Public Works and Ministry of Energy.

# *Action 36. Incorporate green hydrogen and its derivatives, as well as components of its value chain, into matters to be considered in existing or under development territorial planning and zoning instruments*

***Objective***: To integrate green hydrogen and its derivatives, as well as components of its value chain, into territorial planning and zoning to achieve their balanced integration with the various uses, interests, and sensitivities in the territory, with a focus on those municipalities and regions crucial for industry development.

This will be achieved through the updating, modification, or creation of instruments, including their inclusion as subjects for analysis in the Energy Infrastructure Study (DDU MINVU Circular No. 481) in the case of urban planning, the Strategic Environmental Assessment procedure, and/or working groups with relevant organisations. All of this will be within the specific objectives of each instrument, and in accordance with principles such as sustainability, territorial cohesion, energy efficiency, and efficient and mixed use of land (LGUC), as well as territorial diversity, productive dynamism, and territorial competitiveness (PROT from its acronym in Spanish).

In this context, the focus criteria refer to (1) instruments under development, (2) new instruments in areas projected for the development of the green hydrogen industry, and (3) energy transition zones with potential for productive conversion along these lines.

Regarding instruments under development, initial focus lies on the Intercommunal Coastal Border Regulatory Plan of Antofagasta (PRIBCA from its acronym in Spanish), Metropolitan Regulatory Plan of Valparaíso (PREMVAL from its acronym in Spanish), Metropolitan Regulatory Plan of Concepción (PRMC from its acronym in Spanish), the Zoning of Coastal Border of Magallanes, and the Communal Regulatory Plan of Mejillones. As for future instruments, initial focus lies on the Regional Territorial

Planning Plans (PROT) in the regions of Antofagasta, Valparaíso, Biobío, and Magallanes, as well as the Zoning of Coastal Border (ZUBC from its acronym in Spanish) in the regions of Antofagasta, Valparaíso, and Biobío, and the Communal Regulatory Plan of Taltal. Finally, regarding transition zones, the Communal Regulatory Plan of Tocopilla is considered relevant.

***Timeline***: 2023-2026

***Milestones***:

- 2024: Approval of the PROT Regulation.
- 2024: Working group on Territorial Planning Instruments for areas projected for the development of the GH2 industry and its derivatives.
- 2025: Zoning of Coastal Border in Magallanes.
- 2025: Methodological Guide for PROT.

***Responsible Institution***: Ministry of Housing and Urban Planning (MINVU from its acronym in Spanish), Regional Governments, MINVU Ministerial Secretariats and Municipalities. Interministerial Commission on Urban Development, Housing, and Territory (COMICIVYT from its acronym in Spanish), and Ministry of the Interior.

# *Action 37. Develop energy planning instruments with a territorial focus in regions projected to host green hydrogen production and/or consumption projects and their derivatives*

***Objective**:* To guide the energy development of regions projected to host green hydrogen production and/or consumption projects and their derivatives, with a territorial focus, to promote balanced integration of the industry and its value chain in the territory and to accommodate the renewable energies necessary for the industry. This will be achieved through Energy Strategic Plans (PEER from its acronym in Spanish) and Electric Power Generation Development Centres (PDGE from its acronym in Spanish), instruments that consider the best available official information and an interdisciplinary approach, seeking articulation and feedback with territorial planning and zoning instruments, according to their respective scales of intervention.

Priority is initially given to the development of these plans in at least the Magallanes region (already initiated) and Antofagasta with Strategic Environmental Assessment and in the Valparaíso and Biobío regions. Additionally, priority is given to the Long-Term Energy Plan (PELP) Decree incorporating PDGE in the provinces of Tocopilla and Antofagasta.

***Timeline:*** 2024-2027

***Milestones**:*

- 2024: PELP Decree with PDGE for Tocopilla and Antofagasta.
- 2024: Publication of PEER for Magallanes with Strategic Environmental Assessment.
- 2025: Publication of PEER for Biobío.

- 2026: Publication of PEER for Antofagasta with Strategic Environmental Assessment.

- 2027: Publication of PEER for Valparaíso.

***Responsible Institution**:* Ministry of Energy.

## *Action 38. Develop master plans for industrial areas where green hydrogen projects and their value chain will be concentrated*

***Objective**:* To organise, transform, and improve the areas where green hydrogen projects and their derivatives, along with their value chain, will be concentrated, through a master plan for green hydrogen industrial areas, designed from scratch or by transforming existing ones, so that industrial development goes hand in hand with urban development in accordance with the standards established by national and international policy frameworks.

These plans should promote sustainable territorial integration of the industry's value chain (minimising environmental and territorial externalities, generating interface or buffer zones with other uses and activities, and contributing to urban development in the neighbourhood and its surroundings), the use of shared infrastructure (pipelines, ports, desalination, storage, conditioning, energy, etc.), public-private and private-private collaboration, productive chaining, and the minimisation of risks and uncertainties for public and private projects.

To achieve this, an industrial neighbourhood zoning will be designed, considering urbanisation, connectivity with the existing urban fabric (Article 5.2.6 OGUC), design of public spaces and facilities, among others, in accordance with territorial planning, planning, and management instruments, regarding matters such as the existence of

preferred location areas and location conditions of the Regional Territorial Planning Plans (PROT), rules, declarations of public utility, contributions to public space, and urban planning incentives of territorial planning instruments, and servitudes of state-owned lands. Additionally, references to international standards in the field will be evaluated, such as the Green Hydrogen Industrial Clusters Guidelines (ONUDI, 2023), and ISO standards for sustainable cities. Finally, this plan must include a portfolio of intersectoral and private investment that allows timely and orderly implementation.

These plans should be led by Municipalities with the support of Regional Governments and collaboration with companies, both in their design and in their financing and implementation, under the regional governance framework defined.

***Timeline***: 2026-2030

***Milestones***:

- 2025: Evaluate application areas.
- 2026-2030: Begin design and develop the first Master Plan.

***Responsible Institution:*** Municipalities, Regional Governments, and Companies, in coordination with sectoral Ministries, especially the Ministry of National Assets, where state-owned lands are available.

# 6.9 ENABLING INFRASTRUCTURE DEVELOPMENT

The green hydrogen industry and its derivatives offer us the opportunity to once again be a country that invests in infrastructure as a driver of economic growth and development. The value chain of this industry is broad and entails various challenges related to the availability of opportunities, the efficient and sustainable use of infrastructure and land, along with the coordination and cooperation of public and private stakeholders. This should be reflected in the need for logistical and systemic approaches to its conception, possibilities for the use of existing infrastructure and already industrialised lands. In addition to sharing key infrastructure to leverage economies of scale, incorporating sustainability standards into its design and operation, considering the territorial diversity and cultural identity of the places where it is desired to be located, among other factors.

To achieve sufficient and timely infrastructure, strategies are proposed where the State transitions from a coordinating and facilitating role to direct execution of some necessary investments, in cooperation and/or complement to private initiatives, all within the framework of intersectoral planning and existing territorial planning instruments.

In those regions where greater development of green hydrogen projects and derivatives is envisaged, it is proposed to strengthen the role of the State as a coordinator and facilitator of orderly, efficient, and sustainable infrastructure development. Thus, in the northern region, the initial action is to manage state-owned lands to incentivise the development of shared infrastructure to meet the demand of projects, and in the southernmost part of the country, it seeks to enhance the role of public companies, the National Petroleum Company (ENAP), and the Southern Port Company (EPA) so that they can coordinate to valorise their assets to structure logistic development around this new industry, all to trigger public and

private actions that achieve the goal. On the other hand, in industrialised regions and municipalities, the aim is to enhance existing logistic platforms, productive linkages, and local demand, helping to decarbonise the regional productive matrix.

In addition, it is proposed to strengthen the role of the Ministry of Public Works in providing enabling infrastructure and shared use of projects, along with generating conditions that allow for a productive reconversion of areas in energy transition, to develop this new industry where it is competitive. Finally, in terms of enabling infrastructure planning, the challenge of intersectoral coordination in its conceptualisation and optimisation is proposed, as well as the need to aim for its materialisation and implementation through Investment Plans of the executing State infrastructure portfolios (regular portfolio, programming agreements, and concessions), public companies, and private developers themselves.

Below are the actions and milestones leading to timely enabling infrastructure for the green hydrogen and derivatives industry.

## LINE OF ACTION 9:
# ENABLING INFRASTRUCTURE DEVELOPMENT


### MILESTONES

1. Incorporation of the Ministry of Energy into the National Commission for the Use of Coastal Border (CNUBC from its acronym in Spanish) of the Ministry of Defence
2. Incorporation of the Ministry of Energy into the National Commission for Logistics Development
3. Incorporation of Regional Energy Secretariats into Regional Coastal Use Commissions
4. Integrated planning study of green hydrogen and derivatives infrastructure
5. Study of social evaluation methodologies for projects associated with the green hydrogen industry
6. Design of Logistics Development Plan in the Magallanes Region
7. Design of Logistics Development Plan for the Northern Macrozone
8. Criteria for Sustainable Public Infrastructure (Ministry of Public Works)
9. Bid award for reinforcement of Mardones Pier, Magallanes Region (EPA).
10. Sustainable Public Infrastructure Criteria (MOP from its acronym in Spanish).
11. Study for identification of state-owned lands for disposal
12. Agreement between the Ministry of National Assets and the Ministry of Energy for the Land Tender Plan
13. Tendering of state-owned lands for the development of shared infrastructure for the value chain of green hydrogen and derivatives.

# *Action 39. Address the challenges of enabling infrastructure for the green hydrogen and derivatives industry within the framework of intersectoral coordination*

***Objective**:* Establish intersectoral coordination on enabling infrastructure for the development of the green hydrogen and derivatives industry, in the planning and investment sphere, to ensure coherence with national policies. The participation of the Ministry of Energy in these instances will be promoted as the competent body.

In this context, the National Coastal Border Use Commission (CNUBC) and the National Logistics Development Commission (CONALOG from its acronym in Spanish) are particularly relevant, given the need for integrated planning of the value chain infrastructure. Understanding that this exceeds the competencies of the Ministry of Energy, along with the significant challenges in materialising critical infrastructures such as pipelines, storage facilities, ports for importing inputs and exporting/coastal shipping of products, and water intake for desalination, among others. Definitions within the framework of infrastructure plans, instruments such as Coastal Use Zonings, the definition of reserve areas, and the granting of maritime concessions are crucial for their development.

***Timeline**:* 2024-2025

***Milestones***:

- 2024: Incorporation of the Ministry of Energy into the National Coastal Border Use Commission (CNUBC). (Ministry of National Defence, MINDEF).
- 2024: Incorporation of the Ministry of Energy into the National Logistics Development Commission (CONALOG). (Ministry of Transportation and Communications, MTT).

- 2025: Incorporation of Regional Energy Secretariats into Regional Coastal Use Commissions (CRUBC). (Regional Government, GORE from its acronym in Spanish).

***Responsible Institution***: Ministry of Transport and Telecommunications, Ministry of Defence, Regional Governments, in coordination with other relevant agencies.

## *Action 40. Plan the enabling infrastructure development for the green hydrogen and derivatives industry*

***Objective***: Plan enabling infrastructure for the green hydrogen and derivatives industry, considering public and private investment in a systemic approach.

Initially, existing instruments that can channel the complexity of the integral vision required by the green hydrogen and derivatives value chain, incorporating public and private initiatives, and ensuring coherence with territorial planning, will be targeted. Simultaneously, progress will be made in developing methodological improvements towards intersectoral infrastructure planning.

Planning will advance through the development of Logistics Master Plans (PML from its acronym in Spanish) nationwide, focusing initially on the Magallanes and Antofagasta regions, promoting the use of existing or new infrastructure shared to meet the service demands of diverse cargoes, including green hydrogen and derivatives. These plans will guide the government's decision-making for the promotion of specific enabling infrastructure projects.

The design of PMLs includes territorial characterisation of different uses and ions on the territory established in various existing instruments and involves key olders' participation: users, logistics operators, and public bodies.

It must be consistent with national policies, legal and regulatory frameworks, and international treaties. This instrument will also serve as a basis for tools such as reserved coastal areas or guiding the allocation of maritime and port concessions. The Plan being developed in the Magallanes Region incorporates the coordination of investments by the National Petroleum Company (ENAP) and the Austral Port Company (EPA), along with coordination with the Magallanes Green Hydrogen "Transforma" Programme.

Finally, an exploratory methodology will be developed for the planning instruments of competent public agencies (MTT, MOP, and MEN), to jointly address the enabling infrastructure planning of the hydrogen and its derivatives value chain, along with a review of the methodologies available from the Ministry of Social Development for social project evaluation, allowing for a comprehensive approach to the green hydrogen and its derivatives value chain, establishing social benefits that may not be currently valued.

***Timeline***: 2023-2025

***Milestones***:

- 2024: Integrated planning study of green hydrogen and derivatives infrastructure. This action is supported by the Ministry of Economy through the Sustainable Productive Development Programme (DPS). (MEN, MTT, MOP)
- 2024: Study of social evaluation methodologies for projects associated with the green hydrogen industry. This action is supported by the Ministry of Economy through the Sustainable Productive Development Programme (DPS). (MEN/MDS)
- 2024: Design of Logistics Development Plan in the Magallanes Region, according to the Methodological Guide approved by Exempt Resolution No. 1702 of the Ministry of Transport and Telecommunications, dated August 21, 2020. This action is supported by the Ministry of Economy through the Sustainable Productive Development Programme (DPS). (MTT)
- 2025: Design of Logistics Development Plan for the Northern Macrozone, according to the Methodological Guide approved by Exempt Resolution No.

1702 of the Ministry of Transport and Telecommunications, dated August 21, 2020 (MTT)

***Responsible Institution:*** Ministry of Energy, Ministry of Transport and Telecommunications, Ministry of Public Works, Ministry of Defence, Ministry of Social Development and Family, and Ministry of Economy, Development, and Tourism.

## *Action 41. Develop investment plans in enabling infrastructure for the green hydrogen and derivatives industry*

***Objective:*** Develop and execute enabling infrastructure for the green hydrogen and derivatives industry through direct public investment, in collaboration with private companies or private investment, within the framework of intersectoral planning and existing territorial instruments.

At the national level, the aim is to address the needs of port infrastructure and road and rail connectivity for ports managed by the 10 state-owned Port Companies, considering all types of cargo, including those associated with the green hydrogen and derivatives industry, through the update of the National Port Development Plan and the preparation of investment plans for port companies.

In the Magallanes and Chilean Antarctic Region, aligned with the Magallanes Logistics Development Plan, a coordinated and complementary action is projected by the Austral Port Company (EPA from its acronym in Spanish) with an investment plan to reinforce, expand, and provide dock cranes at Mardones for the unloading of necessary equipment and inputs; together with the National Petroleum Company (ENAP from its acronym in Spanish) seeking to reconfigure its facilities and build new infrastructure in partnership with third parties, to capitalise on its strategic position in the fuel supply logistics chain in the region, including:

- Infrastructure for equipment unloading in initial stages: Laredo
- Logistics integration infrastructure: Cabo Negro
- Enabling infrastructure for a new industrial complex: Bahía San Gregorio
- Enabling infrastructure for Tierra del Fuego in existing industrial area: Bahía Gente Grande - Percy.

Finally, within the framework of the planning and implementation processes of the Ministry of Public Works (MOP from its acronym in Spanish) Public Infrastructure, the principles, guidelines, and directives defined by the MOP's Sustainability Policy as well as the actions and measures of the Climate Change Mitigation and Adaptation Plans will be integrated, through the development of Sustainable Public Infrastructure Criteria, which in turn will guide private developers of this industry in good practices.

***Timeline***: 2023-2025

***Milestones***:

- 2024: Submission of concession request for Laredo Pier, Magallanes Region (ENAP).
- 2024: Awarding of tender for reinforcement of Mardones Pier, Magallanes Region (EPA).
- 2025: Sustainable Public Infrastructure Criteria (MOP).

***Responsible Institution:*** State-Owned Enterprises System (SEP), Austral Port Company (EPA), National Petroleum Company (ENAP), Ministry of Transport and Telecommunications, Ministry of Public Works.

# *Action 42. Tender state-owned lands for the development of infrastructure for the value chain of the green hydrogen and derivatives industry*

***Objective***: Develop a bidding plan that incorporates specific segments of the green hydrogen and derivatives value chain, according to energy and land demand projections by the projects, as well as the proper coordination of land allocation and necessary easements, and incentive for shared use of strips by different networks, aiming for efficient land use.

Priority will be given to generating a bidding process to encourage the provision of shared infrastructure by private developers through a tender of state-owned lands, evaluating the availability of lands in areas with the highest projections of hosting projects in the value chain of green hydrogen and its derivatives. The opportunity in the framework of project progress will be considered, along with sustainability criteria of the industry designed within this Plan, as well as the demands of nearby communities, archaeological heritage, and existing biodiversity, encouraging agreements between the parties.

To support this plan, an agreement will be made between the Ministry of Energy and the Ministry of National Assets, which includes a working group to address the design of the plan and its territorial compatibility.

***Timeline***: 2023-2030.

***Milestones***:

- 2024: Study for identification of state-owned lands for disposal through tenders for projects associated with the entire value chain of green hydrogen. This action is supported by the Ministry of Economy through the Sustainable

Productive Development Programme (DPS). (Ministry of Energy, MEN from its acronym in Spanish /Ministry of National Property, MBN from its acronym in Spanish)

- 2025: Agreement between the Ministry of National Assets and the Ministry of Energy for the Land Tender Plan for Green Hydrogen and its derivatives along with its value chain. (Ministry of Energy, MEN/Ministry of National Property, MBN)
- 2025: Tender of state-owned lands for the development of shared infrastructure for the value chain of green hydrogen and its derivatives. (MBN)

***Responsible Institution:*** Ministry of National Assets, with support from | the Ministry of Energy.

# 6.10 DEMOGRAPHIC CHALLENGE OF THE ENERGY TRANSITION

The development of the green hydrogen industry and its derivatives poses the need to address interconnected phenomena, such as energy transition and the demographic challenge, along with their territorial implications. The demographic challenge is a complex issue, encompassing dimensions such as migration, depopulation, seasonal overpopulation or floating population, urban centre growth in density, expansion or dispersion in rural areas, territorial location, and living conditions, among others.

Therefore, the implications of the development of this industry on the human settlement system need to be addressed comprehensively and early on, through territorial planning and management. It is a priority and an opportunity within the framework of the Sustainable Development Goals and the New Urban Agenda.

In the short term, there is a proposal to develop new instruments and regulations focused on the implications for temporary and permanent human settlements, considering infrastructure requirements, amenities, and housing, all subject to the Strategic Environmental Assessment procedure. Additionally, in the medium term, the relevance of regulation regarding temporary human settlements or construction camps associated with the project construction phase will be reviewed.

This line of action consists of the following actions and milestones:

## LINE OF ACTION 10:
# DEMOGRAPHIC CHALLENGE OF THE ENERGY TRANSITION


### MILESTONES

1. Award of the tender for the Intercommunal Regulatory Plan (PRI) of Magallanes and Tierra del Fuego.
2. Working group between the Ministry of Energy and the Ministry of Housing and Urban Planning to review applicable regulations regarding temporary human settlements
3. Study of alternative mechanisms for local taxation
4. Study and proposal for the calculation and allocation of the Municipal Common Fund in the category of floating

*Note: Bar colours only indicate complementarity of measures*

# *Action 43. Develop Territorial Planning Instruments (TPI) addressing the development of human settlements associated with the new industry*

***Objective:*** Plan the growth of populated centres and their infrastructure, equipment, and residence requirements, derived among others, from the development of the green hydrogen industry, evaluating existing territorial planning instruments and planning gaps.

This will allow addressing key issues at the intercommunal level such as guiding growth through the definition of urban expansion limits and territorial structuring through the classification of land for the public road network. At the communal level, it aims to accommodate facilities in land use zoning, urban planning incentives to improve levels of social integration and urban sustainability, and projects, works, and measures that contribute to the achievement of the objectives of the Plan, among others. All of this complements what may be defined in the Regional Territorial Plans (PROTs) regarding the human settlement system and supports the territorial targeting of State programmes in these matters.

In this context, at least the elaboration of the Intercommunal Regulatory Plan (PRI) of Magallanes and Tierra del Fuego and the evaluation of communal regulatory plans of the Province of Magallanes and Tierra del Fuego are identified in the first instance.

***Timeline***: 2024-2030

***Milestone***:

- Second half of 2024: Award of the tender for the Intercommunal Regulatory Plan (PRI) of Magallanes and Tierra del Fuego.

***Responsible Institution**:* Ministry of Housing and Urban Planning, Regional Governments, and Municipalities.

## *Action 44. Review the regulation regarding temporary human settlements associated with the green hydrogen industry and its derivatives*

***Objective**:* Review the relevance of the regulation regarding temporary human settlements or camps associated with the construction phase of projects, in order to adequately address the processing of authorisations and the requirements for infrastructure, equipment, and residence.

***Timeline**:*

***Milestone**:*

- 2024: Establish a working group between the Ministry of Energy and the Ministry of Housing and Urban Planning to review applicable regulations regarding temporary human settlements.

***Responsible Institution:*** Ministry of Housing and Urban Planning, with support from the Ministry of Energy.

# *Action 45. Review mechanisms for allocating resources to strengthen municipal management capacity to address the challenges of the industry's installation in the territories*

***Objective**:* Evaluate mechanisms to strengthen municipal management capacity for facilities and services, in order to address the challenges associated with the arrival of new population linked to the industry, in areas such as health, security, education, waste management, municipal works, community spaces, and others.

This will be done through two instruments; on one hand, the method of calculating and allocating resources given the floating population within the framework of the Common Municipal Fund will be reviewed, and on the other hand, the formula for allocating municipal taxes to industrial taxpayers will be reviewed with the aim of collecting them in the territories where industrial facilities or establishments are located, with a view to their implementation in the period 2025-2030.

***Timeline**:* 2026-2027

***Milestones***:

- 2026: Technical, economic, and social evaluation study of alternative mechanisms of local taxation
- 2027: Study and proposal for calculating and allocating the Common Municipal Fund in the item of floating population.

***Responsible Institution**:* Ministry of Finance and Undersecretariat of Regional and Administrative Development, with the support of the Ministry of Energy.

# 6.11 ELECTRICITY TRANSMISSION AND ENERGY COSTS

The country's aspiration regarding hydrogen is to develop a highly competitive industry that positions Chile as a leader in hydrogen and derivative exports. When analysing production costs, it becomes evident that the cost and availability of clean energy are determining factors for Chile to achieve its goals as a hydrogen producer. It will be necessary to implement regulatory and market measures to minimise energy supply costs, and even explore options for generating revenue from hydrogen production plants by providing services to the National Electric System. To achieve this, progress must be made in the development of regulations for generation-consumption projects, enabling demand in complementary and sufficiency services, and implementing measures that strengthen the recognition of electrical demand for hydrogen and derivative production in long-term energy planning and electric transmission expansion.

In parallel with this Green Hydrogen Action Plan, a Decarbonisation Plan for the electric system is being developed to establish enabling conditions of a regulatory, technological, and institutional nature to accelerate the decarbonisation of the electricity matrix and, consequently, the national economy. This plan places special emphasis on the retirement and conversion of coal-fired power plants, the corresponding facilitation of productive conversion possibilities supporting a fair energy transition, and the provision of flexibility attributes and complementary services to the National Electric System, enabling a cost-effective decarbonisation process of the electricity matrix, reflecting better development costs of the grid, achieving greater efficiency in energy costs, power, complementary services, and transmission infrastructure. This Plan will be developed during the first half of 2024 and will provide a roadmap of reforms and regulatory adjustments that will improve the efficiency of the electricity system

costs, which will impact the competitiveness of economic activities intensive in electricity use, such as green hydrogen.

Actions and milestones considered in this line are as follows:

## LINE OF ACTION 11:
# ELECTRICITY TRANSMISSION AND ENERGY COSTS


### MILESTONES

1. Document with assumptions about hydrogen
2. Incorporation of Magallanes electrical system modelling into PELP
3. Development of consultancy for regulatory proposal
4. Regulation sent to the Comptroller
5. Isolated systems bill sent to Congress
6. Publication of the Decarbonisation Plan roadmap
7. Complete regulatory, regulatory, and normative implementation

# *Action 46. Strengthen the Long-Term Energy Planning (PELP) methodology to address the challenge of the green hydrogen industry*

***Objective***: Strengthen the PELP in projecting the demand for green hydrogen and expand its scope to the Magallanes and Chilean Antarctic region.

With the aim of having a robust estimation of the potential demand for hydrogen and its derivatives in Chile, the Ministry of Energy will enhance the PELP in the development of on/off-grid green hydrogen production projects. This will consider the main sectors and/or economic activities where hydrogen and its derivatives can be used as an energy vector or industrial raw material in the short, medium, and long term (by 2060), serving as input for public policies that promote the use of hydrogen in various productive sectors with potential, contributing to decarbonisation and the goal of carbon neutrality.

Moreover, all tasks related to the study of electric transmission planning for the Magallanes region, which is not currently covered as it does not belong to the National Electric System (SEN), will be established within the PELP processes.

***Timeline***: 2024-2025

***Milestones***:

- End of 2025: Incorporate improvements to the modelling of connection or disconnection to the grid of green hydrogen projects nationwide into the 2025 Long-Term Energy Planning (PELP) Update Background Report (IAA)[14] .

[14] Report updating annual energy demand and supply projections.

- End of 2025: Incorporate modelling of the electric system planning for Magallanes into PELP.

***Responsible Institution**:* Ministry of Energy.

## *Action 47. Amend regulatory frameworks to address the operation of generation-consumption systems defined in Article 225 of the General Electricity Services Law*

***Objective**:* Amend regulations to establish the provisions and requirements necessary for the proper application of Article 225, subsection (f) of the General Electricity Services Law, introduced through the storage law (No. 21.505), which defines generation-consumption systems and specifies that the corresponding charges will be calculated considering the energy and power withdrawn from the grid, and in no case by the potential energy supplied. This will be carried out through a review and adaptation of the Regulation of Coordination and Operation of the National Electric System (DS125 of 2019), as well as specific modifications to other regulations and technical standards to ensure that this legal definition is fully defined at the regulatory level.

This action will establish the costs that projects involving their own generation of renewable energy at a connection point would have to bear, and therefore would not require withdrawing all the electrical demand necessary for hydrogen production from the electric system. The methodology for calculating the costs associated with electrical infrastructure for generation-consumption systems will be defined in a collaborative effort involving the Ministry of Energy, the National Energy Commission, the National Electric Coordinator, with technical support from GIZ, considering participation from industry and society at large.

***Timeline***: 2023-2025

***Milestones***:

- 2024: Development of specialised consultancy to define regulatory proposal enabling the legal application of generation-consumption systems.
- Mid-2025: Submission of regulatory modification to the General Comptroller's Office.

***Responsible Institution***: Ministry of Energy.

# *Action 48. Enable the availability of connection for residential customers to the transmission of hydrogen projects*

***Objective***: The Ministry of Energy introduced the medium-sized systems bill in January 2024 through bill 327-371, defining a new classification of isolated systems for productive purposes. The details of this new classification will be addressed in an upcoming isolated systems bill, which will be submitted to Congress this year 2024. The aim of this measure is to enable the connection of residential customers to these isolated systems for productive purposes and to define conditions for it.

***Timeline***: 2023-2025

***Milestone***:

- End of 2024: Submission of the Isolated Systems bill to Congress.

***Responsible Institution***: Ministry of Energy

# *Action 49. Implementing the participation of green hydrogen, ammonia, and other derivatives projects in electricity markets to provide various services, such as energy, capacity, and ancillary services*

***Objective**:* This action continues one of the measures of the 2020-2023 Action Plan contained in the National Green Hydrogen Strategy, within the axis of regulations, safety, and pilots. This topic is being addressed within the framework of the Decarbonisation Plan, considering the development objectives of the electricity sector in line with the country's decarbonisation and carbon neutrality goals.

***Timeline**:* 2023-2026

***Milestones***:

- 2024: Publication of the roadmap of the Decarbonisation Plan.
- 2026: Completion of regulatory, regulatory, and normative implementation.

***Responsible Institution**:* Ministry of Energy, with the support of the National Energy Commission and the National Electric Coordinator.

# 6.12 USES FOR DECARBONISING THE NATIONAL ECONOMY

Promoting local demand for green energy is key to realising the green hydrogen industry, in line with the guidelines of the National Strategy, contributing to achieving the decarbonisation objectives of our economy. Green hydrogen and derivatives can serve as a solution to replace traditional fuels in various sectors of the national economy, such as industry and residential, reducing both global and local emissions. In turn, the use of low-emission fuels produced in Chile will increase the country's energy independence level by reducing exposure to fluctuations in international markets. Furthermore, it will allow for a green footprint, that is, decarbonising the production cycles of goods and services in the national economy, particularly those that make up the export basket; and it will enable the development of national and local productive chains, generating added value in the regions and the national economy.

To enable a fuel switch in different energy usage sectors, efforts should be made to identify potential demands in sectors such as industrial, transportation in its various modes, and electricity generation. The potential demand for green hydrogen and derivatives associated with the implementation of Sustainable Aviation Fuels (SAF) is also being explored through the Clean Flight programme and the SAF Roadmap, initiatives developed jointly by the Ministry of Energy, the Energy Sustainability Agency, and the Civil Aviation Board, and through public-private collaboration. Railway transport could also represent a potential sector to drive demand for green hydrogen and derivatives.

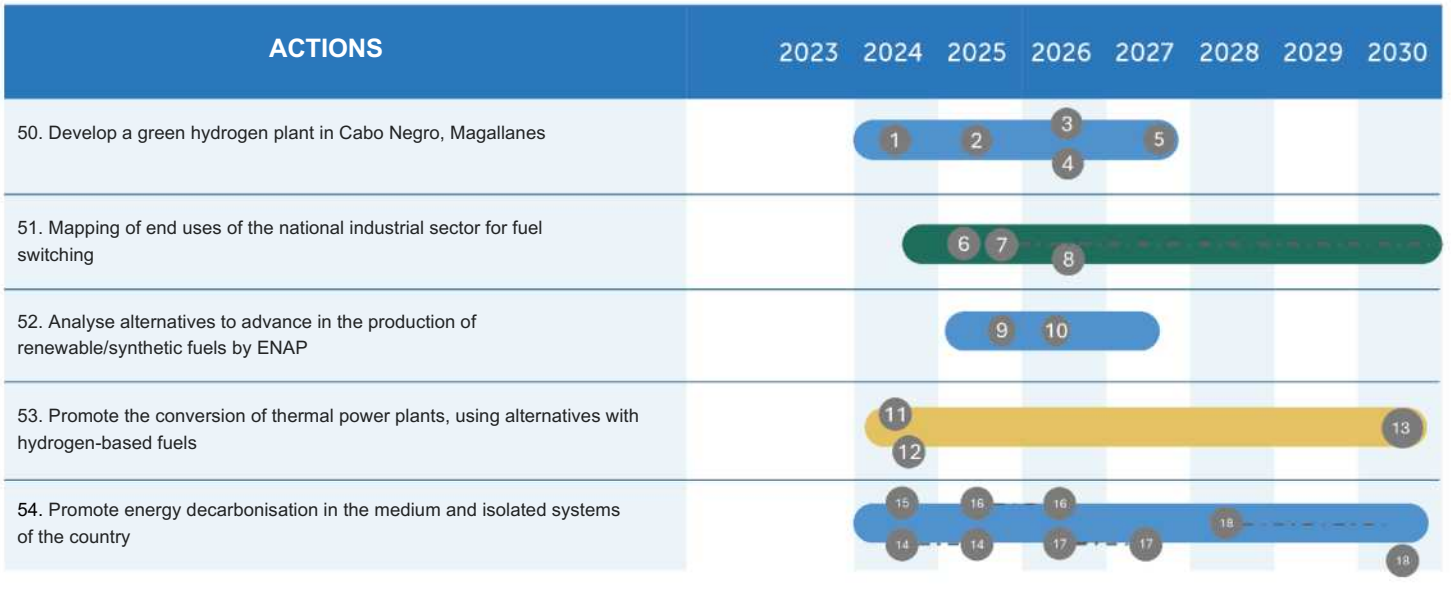
To drive this line of action, ENAP can play a key role in the early stages, providing the necessary supply for applications of hydrogen and

derivatives in the industrial and commercial sectors, around its refineries and its future green hydrogen production plant in Magallanes.

Below are the actions and milestones contained in this line.

## LINE OF ACTION 12:

# USES FOR DECARBONISING THE NATIONAL ECONOMY




### MILESTONES

1. First sod of the plant laid
2. Start of operations in Cabo Negro
3. Blending of natural gas - hydrogen begins at ENAP facilities
4. Use of GH2 in ENAP vehicles
5. Applications for partial use in the industrial and/or commercial sector of GH2 or derivatives
6. Results of Diagnostic Study
7. Continuous updating and annual reports
8. Prioritisation of applications
9. Proposal for progress to implement an alternative renewable/synthetic fuel production.
10. First analysis of technologies and inputs
11. Reconversion study of power plants completed
12. Publication of the roadmap of the Decarbonisation Plan
13. First coal-fired power generation unit converted
14. Legislative processing of the bill on social security matters
15. Presentation and dispatch of the bill on autonomous communities to Congress
16. Legislative processing of the bill on autonomous communities
17. Regulatory and normative adaptation for the correct application of laws.
18. Construction and operation of the first projects based on clean fuels such as green hydrogen and derivatives.

*Note: Bar colours only indicate complementarity of measures*

# *Action 50. Develop a green hydrogen plant in Cabo Negro, Magallanes*

***Objective***: Construct a green hydrogen production plant for internal consumption at ENAP Magallanes. The plant will allow hydrogen injection into gas networks at the ENAP industrial complex in Cabo Negro, and conduct blending tests between hydrogen and hydrogen-based fuels. Additionally, ENAP aims to gain knowledge and experience in the production and use of green hydrogen, as well as understanding the conditions of the Magallanes and Chilean Antarctic region for the development of this industry.

***Timeline***: 2024 - 2025

***Milestones***:

- 2024: Laying the foundation stone for the plant.
- 2025: Commencement of operations.
- 2026: Initiation of natural gas - green hydrogen blending at ENAP facilities.
- 2026: Delivery of fuel (GH2) to ENAP's internal use vehicles.
- 2027: Presentation of 2 to 3 applications for partial use of GH2 or derivatives in the industrial and/or commercial sector.

***Responsible Institution:*** National Petroleum Company (ENAP).

# *Action 51. Mapping of end uses in the national industrial sector for fuel replacement*

***Objective**:* Identify and map the potential demand in the national industrial sector where there is the possibility of fuel replacement in their processes, allowing a transition to the use of green hydrogen or derivatives, thereby decarbonising their operations. This includes identifying options for conversion and adaptation of their processes according to projected technological offerings.

***Timeline**:* 2025-2030

***Milestones***:

- 2025: Results of diagnostic study.
- 2025 - 2030: Continuous updates and annual public reports.
- 2026: Prioritisation of applications that are closer to the market to support the activation of the domestic industry by identifying break-even points as established in the national GH2 strategy.

***Responsible Institution**:* Ministry of Energy.

# *Action 52. Analyse alternatives to advance in the production of renewable/synthetic fuels by ENAP*

***Objective:*** Diversify the fuel supply and contribute to Chile's carbon neutrality goals by 2050, by conducting technical studies at its refineries to start producing synthetic fuels and renewable fuels.

***Timeline:*** 2024-2030

***Milestones***:

- 2025: First analysis of technologies and inputs.
- 2026: Proposal for progress to implement some alternative for the production of renewable/synthetic fuel.

***Responsible Institution:*** National Petroleum Company (ENAP).

# *Action 53. Promote the conversion of thermal power plants, using alternatives with hydrogen-based fuels*

***Objective***: Analyse and implement alternatives for converting thermal power plants to hydrogen and synchronous condenser technologies. The study includes the analysis of two technological options for converting thermal power plants and integrating them into the National Electric System, using hydrogen and hydrogen-based fuels, through co-combustion or blending options.

***Timeline:*** 2023-2030

***Milestones***:

- 2024: Study on the reconversion of power plants completed.
- 2024: Publication of the roadmap of the Decarbonisation Plan, which will include incentives for the conversion of thermal power plants.
- 2030: First coal-fired power generation unit converted.

***Responsible Institution***: Ministry of Energy, with support from the Ministry of Economy through the Sustainable Productive Development Programme (DPS).

# *Action 54. Promote energy decarbonisation in medium and isolated systems throughout the country*

***Objective***: Advance concrete actions for energy decarbonisation in medium and isolated systems throughout the country, considering clean and renewable energy alternatives such as green hydrogen and/or its derivatives, such as ammonia or others. This contributes to the legal goal of achieving carbon neutrality before 2050, across different national territories.

To achieve this, regulatory, and normative updates will be developed to promote decarbonisation in these medium and isolated systems, starting with the legislative process of medium systems and isolated systems bills, aiming to reduce the conditions of energy poverty present in the country, particularly in the case of isolated systems.

***Timeline***: 2024-2030

***Milestones***:

- 2024-2025: Legislative process of the Medium Systems bill.
- 2024: Presentation and dispatch of the Isolated Systems bill to Congress.
- 2025-2026: Legislative process of the Isolated Systems bill.
- 2026-2027: Regulatory and normative adaptation for the correct application of the laws.
- 2028-2030: Construction and operation of the first projects based on clean fuels such as green hydrogen and derivatives, contributing to decarbonisation in territories of the country.

***Responsible Institution:*** Ministry of Energy, with the support of the National Energy Commission.

# 6.13 DEMONSTRATIVE

Under the current conditions of deploying the green hydrogen industry, demonstrative projects play a fundamental role, allowing the generation of information regarding project implementation, their potential social and environmental impacts, and the validation of technology use across different sectors.

In this context, the short-term development of green hydrogen demonstrative projects will be promoted to document practical experiences. These projects will encourage the production and/or consumption of hydrogen at a local level, foster complementary activities that contribute to capacity building for the maturity of the hydrogen market, promote the dissemination and transfer of knowledge related to the industry, and allow for bringing these technologies closer to citizens.

This line of action consists of two actions and four milestones. One aspect focuses on co-financing the development of feasibility studies for the deployment of small-scale consumption, self-consumption, and/or production projects. The other aspect aims to raise awareness of the use of green hydrogen among citizens by implementing this technology in everyday experiences, such as public transportation.

It is important to note that the Ministry of Energy has a New Energetics unit, part of the Fuels and New Energetics Division, which serves as a platform for supporting the development of green hydrogen and its derivatives pilot projects.

**The detailed actions and milestones for this line of action are as follows:**

## LINE OF ACTION 13:
# DEMONSTRATIVE PROJECTS

| Actions | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|
| 55. Encourage the use of green hydrogen and its derivatives in the local industry through co-financing pilot projects of green hydrogen and its derivatives | | 1 | 2 | | | | | |
| 56. Implement a pilot project of green hydrogen bus in public transportation | | 3 | 4 | | | | | |

### MILESTONES

1. Adjudication of projects in the third edition of the green hydrogen accelerator
2. Evaluation of continuity of the accelerator
3. Purchase of the bus
4. Commencement of pilot operation

*Note: Bar colours only indicate complementarity of measures*

# *Action 55. Foster local industry consumption of green hydrogen and its derivatives through co-financing pilot projects of green hydrogen and its derivatives*

***Objective**:* Foster local productive transformations towards decarbonisation by industrial process reconversion that demand green hydrogen, through the Green Hydrogen Accelerator (AGH2) programme of the Ministry of Energy. The programme provides co-financing for the deployment of consumption and/or production projects on a small and medium scale.

In its third edition, the accelerator will fund projects that use an electrolyser with a power equal to or less than 500 kW. The continuity of the accelerator, including scope and objectives, will be defined considering industry needs and the evaluation of results obtained in previous editions.

***Timeline**:* From 2024

***Milestones***:

- May 2024: Adjudication of projects for the third edition of the AGH2 programme
- 2024 - 2030: Continuation of the programme to support the realisation of GH2 applications as defined in the Strategy.

***Responsible Institution:*** Ministry of Energy.

# *Action 56. Implement a pilot project of a hydrogen bus in public transportation to evaluate the technical, economic, and social aspects of deploying this technology*

***Objective***: The main goal of this pilot is to evaluate, technically, economically, and socially, passenger transportation solutions with green hydrogen in operating conditions, bringing hydrogen technology closer to the public. To achieve this, the Ministry of Energy, through a broad agreement with the Ministry of Transportation and Telecommunications and the Metropolitan Public Transport Directorate, and in coordination with private entities, is promoting the deployment of a hydrogen bus in the streets of the Metropolitan region as part of the public transportation network. The pilot project involves conducting necessary tests to gather information that allows evidence-based decision-making regarding the scaling-up of this technology.

The possibility and relevance of conducting another pilot bus experiment in regions with regulated public transportation will be evaluated.

***Timeline***: 2024-2025

***Milestones***:

- Fourth quarter of 2024: Purchase of the bus.
- First half of 2025: Commencement of pilot operation.

***Responsible Institutions:*** Ministry of Energy in conjunction with the Ministry of Transportation and Telecommunications and the Metropolitan Public Transport Directorate. This initiative is supported by the RH2 project of GIZ.

# 6.14 BOOSTING PRODUCTIVE LINKAGES

The green hydrogen and derivatives industry has characteristics that could configure new, more inclusive, sustainable, and high-value-added industrial systems, capable of gradually attracting new highly sophisticated or emerging productive sectors that demand intensive use of clean energy. Consequently, it represents an opportunity to create more and better jobs and generate local economic opportunities while reducing the risk of external dependency.

Furthermore, the integration of this productive activity has the potential to extend goods and services, such as electric connection networks and/or supply energy to isolated areas. In regions with water scarcity issues, it could provide access to water through multipurpose desalination plants, thereby promoting territorial decentralisation and fostering the development of rural communities.

For Chile to have the technological capabilities to manufacture machinery and equipment for the green hydrogen and derivatives industry, it must develop greater productive diversification. Therefore, it is relevant to promote targeted public policies that, leveraged by the country's and its regions' comparative advantages, allow for the enhancement of product clusters requiring industrial capabilities.

Given the above, it is crucial to support and strengthen local capacities in productive activities related to the hydrogen value chain, as well as attract international companies to install their manufacturing capabilities in Chile for the production of sophisticated equipment, or alternatively, for integration and assembly of components.

Below are the actions and milestones aimed at boosting productive linkages associated with the green hydrogen industry and its derivatives.

## LINE OF ACTION 14:
# BOOSTING PRODUCTIVE LINKAGES


### MILESTONES

1. First call for the "Impulsa Technological Transition" instrument
2. Continuation of the programme
3. Publication of initiative report
4. Publication of RFP call
5. Award and contract with selected company/companies

*Note: Bar colours only indicate complementarity of measures*

# *Action 57. Drive technological transformations in the industry through CORFO's "Impulsa Transición Tecnológica" instrument*

***Objective**:* The new CORFO instrument called "Impulsa Technological Transition" aims to technologically transform the national industry and support suppliers through co-financing projects, in order to address the new challenges and opportunities associated with value chains of emerging sectors, including the green hydrogen and derivatives industry. It will be supported by the Ministry of Economy through the Sustainable Productive Development Programme (DPS).

***Timeline**:* 2024-2025 Design and implementation. Available until 2030.

***Milestones:***

- 2024: First call for the "Impulsa Technological Transition" instrument.
- 2025-2030: Continuation of the programme.

***Responsible Institution**:* CORFO, with support from the Ministry of Economy through the Sustainable Productive Development Programme (DPS)

# *Action 58. Identify and make available information associated with companies providing services related to the value chain of the green hydrogen and derivatives industry*

***Objective***: To have information about national companies that can cover part of the needs and gaps in goods and services associated with hydrogen technologies, considering the corresponding safety and/or certification criteria, enhancing local development and allowing capacity building to remain in the territories. The initiative will be developed in coordination with similar inputs from other instances, such as regional Roadmaps. This information may serve as a reference for the industry itself or as input for the design of potential measures to promote value chain development.

***Timeline***: 2024

***Milestone***:

- 2024: Publication of report on initiative development.

***Responsible Institution:*** Ministry of Energy, with the support of the Spanish Agency for International Development Cooperation (AECID).

# *Action 59. Foster the establishment of electrolyser factories in Chile*

***Objective***: To convene a Request for Proposal (RFP) process through which real proposals will be sought from national and international companies to promote the manufacturing and assembly industry of electrolysers in the national territory, with a potential definition of incentives and/or public policies for their promotion. This initiative arises from the analysis of the results of a recent Request for Information (RFI) process for electrolysers developed by CORFO, which aimed to identify those companies interested in manufacturing and/or assembling electrolysers in Chile, and under what conditions they would be installed to supply the national and regional market. This call aims to contribute to sustainable productive development and the creation of a green hydrogen industry, to accelerate the implementation of initiatives that contribute to decarbonisation and a fair energy transition.

***Timeline***: 2024-2025 Design and implementation.

***Milestones***:

- 2024: Publication of RFP announcement.
- First half of 2025: Adjudication and contract with the selected company or companies.

***Responsible Institution:*** CORFO.

# 6.15 STRENGTHENING AND DEVELOPMENT OF HUMAN CAPITAL

For the deployment and operation of the green hydrogen industry and its value chain in the country, it is necessary to have qualified individuals who apply the necessary knowledge in the various links of the production process.

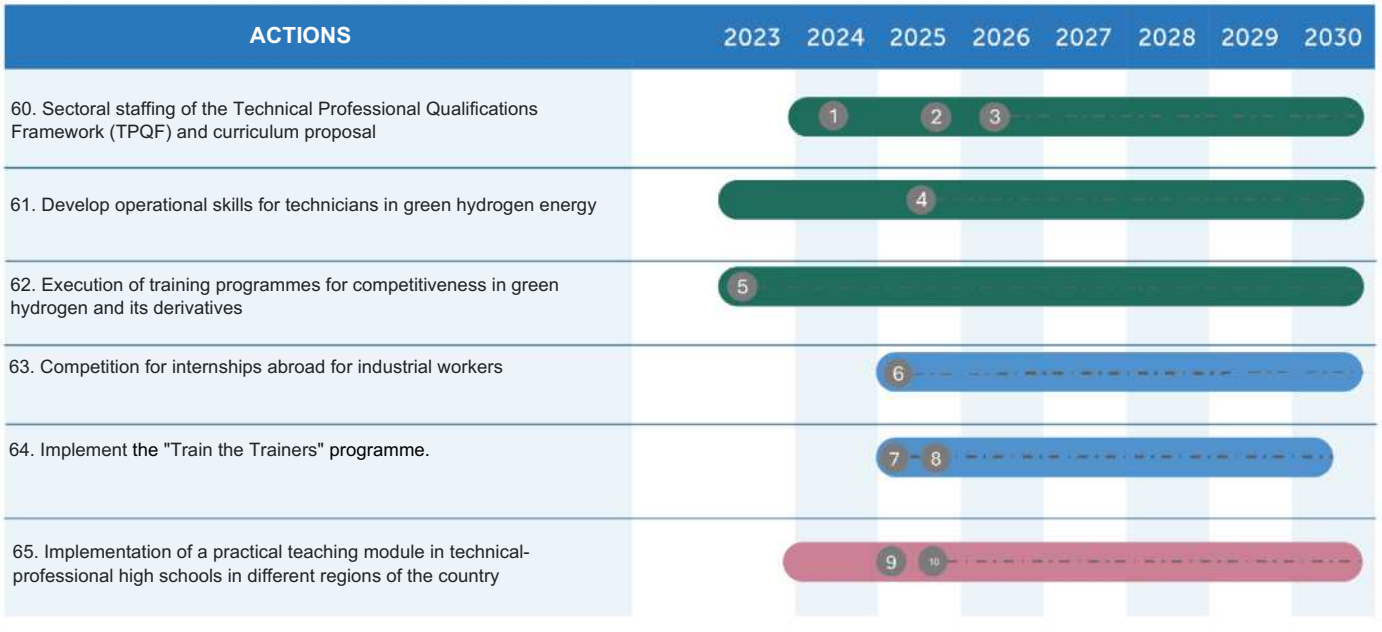
To this end, capacities will be developed according to the needs of the industry today and in the future, allowing to fill the identified gaps to increase skilled work and strengthen the workforce of the green hydrogen productive sector and associated industries, through training and education at all levels.

In the short term, new knowledge will be delivered and reinforced to people who wish to work in this industry and who already have experience in fuel or chemical substance management areas, who will be the most suitable to respond to the immediate needs of the first projects. At the same time, new knowledge will be incorporated into existing training programmes at different educational levels: secondary education, technical-professional secondary education, technical higher education, and professional higher education, as well as training for people with no similar knowledge of the green hydrogen industry and its derivatives.

The labour market is very dynamic, and the needs for occupations and skills are constantly evolving. The development of these skills responds much less to demand. Therefore, it is important to generate clear governance among territories, their industry, and different educational institutions. Initiatives that are strengthened and developed with the formation of human capital require strict inter-institutional coordination within the State and with other agents outside the public sphere, such as academia and the private sector.

This line of action includes the following actions and milestones aimed at having human capital that meets the challenges of this industry.

## LINE OF ACTION 15:
# STRENGTHENING AND DEVELOPMENT OF HUMAN CAPITAL




### MILESTONES

1. Prospective Study on Employment and Vocational Training in Green Sectors: green hydrogen in Chile
2. Second Diagnostic Study of specific profiles for future incorporation into CFT curricula, under the MCTP
3. Proposal for updating curricular grids for Technical Training Centres (CFT) based on the MCTP
4. Delivery of training programmes and training materials
5. Annual publication of results of allocation to training courses and scholarships; and of labour competency programmes
6. First competition for internships abroad and continuity of the programme in subsequent years
7. 8. Conducting a technological tour for vocational education instructors (7) and university professors (8) and continued
9. 10. Installation of electrolyser equipment in high schools, Magallanes Region (9) and in other regions of the country (10)

*Note: Bar colours only indicate complementarity of measures.*

# *Action 60. Sectoral Staffing of the Technical Professional Qualifications Framework (MCTP) and Curriculum Proposal*

***Objective**:* To identify the occupational profiles required in the green hydrogen chain, a process that will be developed in conjunction with the private sector.

Based on the information provided by the study, career paths, occupations, and skills required by the sector will be identified, and occupational profiles will be defined.

In turn, these occupational profiles will populate the Sectoral Technical Professional Qualifications Framework (MCTP from its acronym in Spanish), following the guidelines of the TP Qualifications Advisory Commission of the Ministry of Education (Mineduc). The TPQF will be an input for training programmes, certification of labour competencies, and for updating, redirecting, and creating new curricula according to the country's needs and the labour market in the case of training institutions (which include Technical Training Centres (CFT) and Professional Institutes (IP)).

***Timeline**:* 2025-2030

***Milestones***:

- 2024: Prospective Study on Employment and Vocational Training in Green Sectors: Green Hydrogen in Chile.
- 2025: Diagnostic Study of Specific Profiles for Future Incorporation into CFT curricula, under the MCTP.
- 2026 - 2030: Proposal for the update of curricular frameworks for CFT based on the MCTP.

***Responsible Institution:*** Ministry of Energy in coordination with the y of Labour and Social Welfare and the Ministry of Education, with the support of

Spanish Agency for International Development Cooperation (AECID) and the IDB.

# *Action 61. Develop operational capabilities for technicians in green hydrogen energy*

***Objective***: Development of training and training programmes in the dimensions of operation, maintenance, safety, and risk prevention, among other topics associated with the facilities for production, transportation, storage, and consumption of green hydrogen and derivatives; aimed at technical-professional high school education, to strengthen the available human capital in the regions linked to the value chain of green hydrogen and derivatives.

***Timeline***: 2024 - 2030

***Milestone***:

- 2025-2030: Delivery of training programmes and educational material.

***Responsible Institution:*** Ministry of Energy and Regional Governments (GOREs) with support from the Ministry of Energy in coordination with the Ministry of Education, with the support of the Spanish Agency for International Development Cooperation (AECID).

# *Action 62. Implementation of training programmes for competitiveness in green hydrogen and derivatives*

***Objective**:* This measure aims to strengthen human capital by addressing identified gaps, enhancing the quality and/or quantity of skilled labour, competencies, and learning of the current or potential workforce in the green hydrogen and derivatives productive sector and its entire value chain. To achieve this, actions such as (1) providing training scholarships, (2) certifying labour competencies, and (3) offering international school internships will be carried out. Additionally, an online course on green hydrogen "Opportunities and Applications" is conducted by women for women, with the mission of enhancing the capabilities of professionals to prepare projects related to green hydrogen generation based on technological, strategic, and economic criteria in the context of renewable energy development.

***Timeline**:* 2023 - 2030

***Annual and ongoing milestones**:*

- Annual publication of results of awards for training courses and scholarships; and labour competency programmes.

***Responsible Institution:*** CORFO in coordination with the Ministry of Labour. This action is supported by the Ministry of Economy through the Sustainable Productive Development Programme (DPS).

# *Action 63. Overseas Internship Competition for Industrial Workers*

***Objective**:* An internship programme will be developed focusing on workers with technical-professional training to have specialists in green hydrogen production. The process will consider a gender approach, inclusion of indigenous peoples, and individuals directly or indirectly affected by the closure of coal-fired power plants.

***Timeline**:* 2025-2030

***Annual and ongoing milestones:***

- First competition for internships abroad and continuity of the programme in subsequent years

***Responsible Institution:*** Ministry of Energy in coordination with the National Agency for Research and Development (ANID).

# Action 64. Implementation of the "Train the Trainers" Programme

***Objective***: To train technical-professional education mediators and university professors from regions through technological tours specialised for different stages of the green hydrogen value chain. This aims to contribute to the development of technical-professional and professional training programmes nationwide, enabling the addressing of identified industry needs.

***Timeline***: 2025-2030.

***Milestones***:

- 2025: Organisation of technological tours for technical-professional education mediators and continuity.
- 2025: Organisation of technological tours for university professors and continuity.

***Responsible Institution***: Ministry of Energy in coordination with the Ministry of Education, with the support of the Spanish Agency for International Development Cooperation (AECID).

# *Action 65. Implementation of a practical teaching module in technical-professional high schools in different regions of the country*

***Objective**:* A training and competency development programme will be designed for competencies associated with the operation of green hydrogen production technologies, aligned with the technical-professional training qualification framework (MCTP) of the energy sector. Funds will be allocated to strengthen the available infrastructure in technical-professional high schools and state technical training centres in the Magallanes Region, through the implementation of GH2 production training spaces, with equipment associated with electrolysis and complementary operational processes (such as fuel cells), which can be used by different technical-professional high schools for the practical teaching of the electrolysis process and operation of the electrolyser and other components of the value chain, different technologies, etc.

***Timeline**:* 2024-2030

***Milestones***:

- 2024: Installation of electrolyser equipment in high schools, Magallanes Region.
- 2025-2030: Installation of electrolyser equipment in high schools in other regions of the country, prioritising the Antofagasta Region and the Biobío Region.

***Responsible Institution:*** Ministry of Education with support from the Ministry of Energy and the Ministry of Economy, Development, and Tourism. Additionally, the initiative receives support from the Spanish Agency for International Development Cooperation (AECID) and the Sustainable Productive Development (DPS) programme.

# 6.16 GENDER PERSPECTIVE IN THE INDUSTRY

Within the framework of a just energy transition, the development of new industries becomes globally relevant, especially in the accelerated advancement of new sectors such as the green hydrogen industry. Here the opportunity arises to advance gender equality and the inclusion of women, to ensure sustainable development that leaves no one behind.

Promoting the sustainable integration of women in emerging energy industries requires addressing two dimensions of current challenges: structural barriers and capacity gaps.

Among the structural barriers present in the industry, it is necessary to identify and address requirements at the infrastructure and facility level that do not consider the needs of women. Examples include gender-focused health and sanitation aspects (hygienic supplies and facilities), safety equipment of various sizes, as well as the existence of furniture and facilities that recognise and acknowledge caregiving work and the disproportionate burden it places on women's lives.

On the other hand, given the low 23% participation rate of women in the energy sector, it is relevant to prioritise initiatives that address gender difficulties and biases in recruitment processes, support for women's career paths, promotion and consolidation of women's participation in leadership positions and decision-making processes, promotion of policies and initiatives for balancing personal, family, and work life, violence against women and girls, as well as other critical issues that are necessary to address in the energy industry from a gender perspective.

The energy sector, in line with international and national standards, has the responsibility to advance the challenge of achieving gender equality in the development of both traditional and new industries.

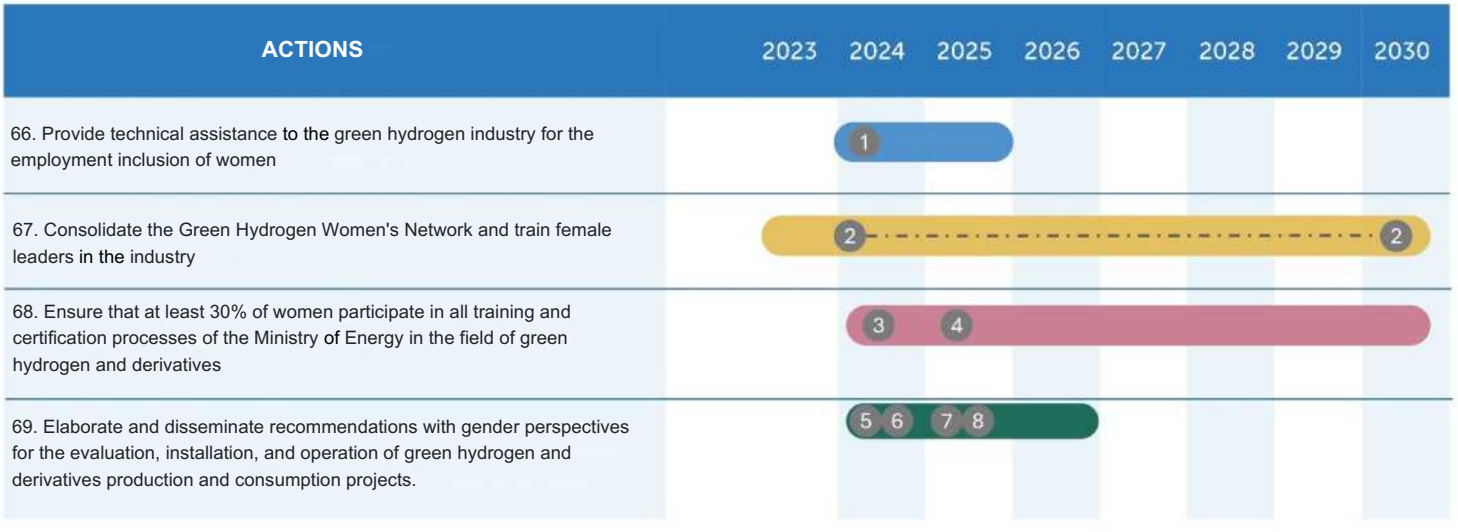
For this reason, within the framework of this Action Plan, an interministerial gender committee on GH2 has been established, along with the development of a gender mainstreaming strategy, where a series of criteria and initiatives have been developed within the following areas of focus:

- Career paths: sustainable employment inclusion of women.
- Leadership and participation of women in decision-making processes in GH2.
- Training and education: reducing gender gaps in GH2 training.

Impact of the industry on communities and localities: promoting and driving a safety and gender approach in territories with GH2 development.

This line of work includes the following actions and milestones, which aim to address and highlight the necessary needs for the deployment of this sector with a gender perspective and the inclusion of women.

## LINE OF ACTION 16:
# GENDER PERSPECTIVE IN THE INDUSTRY




### MILESTONES

1. Intersectional gender working group on green hydrogen
2. Conduct at least one in-person annual meeting of the Network
3. Online GH2 Course with a focus on women
4. Diagnostic Study of specific profiles for future inclusion in CFT curricula, under the MCTP
5. First standards validated with the industry
6. Development of a good practice guide for compliance with gender standards for green hydrogen and derivatives projects
7. Implementation, publication, and dissemination of the study on gender gaps in the green hydrogen and derivatives industry
8. Development of recommendations for public spaces and human settlements with a gender and security focus

*Note: Bar colours only indicate complementarity of measures*

# *Action 66. Provide technical assistance to the green hydrogen industry for the employment integration of women*

***Objective**:* In line with the Energy + Women Plan and in coordination with other interministerial initiatives, technical assistance will be provided to hydrogen guilds and companies to deliver tools and knowledge management aimed at addressing sustainable female labour inclusion and local economic development with a gender perspective.

***Timeline**:* 2024-2025

***Milestone***:

May 2024: Intersectional gender working group in GH2.

***Responsible Institution**:* Ministry of Energy, Ministry of Economy, CORFO, Ministry of Women and Gender Equity, Ministry of Labour.

# *Action 67. Consolidate the Green Hydrogen Women's Network and train industry leaders*

***Objective**:* Strengthen the leadership skills of women in the green hydrogen industry in Chile, involving them in the gender mainstreaming strategy for the sector, with the aim of advancing towards the development of an inclusive industry with gender equality at corporate levels, as well as in communities and localities.

***Timeline**:* 2023-2030

***Annual Milestone:***

• Hold at least one meeting of the Women's GH2 Network.

***Responsible Institution**:* Ministry of Energy, Ministry of Economy, CORFO, Ministry of Women and Gender Equity with support from GIZ.

# *Action 68. Training of at least 30% of women in all training and certification processes of the Ministry of Energy in matters of green hydrogen and derivatives*

***Objective***: The Ministry of Energy has established gender quotas in all its training and certification programmes under the Human Capital programme. A quota of 30% of women of the total to be trained has been set, which will be safeguarded for areas related to green hydrogen and derivatives. Additionally, collaboration will be sought with other agencies in the gender mainstreaming strategy to position this focus in the training spaces of the hydrogen industry and its value chain, creating specific training and dissemination opportunities for women.

In 2023, the Regional Government of Magallanes, together with the Ministry of Women and Gender Equity and the Ministry of Energy, signed an agreement to promote the inclusion of women in the green hydrogen industry and in training and capacity-building instances in the region, safeguarding the 30% quota.

***Timeline***: From 2024.

***Milestones***:

- 2024: Online course on green hydrogen "Opportunities and Applications" with a focus on women, aimed at enhancing the capabilities of professionals to prepare projects related to green hydrogen generation according to technological, strategic, and economic criteria in the context of renewable energy development.
- Third quarter of 2025: Publication of the "Second Populate of the Qualification Framework for Technical Professional Training in the Energy Sector" study, where the technical qualification framework is updated to include new profiles, including those related to green hydrogen.

**Responsible Institution:** Ministry of Energy, CORFO, Ministry of Women and Gender Equity, Ministry of Economy.

# *Action 69. Develop and disseminate gender-focused recommendations for the evaluation, installation, and operation of green hydrogen and derivatives production and consumption projects*

***Objective***: To establish policies and standards with a gender focus for the green hydrogen industry, considering aspects such as the development of inclusive enabling infrastructure, the generation of best practices for meeting gender standards for hydrogen projects, and recommendations for public spaces and the incorporation of gender and safety perspectives in the development of public spaces and human settlements.

***Timeline***: 2024-2026

***Milestones***:

- 2024: First standards validated with the industry in the intersectional gender working group in GH2.
- 2024: Development of a guide of best practices for meeting gender standards for green hydrogen projects, including health standards.

- 2025: Implementation, publication, and dissemination of the gender gap study in GH2.
- 2025: Development of recommendations for public spaces and human settlements with a focus on gender and safety.

***Responsible Institution***: Ministry of Energy, Ministry of Economy, Ministry of Women and Gender Equity, Ministry of Health. These initiatives are supported by various institutions and programmes, including the Spanish Agency for International Development Cooperation (AECID) and those associated with CORFO's financial facilitation instrument.

# 6.17 BOOSTING RESEARCH, DEVELOPMENT, AND

Public policy should promote continuous knowledge transfer, both nationally and internationally, to enable timely generation of knowledge and skills development that contributes to the development of the green hydrogen industry, addressing the demands arising from the advancement of a technologically innovative, challenging, and dynamic sector.

To achieve this, there needs to be harmonious coordination among research and innovation institutions, industry, and the public sector. The state has the role of creating enabling conditions for effective innovation and technological development processes at all levels that impact its development. Research and innovation in green hydrogen and its value chain provide an opportunity to contribute to broad and cross-cutting national development objectives.

The establishment and operation of, for example, technological development centres focused on the value chain of green hydrogen production and supply, can generate the necessary infrastructure and technical capacity for knowledge generation, provision of testing, measurement, and certification services to academic and industrial actors, thus driving technological advancements and solutions. In this regard, the creation of two technological development centres, one led by the Chilean Navy and another by the Regional Government of Magallanes in the same region, stands out.

Below are the actions and milestones that will support and drive research, development, and innovation for the green hydrogen and derivatives industry, across its entire value chain.

## LINE OF ACTION 17:
# BOOSTING RESEARCH, DEVELOPMENT, AND INNOVATION


### MILESTONES

1. Start of working group sessions.
2. Publication of R&D Guide for the application of projects related to GH2 and derivatives to the R&D Law
3. ANID contests are held annually throughout the period
4. Launch of the Magallanes Technological Development Centre
5. Launch of the Technological Development Centre for the Maritime and Naval Industry of the Chilean Navy
6. Development of a pilot propulsion system fuelled by synthetic fuel, by the Technological Development Centre for the Maritime Industry
7. Publication of a study on scientific and technological needs and a plan for the enabling infrastructure development
8. Publication of the first version of national and international patent indicators

# *Action 70. Analysis of R&D challenges in green hydrogen projects to complement R&D Law and other associated instruments*

***Objective***: To identify the main gaps and opportunities for scientific and technological research and development of green hydrogen in Chile through the formation of a working group between the Ministry of Science, Technology, Knowledge, and Innovation; CORFO; Ministry of Energy; Ministry of Economy, Development, and Tourism; and academia, related to the value chain of green hydrogen and its derivatives. The working group will involve timely coordination and participation of the private sector and other governance bodies that gather relevant information such as the "Transforma" programmes. This initiative will lead to the development of roadmaps and guides for R&D lines of work that guide projects associated with the value chain of green hydrogen and derivatives around the Research and Development Law and promote research, development, and innovation in those areas of greatest impact or need for the green hydrogen industry.

***Timeline***: 2024-2030

***Milestones***:

- 2024: Start of working group sessions.
- 2025: Publication of R&D Guide for the application of green hydrogen and derivatives projects to the R&D Law.

***Responsible Institutions***: Ministry of Science, Technology, Knowledge, and Innovation, with the support of CORFO, Ministry of Energy, and Ministry of Economy, Development, and Tourism.

# *Action 71. Development of research, development, and innovation contests by the National Agency for Research and Development (ANID) related to applications of production, transportation, storage, and consumption of green hydrogen and derivatives*

***Objective***: Financially support the execution of scientific and technological applied research projects, with potential economic and/or social impact, especially with an emphasis on green hydrogen. For this purpose, the following competitions are available:

a. FONDEF IDeA R&D & Advanced Technology IDeA Contests: Contest aimed at co-financing projects in the fields of applied research and technological development that require long cycles for the implementation of research methodologies, laboratory experiments, and prototype development. This call promotes the participation of projects that contribute to the following strategic objectives of the Sustainable Productive Development Programme: i) Just decarbonisation; ii) Resilience to the climate crisis and its environmental impacts, and iii) Sustainable productive diversification. In the line of just decarbonisation, emphasis will be placed on technological development for a sustainable green hydrogen industry and the generation of local demand for GH2.

b. FONDEF Technological Research Contest: Contest aimed at developing and validating solutions based on scientific and technological foundations that require scaling stages to reach advanced maturity level technologies for application in the market. It calls for a wide range of thematic areas, including the energy and green hydrogen sector.

***Timeline***: 2024-2030

***Annual Milestone:*** Publication of results of allocation to training courses and scholarships; and labour competency programmes.

***Responsible Institution:*** National Agency for Research in coordination with the Ministry of Economy, Development, and Tourism. With the support of the Sustainable Productive Development Programme (DPS).

## *Action 72. Promotion of specialised technological development through Green Hydrogen Technological Development Centres*

***Objective***: Strengthen the capacity to develop and manage green hydrogen technological innovation, aimed at generating local technical and economic information, transferring knowledge and technology at interinstitutional levels and between the national and international ecosystem, in the field of green hydrogen and its derivatives, through the implementation of two technological development centres:

- "Green Hydrogen Technological Development and Interinstitutional Coordination Centre for the Maritime and Naval Industry", carried out by the Chilean Navy for the technological development of the Naval and Maritime Industry.
- "Magallanes Technological Development Centre." Corresponding to one of the prioritised initiatives identified from the work carried out by the Transforma Magallanes programme.

***Timeline***: 2024-2026

***Milestones**:*

- 2025: Launch of the Magallanes Technological Development Centre.
- 2025: Launch of the Technological Development Centre for the Maritime Industry.
- 2026: Development of a pilot propulsion system powered by synthetic fuel, by the Technological Development Centre for the Maritime Industry.

***Responsible Institutions:*** Chilean Navy, Ministry of Energy, and Ministry of Defence. Regional Government of Magallanes and Chilean Antarctica, CORFO, and Ministry of Economy, Development, and Tourism, with the support of other agencies from the Chilean Government. Both initiatives are supported by the Sustainable Productive Development Programme (DPS), and in the case of the Magallanes Centre, it is executed by CORFO.

## *Action 73. Compilation of information on scientific and technological equipment and infrastructure for conducting research, development, and innovation in green hydrogen, and development of a strengthening proposal*

***Objective**:* A study will be developed to strengthen research, development, and tion activities related to green hydrogen in Chile, quantifying the R&D needs ary to cover the entire value chain of green hydrogen; surveying the scientific and logical capabilities of the main research centres in Chile that are developing solutions l this industry, and proposing public policy instruments that promote the

deployment of scientific and technological infrastructure in the country.

Additionally, public policy instruments will be proposed to promote the deployment of infrastructure and equipment for technical vocational training in the country, focusing on a network of specialised laboratories in green hydrogen and its derivatives, adequately equipped for technical training, and providing training and skills development necessary for the green hydrogen value chain, as well as the occupational profiles demanded by the industry.

***Timeline***: 2024-2025

***Milestone***:

- 2025: Publication of a study on scientific and technological needs, capacities, infrastructure, and a plan for the enabling infrastructure development.

***Responsible Institution***: Ministry of Energy in coordination with the Ministry of Education, with the support of the Spanish Agency for International Development Cooperation (AECID).

# *Action 74. Generate and disseminate technological information related to the value chain of green hydrogen and its derivatives*

***Objective***: Provide technological information to facilitate understanding of global panoramas and trends regarding technologies related to the value chain of green hydrogen and its derivatives. This will enable, among other uses, the construction of indicators based on national and international patent data, which reflect the capacity and performance status of countries in these development fields.

***Timeline***: 2023-2025

***Milestone***:

- 2025: Publication of the first version of national and international patent indicators on technologies related to the value chain of green hydrogen and its derivatives.

***Responsible Institution:*** National Institute of Industrial Property, Ministry of Economy, Development, and Tourism, with the support of the Ministry

# 6.18 OPENING OF INTERNATIONAL MARKETS

In accordance with the ambition set out in the National Green Hydrogen Strategy to make Chile a significant global exporter of green hydrogen and its derivatives, it is necessary to advance actions that position Chile on the global stage as a potential leader in the future global green hydrogen economy.

For this purpose, one of the crucial elements is foreign investment, which also contributes to the goals of decarbonisation and diversification of our productive matrix. In this way, Chile can leverage its leadership in the global green hydrogen market to attract investments, offering among its advantages the natural conditions for low-cost hydrogen production and derivatives, and institutional strength and coordination among stakeholders.

This task requires a high degree of international collaboration through bilateral and multilateral cooperation with countries and international organisations, dissemination of information to foreign investors about Chile's business ecosystem, and promotion of products and attraction of investments from specialised Chilean institutions.

To this end, our country has signed a series of international cooperation instruments aimed at strengthening relations with potential importers of green hydrogen and its derivatives, establishing general principles of action for the parties, sharing experiences, facilitating technical assistance, and exchanging information and knowledge associated with the deployment of green hydrogen value chain technologies and its derivatives.

Furthermore, in anticipation of the need to prepare for the massification of green markets globally, it is essential to forge the necessary conditions in the national production ecosystem of green hydrogen

and its derivatives to meet the regulatory and certification requirements established in the main global demand hubs.

On the other hand, our country seeks to contribute to the development of a low emissions global maritime trade through green maritime corridors in Chile, positioning it as a link in the sustainable trade of the future.

This line of action includes actions and milestones aimed at promoting products and attracting investments, international cooperation, and improving the country's necessary conditions to participate in international green markets.

## LINE OF ACTION 18:
# OPENING OF INTERNATIONAL MARKETS


### MILESTONES

1. Participate in the two main annual international meetings/exhibitions of the sector.
2. Implement, through ProChile's commercial offices abroad in focus markets for the industry, promotion activities to maintain Chile's international positioning.
3. Publication of an e-Book on green hydrogen in Chile
4. Launch of this Action Plan in English at the Investment Forum.
5. Development of an annual internationalisation agenda to prioritise and strategically plan cooperation activities.
6. Identification of ports in Asia to promote strategic alliances.
7. Finalise Chile's participation in regional certification frameworks, such as Certhilac.
8. Publication of the study and roadmap to establish the requirements to meet international standards of major import hubs.
9. First enablement of the RENOVA platform for the hydrogen certification system.
10. Launch of certification platform.
11. Publication of the results of feasibility studies for the transportation of copper and sulfuric acid.
12. Publication of the results of the pre-feasibility study for a green maritime corridor for aquaculture in the Aysén region.
13. Materialise the first green maritime commercial route in Latin America by 2030.

*Note: Bar colours only indicate complementarity of measures.*

# *Action 75. Positioning the country's green hydrogen industry abroad*

***Objective**:* Position Chile in the international market by promoting the opportunities of hydrogen and its derivatives produced in the country to international off-takers, thus contributing to the country's image, market intelligence, and commercial management.

***Timeline**:* 2023-2030

***Annual Milestones:***

- Participate in the two main annual international meetings/exhibitions of the sector to deepen the country's positioning and enhance commercial opportunities with international off-takers.
- Implement promotional activities through ProChile's commercial offices abroad in focus markets for the industry to maintain Chile's international positioning.

***Responsible Institution**:* ProChile.

# *Action 76. Attracting foreign investment for the green hydrogen and derivatives industry in Chile*

***Objective***: Contribute to attracting investment by promoting, supporting, and facilitating its entry into the market, connecting investors' interests with the business opportunities that the country offers. This includes developers, manufacturers, and other international actors in the value chain. The aim is to attract foreign investment and identify new industrial opportunities to create a productive ecosystem in line with the goals set out in the National Green Hydrogen Strategy.

A crucial activity in this action is to convey to various stakeholders, both national and foreign, a narrative about the development of the green hydrogen and derivatives industry in Chile, emphasising Chile's potential, interministerial coordination (public sector), and the role of project developers. In the first half of 2024, the first e-Book on green hydrogen will be published to address this need.

***Timeline***: Ongoing work 2023-2030

***Milestones***:

- First half of 2024: Publication of an e-Book on green hydrogen in Chile
- First half of 2024: Launch of this Action Plan in English at the Investment Forum.

***Responsible Institution:*** InvestChile.

# *Action 77. Subscription and implementation of international cooperation instruments*

***Objective**:* Promote technical and diplomatic cooperation with strategic countries through instruments such as agreements, Memoranda of Understanding (MoUs), joint declarations (JDs), among others, to promote lines of work that foster technology development, regulatory harmonisation, as well as international certification.

***Timeline**:* 2023-2030, adapting to the needs of each timeframe within this decade.

***Annual Milestone:***

Development of an annual internationalisation agenda to prioritise and strategically plan cooperation activities, enabling the utilisation of available opportunities and the opening of new avenues for international cooperation.

***Responsible Institution**:* Ministry of Energy, with support from the Ministry of Foreign Affairs.

# *Action 78. Promote agreements and/or strategic partnerships with governments and multilateral actors for the development of the green hydrogen industry and its derivatives in the country*

***Objective**:* Foster and implement agreements and/or strategic partnerships with governments and multilateral actors that establish actions contributing to enabling and enhancing the green hydrogen industry and its derivatives. These actions may include the transfer of resources, technology, knowledge, and innovation; incentives for import-export markets; regulatory harmonisation; international certification schemes, among others.

***Timeline**:* 2023-2030, adapting to the needs of each time frame within this decade.

***Milestone***:

Second half of 2024: Identification of ports in Asia to promote strategic partnerships, as a continuation of the work done with European ports.

***Responsible Institution:*** Ministry of Energy in coordination with relevant agencies, as appropriate.

# *Action 79. Develop a strategic proposal for establishing a sustainability certification system for hydrogen*

***Objective***: Develop a strategic proposal for establishing a sustainability certification system for hydrogen, ammonia, and other synthetic fuels in Chile. This proposal should delve into elements associated with the certification framework to ensure compliance with import requirements being discussed in Europe (with a special emphasis on Germany), Japan, the Republic of Korea, among others, applied to hydrogen, ammonia, and synthetic fuels.

Additionally, a certification scheme for hydrogen and its derivatives will be promoted, under a harmonisation approach, aligned with the characteristics of the Latin American and Caribbean region, accommodating the requirements and particularities of the countries.

***Timeline***: 2024-2025

***Milestones***:

- 2024: Formalise Chile's participation in regional certification schemes, such as Certhilac.
- 2025: Publication of the study and roadmap to establish the requirements for meeting international standards of the main import hubs consistent with national regulatory context.

***Responsible Institution:*** Ministry of Energy and Ministry of the Environment, with the support of GIZ, IDB, and other organisations.

# *Action 80. Strengthen the National Registry of Renewable Energies (RENOVA) of the National Electric Coordinator as the foundational platform for the hydrogen certification system*

***Objective**:* Define the necessary actions to establish a green hydrogen sustainability certification system in line with the main international standards. The Ministry of Energy will lead this coordinated interinstitutional effort, which involves strengthening the National Registry of Renewable Energies (RENOVA) of the National Electric Coordinator as the foundational platform for the hydrogen certification system.

From this work, the role of RENOVA in other certification systems (such as Huella Chile, Article 30 LMCC - Voluntary certification system for GHG and water) will be established, and an official methodology will be developed, along with the publication of an administrative act detailing the calculation of the grid emission factor and the residual.

***Timeline**:* 2025-2030

***Milestones***:

- 2025: First activation of the RENOVA platform for the hydrogen certification system.
- 2026-2030: Launch of the certification platform.
- Responsible Institution: Ministry of Energy in strict coordination with the National Electric Coordinator.

# *Action 81. Implement green maritime corridors*

***Objective**:* To promote maritime routes where vessels operate using exclusively low-emission alternative fuels. This effort, led by the Ministry of Energy with the support of the Ministries of Transportation and Telecommunications and Foreign Affairs, and in coordination with the private sector, aims to develop relationships among all stakeholders in the value chain for cargo movement in frameworks that favour the decarbonisation of the maritime sector.

Currently, the possible green maritime corridors are being analysed, with ammonia being one of the options among the low-emission alternative fuels being considered. This effort is part of a set of integrated initiatives, including the implementation of feasibility studies to identify the most viable routes.

***Timeline**:* 2023-2030

***Milestones***:

- End of 2024: Publication of the results of feasibility studies for transporting copper and sulfuric acid.
- Mid-2025: Publication of the results of the pre-feasibility study for a green maritime corridor for aquaculture in the Aysén region.
- 2030: Materialise the first green commercial maritime route in Latin America before 2030.

***Responsible Institution**:* Ministry of Energy, with support from the Ministry of Foreign Affairs and the Ministry of Transportation and Telecommunications.

# 7

# ANNEXES

# Available for download on the website www.planhidrogenoverde.cl

A.1 SUSTAINABILITY ANALYSIS

A.2 AUDIENCE ANALYSIS AND PARTICIPATORY WORKSHOPS

A.3 SIGNED INTERNATIONAL AGREEMENTS

A.4 STRATEGIC COMMITTEE DOCUMENT

A.5 CORRESPONDENCE BETWEEN 111 MEASURES OF THE PRELIMINARY AND FINAL VERSIONS OF THE ACTION PLAN

# Green Hydrogen Action Plan

2023-2030

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