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Explaining Varying Green Hydrogen Ambitions: State Capacity and Business Positioning in Chile and Peru

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Abstract: Green hydrogen (GH₂) ambitions vary significantly across Latin America, despite the region's favourable conditions for production. This article investigates the contrasting trajectories of GH₂ sector development in Chile and Peru – two countries with similar natural endowments but divergent levels of engagement. Drawing on a political economy perspective, the article develops a theoretical typology based on the interaction between state capacity and business positioning. It identifies four ideal-type configurations of state-business relations: cooperative, contentious, business-driven/project-based, and non-alignment/non-development. This typology offers a heuristic tool for analysing different pathways of engagement with GH₂. Using a comparative case study design grounded in documentary analysis and 17 expert interviews, the article shows that Chile follows a cooperative model, where a high-capacity state and a supportive business sector jointly advance GH₂ development through strategic coordination, public investment, and international partnerships. In contrast, Peru exemplifies a business-driven, fragmented approach, shaped by low state capacity, institutional volatility, and the influence of a powerful fossil fuel sector. The findings highlight the importance of state-business configurations in shaping green industrial policy in the Global South and point to future research avenues including the role of fossil sector resistance, external actors, and civil society mobilization.

Keywords: Latin America; decarbonisation; strategic state capacity; green industrial policies; political economy

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1 Introduction

Amid the global shift toward post-carbon economies, green hydrogen (henceforth GH₂) has emerged as a promising solution to decarbonize hard-to-abate industries. For many industrialized nations with a higher demand for GH₂ than production capacity, ensuring access to future markets abroad has become a strategic priority. Meanwhile, many countries in the Global South with conducive natural conditions view the sector, above all, as an economic opportunity, besides the potential contribution to decarbonisation. Establishing a GH₂ sector is risky and uncertain. It requires substantial investment in infrastructure, technology, and renewable energy sources. Market demand is still unpredictable, and investors are hesitant. In addition, technological issues related to storage and transport are unresolved, environmental challenges persist, and it is unclear how the new industry will affect territorial dynamics.

Given its abundant renewable energy resources, extensive land availability, and favourable climatic conditions, Latin America is considered a global hotspot for GH₂ production. While almost all states have proclaimed interest, the degree of actual progress in developing the sector varies significantly across the region. Governments have different GH₂ ambitions, as reflected, amongst others, in adopting new regulations, setting economic incentives, and launching pilot projects. Peru and Chile are a case in point. Despite sharing similar geographical and climatic conditions conducive to GH₂ production, the two countries have pursued markedly different trajectories in GH₂ development. While Chile already runs several pilot projects, in Peru, GH₂ ambitions are much more limited.

This article investigates the factors that shape GH₂ ambitions, defined as efforts to develop GH₂ as a new industrial sector. Drawing on a political economy perspective and focusing empirically on the cases of Chile and Peru, we examine how variations in state capacity and business positioning influence sectoral development. To this end, we propose a theoretical typology comprising four distinct configurations of state-business relations, each with different implications for GH₂ development: (1) cooperative GH₂ development, (2) contentious GH₂ development, (3) business-driven/project-based GH₂ development, and (4) non-alignment/non-GH₂ development. The typology rests on the premise that the development of the high-risk sector depends on a synergistic alignment between capable and willing state institutions and interested business actors. In contexts where either the state or business is unwilling or unable to engage effectively, GH₂ development tends to be limited. Importantly, the typology is neither normative nor hierarchical; no configuration is inherently superior. While certain types may offer more favourable

conditions for advancing the sector, they do not guarantee successful or economically viable outcomes.

Based on this typology, we conduct a systematic comparison of GH2 development in Chile and Peru. We argue that Chile is a case of “cooperative GH2 development” where an active high-capacity state combines with a supportive business sector to advance the development of the GH2 industry. In Peru, a low-capacity state with a reluctant business sector heavily influenced by the gas industry, an initial configuration of “non-alignment/non-GH2 development” has changed to a “business-driven” model manifested in isolated GH2 projects.

Methodologically, this study employs a comparative case study design, selecting Chile and Peru as “most similar, different outcomes” cases. Data collection includes press reviews, 17 expert interviews, and the analysis of government and corporate publications. Empirical information is triangulated to construct analytical narratives explaining varying GH2 ambitions.

In the next section, we first describe the context of the global GH2 hype taking off since 2020 and then review the emergent social science GH2 literature and related recent scholarship on green industrial policies. Afterwards, we present a theoretical framework to understand varying GH2 ambitions, constructing a theoretical typology along the dimensions of state capacity and business positioning. The following empirical section compares Chile and Peru, highlighting how different levels of state capacity and business positioning translate into different configurations of GH2 development. The conclusion resumes and discusses avenues for further research.

2 Dissecting the Global Green Hydrogen Hype

Hydrogen (H₂), the simplest and most abundant chemical element in the universe, typically exists in compounds such as water or hydrocarbons and has to be extracted through electrolysis. As an energy carrier, H₂ can be used in fuel cells, industrial processes, and power generation. It produces no direct emissions when used, making it attractive for global decarbonization.

H₂ has been produced for decades, although not emission-free or “green” (Zhu 2024). “Green hydrogen” became increasingly an option with the substantial reduction of costs in renewable energies (eolic or solar) powering electrolysis and of required technologies (IEA, 2022). However, as of today, around 95% of global hydrogen production is still fossil-based, mostly produced with gas (IRENA, 2020).¹

¹ The hydrogen industry uses a colour-based naming system to indicate how hydrogen is produced. The most common form is “grey hydrogen” produced from natural gas via steam methane reforming, releasing CO₂ into the atmosphere; Another type is “blue hydrogen” produced from natural gas, but

Starting in 2020, a global hype around GH₂ emerged. It was triggered primarily by industrialised countries, where governments and corporations alike launched ambitious strategies and projects to decarbonise and diversify their industries. The Russian invasion of Ukraine in 2022 gave this momentum a geopolitical boost, as many countries, particularly in Europe, sought to reduce their reliance on Russian fossil fuels. In this context, GH₂ began to be framed not only as a sustainability solution but also as a component of energy security.²

Following the demand projections of industrialised countries, GH₂ ambitions exploded worldwide. Especially, low and middle-income countries started to advertise their possibilities for GH₂ production. As of 2024, 95 countries had published GH₂ road maps (Ariztía and Undurraga 2025a), in addition to regional strategies such as the EU Hydrogen Strategy (EU, 2020). Globally, the industry has announced for the same year 1,572 GH₂ projects and investments of about USD 680 billion in hydrogen value chains (Hydrogen Council and McKinsey 2024). Across the globe, “performances” and “spectacles”, such as international fairs or prototype launches, visualising and enacting “GH₂ futures” have increased enormously (Ariztía and Undurraga 2025b).

By 2024, initial optimism began to wane. High production costs, limited infrastructure, and uncertain market conditions led to the scaling back or delay of several projects (Van de Graaf et al. 2020; Odenweller and Ueckerdt 2025).³ While these uncertainties have not prompted the world to abandon GH₂, states differ substantially in their GH₂ ambitions.

Social science research on GH₂ remains at an early stage (Hanusch and Schad 2021; Vallejos-Romero et al. 2022). Research has primarily focused on Europe and East Asia (notably Japan and South Korea), with key areas of inquiry including public acceptance and societal perceptions of GH₂ (Häußermann et al. 2023; Gordon et al. 2024), policy and regulatory frameworks, and the broader social costs and implications of GH₂ development (Van de Graaf et al. 2020). In Latin America, scholarship has mobilised the concept of “green extractivism” to examine emerging land-use conflicts associated with renewable energies and hydrogen infrastructure projects (Ulloa 2023; Dorn 2024a, 2024b; Dietz 2022). In addition, economic analyses have addressed the potential of GH₂ in the region (for Chile Scholvin 2024) as well as its

including carbon capture. Other types or colours, all involving emissions, are brown, turquoise, pink, and yellow hydrogen.

² For a similar argument, regarding lithium, see Riofrancos (2022).

³ Tracking 190 projects over 3 years, Odenweller and Ueckerdt (2025) found that only 7% of global capacity announcements finished on schedule. In addition, several emblematic and highly visibly flagship GH₂ projects have been shut down since 2024, for instance in Spain (by REPSOL) and the UK (by BP).

implications for global supply chains and geopolitical dynamics (Van de Graaf et al. 2020; Kalvelage and Walker 2024).

Notwithstanding the prominence of GH2 in public debates, globally, the sector remains largely aspirational (Ariztía and Undurraga 2025b). Scholars have pointed out important differences between the Global North and the Global South, stressing that the Global North's demand triggered the Global South's aspirations in the first place (Dietz 2022). Cautioning against perpetuating economic dependence and global asymmetries, Ariztía and Undurraga (2025a) find that countries in the Global North tend to position themselves as technology providers and focus on hydrogen use in their industries. In contrast, Global South countries often present themselves as low-cost producers of GH2, remaining on the lowest rungs of the emerging global GH2 chain. Within the Global South itself, however, further differentiation is evident. While some fiercely promote the sector, notwithstanding the risks, others take a more cautious stance, despite their proclaimed interest.

The literature on green industrial policy has emphasized the crucial role of the state and public policy in fostering new industrial sectors aimed at decarbonization, including GH2 (Lebdioui 2024; Rodrik 2014). Industrialized countries have deployed substantial *de-risking* mechanisms – such as subsidies, guarantees, and public–private partnerships – to reduce investment uncertainty and attract private capital to this nascent sector (Gabor and Sylla 2023; Collington 2025). In parallel, many governments have adopted proactive “GH2 diplomacy” strategies, seeking to secure supply chains and international partnerships (Van de Graaf et al. 2020). Kalvelage and Walker (2024) illustrate the growing role of extra-state actors, including international development agencies and transnational financial institutions, in advancing the strategic interests of industrialized countries within prospective GH2-producing nations.

Barriers to GH2 development include technological gaps and costs (Van de Graaf et al. 2020). The broader energy transition literature also indicates the potential role of incumbent fossil-fuel industries in hindering or slowing down energy transitions, including GH2 development (Moe 2015; Breetz et al. 2018; Hochstetler 2020; Newell 2021). Global South countries feature additional structural constraints for energy transitions, including GH2 development, such as the dependence of many countries on fossil fuel rents (Gopalakrishnan and Miller 2024), including many Latin American ones (Sovacool et al. 2019). Also, the persistence of fossil fuel subsidies, as in Ecuador and Bolivia, renders their removal a politically risky endeavour (Lehmann and Alarcón 2023). Collington (2025) stresses that, under the condition of uneven state capacity prevalent in many Global South countries, “derisked decarbonisation” is only successful in sectors where economic growth opportunities are expected.

In this article, we seek to understand when states advance in risky GH2 development or take a more hesitant stance. In the following section, we develop a theoretical framework for understanding varying GH2 ambitions.

3 The State and Business: A Framework for Understanding Green Hydrogen Ambitions

In line with recent literature, we posit that the development of a new industrial sector such as GH2 depends on the interaction between two key actors: the state and private business. In industrial policies, the state is essential in mobilizing resources, formulating long-term strategies, establishing legal frameworks, and initiating risk-laden projects (Rodrik 2014). The private sector, in turn, contributes technical expertise and capital, typically seeking medium-to long-term returns (Hochstetler and Kostka 2015; Evans 1995). These contributions depend on businesses' perceptions of risks and opportunities, as well as the states' incentives and signals to alleviate investments and "de-risk" (Gabor and Sylla 2023).

In Latin America, these interactions unfold within a prevailing market logic (Schneider 2013). Rather than pursuing strong market-shaping interventions, Latin American states tend to prioritize private sector leadership, market competition, and export orientation as central pillars of their economic development strategies. State intervention is generally limited and assumes a facilitative role.

To analyse the dynamics of GH2 development, we propose an analytical framework centred on the interaction between two key dimensions, each associated with one of the principal actors: state capacity and business positioning. We argue that these dimensions are interdependent and that their specific configuration shapes distinct trajectories for GH2 development.

We define state capacity as the organizational ability of the state to design and effectively implement public policies (Skocpol 1985). In Latin America, state capacity is unevenly distributed across countries, sectors, agencies, and territories (Soifer 2012; Brinks et al. 2020). In the context of the energy transition, this concept takes on a distinctly sectoral character, linked to the ability to foster emerging industries under conditions of high uncertainty. The creation of sectors such as GH2 depends not only on market signals or the availability of natural resources, but also on the existence of specific state capacities that can sustain and guide processes of productive and technological transformation.

The literature has identified various types of capacities that fulfil these distinct functions. One is administrative capacity, closely linked to the presence of a Weberian bureaucracy that is professional, stable, and technically competent, capable of

planning, coordinating, and implementing public policies in a coherent and effective manner, with relative autonomy from particularistic pressures (Carrasco 2024). This includes the ability to develop long-term plans independently of the current administration (Orihuela 2014; Orihuela and Serrano 2024).

Second, regulatory capacity enables the establishment of clear and credible legal frameworks that reduce investment uncertainty, promote public welfare, and ensure efficient procedures in accordance with the rule of law (Madariaga and Rangel-Padilla 2025; Baker et al. 2014). Likewise, fiscal capacity is crucial for mobilizing public resources toward infrastructure, technologies, or subsidies (Singh 2023; Madariaga and Rangel-Padilla 2025).

The state's ability to define public missions and shape markets constitutes another critical dimension of state capacity (Mazzucato 2018). This capacity allows the public sector to articulate ambitious collective goals and reorganize instruments, agencies, and alliances around them (Orihuela and Serrano 2024). In sectors such as renewable energy and advanced technologies, where upfront costs are high and returns are long-term, this orientation is particularly relevant for attracting "patient investors" and fostering the conditions necessary for technological learning (Wood et al. 2020). Equally important is the state's capacity to build close, stable, and strategic relationships with the private sector. In this "embedded autonomy" (Evans 1995), the state maintains bureaucratic and organizational independence while engaging systematically with business actors to facilitate effective policy implementation.

Finally, recent literature has emphasized the importance of strategic state capacity, defined as the ability to build coalitions, mobilize allies, and demobilize opposition around long-term industrial objectives (Meckling and Nahm 2022). Strategic capacity is especially important when the sector to be promoted imposes (perceived) costs on incumbent industries or social groups with veto power. In the case of GH2, this entails neutralizing opposition from competing (fossil-based) sectors and securing private sector support through risk mitigation strategies. Given the global scope of the GH2 race, strategic capacity also encompasses "GH2 diplomacy", the ability to attract international support through financial services, technical cooperation, and investment.

Thus, high state capacity combines bureaucratic-administrative capacity, regulatory capacity, fiscal resources, and strategic coordination mechanisms, all of which are essential to sustaining the development of the emerging GH2 industry.

Business positioning refers to the orientation of the private sector toward GH2 development. We distinguish between active/passive support and opposition. Active support involves private investment as well as complementary activities that foster sectoral development, such as contributing to an optimistic investment climate through public discourse and the performative articulation of "GH2 futures" (Ariztia and Undurraga 2025b). Passive support denotes a more cautious stance in which the

Table 1: State-business relations and GH2 development configurations.

| Business | Support (active or passive) | Opposition |
|---------------------|---|---|
| State High capacity | 1. Cooperative GH2 development The state and business align in goals and actions, enabling risk-taking development through co-investment, long-term planning, and policy stability. | 2. Contentious GH2 development The state seeks to advance GH2 but faces resistance from business actors. The perspective of GH2 is unclear. |
| Low capacity | 3. Business-driven/project-based GH2 development In the absence of state leadership and capacity, supportive businesses drive localized or experimental projects. Progress remains fragmented and contingent. | 4. Non-alignment/Non-GH2 development Neither the state nor the business sector supports the initiative. Development is blocked due to a lack of institutional will and active opposition. |

Source: Author's Elaboration

private sector refrains from direct engagement but does not obstruct or resist the emergence of the new sector.

In contrast, business opposition manifests primarily through the activation of business power, understood as the multifaceted repertoire of influence exercised by key economic actors (Fairfield 2015), and is a historical force in Latin America (Schneider 2013; Madariaga 2020; Atria 2023). This power operates across multiple dimensions: structural power (e.g., the threat to withhold or relocate investment), instrumental power (e.g., campaign financing and revolving door practices), discursive power (e.g., agenda-setting through media ownership or undermining confidence in emerging sectors), and institutional power (e.g., direct participation in public governance structures) (Busemeyer and Thelen 2020). Business actors may also refrain from supporting the new sector due to economic concerns; anticipated losses, uncertain returns, and perceived sectoral volatility can produce reluctance to engage, particularly in nascent and high-risk sectors such as GH2 (Allan et al. 2021).

Combining the dimensions of state capacity and business positioning yields a theoretical typology with four ideal-type configurations that shape whether countries pursue risk-taking or risk-averse strategies in GH2 development (Table 1). The four ideal types underlying GH2 development are: cooperative GH2 development, contentious GH2 development, business-driven/project-based GH2 development, and non-alignment/non-GH2 development. These configurations are not static. Transitions between configurations can occur in response to changing conditions, especially in the business positioning dimension.⁴ For example, when business actors

⁴ State capacities generally do not change in the short term. Political willingness may change, but without capacities, a change in willingness not necessarily produces change.

begin to perceive a previously risky sector as an emerging opportunity, or conversely, when either the state, the business sector, or both lose confidence in the prospects of positive development.

First, when high state capacity aligns with business support, whether active or passive, *cooperative GH2 development* takes place. In such contexts, the state promotes green hydrogen and ensures international and national support. The private sector either contributes resources and initiative (active support) or refrains from obstructing the process (passive support). As we will demonstrate below, Chile constitutes a paradigmatic case of this model.

The second configuration, termed *contentious GH2 development*, arises when a state with high capacity actively promotes the sector but encounters opposition from powerful business actors. In such cases, business power is mobilized to slow, dilute, or redirect the state's efforts. Under these conditions, the strategic dimension of state capacity becomes critical, not only to advance policy but also to neutralize opposition and cultivate supportive coalitions. Given recent setbacks in Chile's GH2 sector, the country may be transitioning toward this more contentious scenario.

In contexts where state capacity is limited, but segments of the business community perceive economic opportunities, GH2 development may follow a *business-driven/project-based* trajectory. In such cases, weak state leadership, stemming from under-resourced institutions, lack of political willingness, or administrative fragmentation, precludes the state from assuming risk or coordinating industrial transformation. Nonetheless, motivated private actors may initiate projects independently. In the absence of state coordination, sectoral development tends to be fragmented, regionally uneven, and reliant on external support. Peru has recently shifted toward this configuration, following a period aligned with the fourth scenario.

This fourth scenario of *non-alignment/non-development* emerges when state capacity is weak, and business opposition is strong. In this context, industrial policy is either absent or merely symbolic, as the state lacks the instruments, resources, or political will to promote GH2 development. Simultaneously, business actors actively mobilize their power to preserve existing structures and resist sectoral change. Under this configuration, states do not develop a GH2 sector.

In sum, the relationship between state and business actors are central to the development of high-risk sectors such as GH2. We propose a framework that captures the interaction between state capacity (high vs. low) and business positioning (supportive vs. obstructive) to explain variation in GH2 development. This typology provides a foundation for comparative analysis and helps identify the key conditions shaping GH2 development. Before applying it to the cases of Chile and Peru, the following section offers a brief overview of the current state of GH2 development in both countries.

4 State-Business Relations and Contrasting Green Hydrogen Ambitions in Chile and Peru

4.1 Contrasting GH₂ Ambitions

In Latin America, strong demand signals from industrialized countries have generated widespread interest in GH₂. Although nearly all countries have shown some level of interest, their ambitions and degrees of engagement vary significantly. The South American neighbours Chile and Peru illustrate this variation. Both countries feature excellent natural conditions conducive for GH₂ production, including massive “clean” conventional (hydro) and non-conventional (solar and eolic) energy sources. Given their location along the Pacific coast, they also count on ample water (especially salt water) and land resources. Both have extensive export-oriented business sectors, with a strong presence of mining, that are consistently focused on expanding their markets. Notwithstanding these similar potentials, Chile and Peru have demonstrated so far very different GH₂ ambitions.

In Chile, GH₂ sector development is advancing considerably (Day 2024). The Chilean government launched a “National Green Hydrogen Strategy” in 2020, actualized in 2022, and in 2024, amended by the Green Hydrogen Action Plan 2023–2030. Currently, over 60 GH₂ projects at various stages of development operate across the country (Annex Table 1). The goal is for 25 % of these projects to commence GH₂ production before the end of the decade (Gobierno de Chile 2024). Chile’s Economic Development Agency (CORFO) has selected six proposals in its first call for applications to develop GH₂ production plants until December 2025 (Marca Chile 2022).

In Peru, GH₂ has only recently emerged as a topic of interest. Although the official discourse acknowledges the potential of GH₂, concrete steps toward sectoral development have been limited. In 2023, the Peruvian congress adopted a national roadmap. More recently, two major GH₂ projects, *Horizonte de Verano* and *La Joya*, have been announced in the southern region of Arequipa. In addition to these large-scale initiatives, several smaller projects have been proposed, including efforts to convert existing grey hydrogen production facilities to GH₂ (Annex Table 2).

4.2 State-Business Relations and Divergent GH₂ Pathways in Chile and Peru

In this article, we argue that the advancement of the GH₂ sector depends on the interplay between state capacity and business positioning, giving rise to four potential development pathways. We illustrate the validity of this theoretical typology through a comparative analysis of Peru and Chile. Our findings show that in Chile, GH₂ development is progressing through a model of *strategic collaboration*,

characterised by a high-capacity state and a supportive business sector. In contrast, Peru exhibits a more hesitant approach, shaped by limited state capacity and a business sector that is largely unengaged and partially oppositional.

State capacity is comparatively high in Chile, rendering the country an outlier in the context of Latin America’s low-performing states (Soifer 2012). According to almost all indicators, the country is, in general, institutionally stable and capable of implementing adopted policies (Figure 1). Moreover, Chile possesses high strategic, administrative, and regulatory capacity (Table 3). Regarding energy transitions, Chile successfully implemented a renewable energy reform in 2014, where state actors collaborated with business and civil society groups (Allain and Madariaga 2020; Maillet and Rozas, 2019), setting an important precedent for further engagement in sectors perceived as “green”. The newly adopted strategic and regulatory framework for developing GH2 is solid, formalizing clear production goals and establishing a timeline for implementing enabling conditions essential for the industry’s growth. Although the National Strategy targets are unlikely to be met, they were intended to signal Chile’s commitment to GH2 development.⁵

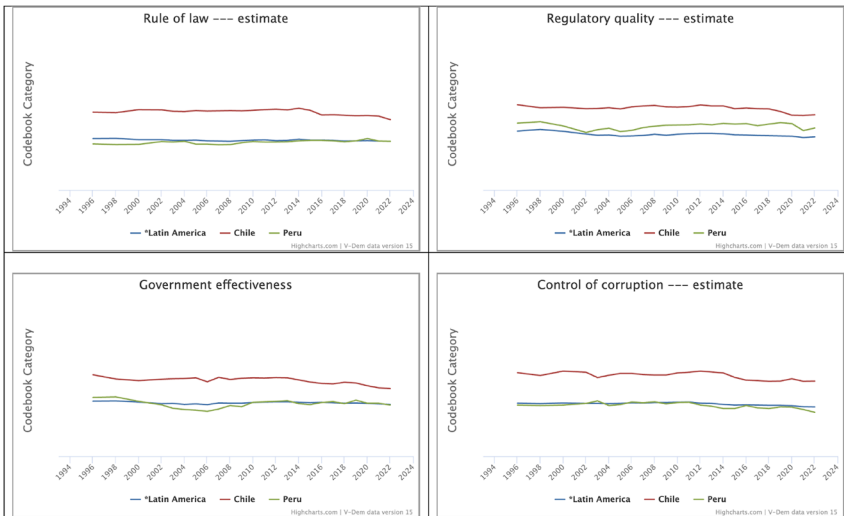


Figure 1: State capacity indicators in Chile and Peru.

Source: Author’s Elaboration based on Coppedge et al. (2025) – Varieties of Democracy

5 Interview, Chilean Green Hydrogen Committee, virtual, 28.10.2024

Chile's GH2 policy is regarded as a "state policy" by Chilean decision-makers.⁶ Initial steps toward GH2 development were taken in 2018, and the policy has been maintained across successive administrations. One of the clearest institutional expressions of this continuity is the establishment of the *Green Hydrogen Committee* by the government of Gabriel Boric in 2023. The committee brings together former officials, technical experts, and individuals from across the political spectrum to provide strategic guidance, build consensus, and develop both an action plan and a coherent political narrative to advance Chile's GH2 strategy at the national and international levels. Prominent figures such as former Energy Minister Juan Carlos Jobet and former President Michelle Bachelet are members of the committee and have played key roles in sustaining political momentum for the sector.

The state has developed and offers various instruments to support the creation of a GH2 sector, combining regulatory measures, financing schemes, and institutional coordination (Table 2). It has also fostered strategic coordination with long-term national frameworks such as the National Energy Policy and the Long-Term Climate Strategy (Gómez et al. 2025). Chile possesses a functioning public bureaucracy. GH2 policies are executed by the state agency CORFO (Corporación de Fomento de la Producción) in cooperation with other public agencies. Through the last years, the Chilean governments have actively involved various ministries and agencies, including the Ministry of Energy; Ministry of Science, Technology, Knowledge and Innovation; Ministry of Finance, Ministry of Economy, Development and Tourism; and the National Geology and Mining Service, to promote investment, research, development, and innovation across the entire H2 value chain (Palma-Behnke et al. 2021). Also, public companies like ENAP (Empresa Nacional del Petróleo) are leveraging existing dock infrastructure for GH2 production. Within the Ministry of Energy, a new Energy Unit was created, monitoring projects, establishing links between the government, companies, and associations, and co-financing GH2 initiatives. The unit also manages studies and international relations, supporting collaborations with foreign ports and countries.

The implementation of Chile's GH2 strategy rests on public–private networks and external support, strategically mobilized by the state. Regional GH2 Hubs have been institutionalised in Magallanes and Antofagasta, the regions in the South and North hosting the main projects, to involve various stakeholder groups from the business sector, local governments, and the local population (Cruz et al. 2023). For

⁶ Interview, Political Authority, virtual, 30.10.2024

Table 2: Main green hydrogen instruments in the Chilean case.

| Instrument/Program | Implementing agency/organization | Funding |
|--|---|---|
| National Green Hydrogen Strategy (2020) and action Plan 2023–2030 (2024) | Ministry of Energy and CORFO | Public funding with multi-lateral support (WB, IDB, EIB, KfW) |
| Green H2 FUND I | Greenstreet S.A. (private) and CORFO | US\$100–300 M (80 % private, 20 % CORFO) |
| Green credit | CORFO and banking entities (Banco Security, Banco BICE, Bice Kaufmann, Banco Internacional, Banco BTG Pactual, Banverde S.A., Banco Santander, and Eurocapital) | Up to US\$20 M per company |
| CORFO financing rounds | CORFO | US\$50 M (up to 240 MW) |
| Technological program for the use and adoption of GH2 | CORFO and Ministry of Economy | Up to CLP 3.500 M per project (60 % public, 40 % private) |
| R&D programs and calls | CORFO | Up to CLP 1.000 M per project |
| Chile Transforma H2V strategic program | CORFO | N/A |
| Facility Chile green hydrogen | CORFO (funded by WB, IDB, EIB, KfW, EU) | US\$1.000 M initial, leveraging up to US\$12.500 M |
| International agreements (MoUs and declarations) | Singapore, Japan, South Korea, Germany, United Kingdom, France, and other countries | N/A |
| Collaboration agreements (interministerial) | Ministry of National Assets, Ministry of Energy, and CORFO | N/A |
| Development of common use infrastructure | ENAP, Empresa Portuaria Austral, Total Eren Chile, HIF Global, EDF Renewables Group, Grupo EDF, RWE, and HNH Energy | N/A |
| Participation in international platforms | H2LAC, Euroclima+, Team Europe Initiative, Hydrogen for Development partnership (H4D) | N/A |

Source: Author's elaboration based on governmental documents and press releases.

instance, CORFO's "Transforma H2V Program" in Magallanes promotes the development of GH2 technologies in the region, in alignment with the regional GH2 roadmap drafted in a participatory process.⁷

⁷ Interview, Political Authority, virtual, 30.10.2024.

Political stability, administrative capacity, and strategic capacity have also attracted or maintained international cooperation and underlie international agreements. Within the general national context of openness to trade and investment, the Chilean state works towards positioning Chile as a global pioneer in GH2 production (InvestChile 2024). It conducts national and international campaigns, often supported by international cooperation. These include massive ad campaigns, amongst others, through the platform “Marca Chile”, the participation in international fora, especially in prospective markets in Europe (e.g. Germany, Netherlands), and the organization of trade and business fairs within Chile (Ariztía and Undurraga 2025b). Chile has close ties to the German technical cooperation GIZ, which was already tightly involved in the energy reform in 2014.⁸ The partnership with GIZ plays a crucial role in advancing Chile’s GH2 sector, by providing resources and expertise.⁹ Additionally, GIZ has actively facilitated the involvement of national and international stakeholders, particularly from the business sector, in the evolving GH2 industry. Alongside the European Union’s “Euroclima” program, the World Bank, and the Economic Commission for Latin America and the Caribbean (ECLAC), GIZ co-founded and manages the online platform H2LAC to promote GH2 production and foster global trade relations. The headquarters are based in Santiago de Chile.¹⁰ GIZ officials stress that Chile was chosen as a strategic partner because of the Chilean government’s perceived strategic vision and commitment, coupled with the country’s strong record of institutional stability.¹¹

The Chilean State also plays a central role in facilitating international cooperation in both technology and business. Notable international partners include the European Union, Germany, Japan, South Korea, and Indonesia. Chile is involved in several international collaborations, such as Mission Innovation and the International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE), and plays a leading role in developing a Latin American GH2 certification. Political stability, sustained policy commitment across administrations, and Chile’s traditionally strong institutions are viewed as key foundations for investment decisions in the GH2 sector.¹² Indeed, Chile actively promotes political stability as one of its comparative

8 Acronym in German for Deutsche Gesellschaft für Internationale Zusammenarbeit/German Corporation for International Cooperation.

9 Interview, GIZ Germany official, virtual, 14.11.24

10 See: <https://h2lac.org/> H2LAC currently brings together 50 partners from 16 countries, including public organizations, private sector entities, renewable energy associations, European chambers of commerce in the region, and knowledge institutions. It hosts green hydrogen promotion events across the region.

11 Interview GIZ Germany official, virtual, 14.11.24

12 Interview, Political Authority, virtual, 30.10.2024.

advantages in GH2 development, particularly in contrast to neighbouring countries such as Argentina.¹³

The business sector is actively supporting GH2 development in Chile, although business risk and opportunity evaluation are more critical than the state's discourse. An essential enabling factor is the absence of a powerful fossil fuel sector, which reduces structural resistance to the emergence of green industries and energy transitions more broadly. Within the business community, there is widespread recognition of a cooperative and constructive relationship with the state.¹⁴ Chilean business groups actively participate in the enactment of positive "GH2 futures" (Ariztía and Undurraga 2025b). Currently, around 50 GH2 projects have been announced, involving a wide range of actors, most of them transnational energy or technology companies such as ENEL, Engie, Siemens, RWE, TEG, and Alfanar (Annex Table 1). In several cases, their engagement is directly linked to Chile's proactive "GH2 diplomacy," illustrating how business support in Chile is not merely market-driven but closely tied to the state's strategic capacity.

Chile is currently implementing two large-scale pilot projects for GH2: one located in the northern mining region of Antofagasta and another in the southern Magallanes region (*Project Hanu Ori*). Especially, the Antofagasta initiative involves Chilean capital and is designed to create synergies with the local mining sector, which is expected to be a key consumer of GH2. In addition, a dynamic sub-sector of renewable energy operators and service providers is emerging as a strategically interested stakeholder group.¹⁵ These actors perceive GH2 as a new business opportunity that could expand their operations.¹⁶

The private sector has also promoted GH2 on its own initiative by establishing "H2 Chile", the Chilean Hydrogen Association. Founded in 2018, even before the launch of the national GH2 strategy, H2Chile brings together companies, universities, and other strategic actors to position Chile as a global leader in GH2, consolidating the industry and influencing public policy processes related to the sector.¹⁷ Business interest has also redounded in the establishment of "H2V Magallanes", a regional association focused specifically on promoting GH2 production in the Magallanes Region. H2 Chile hosts and participates in a wide range of events such as congresses,

¹³ Interview, GH2 expert based in Brazil/Chile, virtual, 03.12.2024; Interview, Chilean Green Hydrogen Committee, virtual, 28.10.2024

¹⁴ Interview, Political Authority, virtual, 30.10.2024.

¹⁵ Interview Former Energy Sector Representative, virtual, 26.6.2025; Interview GH2 economist, virtualm 3.7.2025.

¹⁶ Chile's renewable energy potential exceeds domestic energy demand by a factor of approximately 80, providing the technical foundation for large-scale hydrogen production aimed at export markets (Palma-Behnke et al. 2021).

¹⁷ See <https://h2chile.cl/>

seminars, fairs, and webinars (Table 4), often in collaboration with the state and international partners. These events have played a key role in fostering dialogue among public institutions, private companies, academia, and civil society.

In sum, GH2 development in Chile is advancing through a cooperative dynamic between the state and the private sector. However, given the numerous uncertainties surrounding the technological, economic, and geopolitical dimensions of GH2, it remains unclear whether this collaboration will yield the intended outcomes. In fact, the slow and complex process of establishing GH2 production is beginning to deter private actors. Despite the perception of generally positive state-business relations, private sector representatives report experiencing “participation fatigue”, their frustration with the state’s demands on their time and resources without yielding tangible outcomes.¹⁸ Also, regional stakeholders from investment regions and civil society groups have expressed concerns over externalities of the new mega projects. Thus, a shift toward a more contentious or fragmented model of development may occur.

Peru takes a much more hesitant approach to GH2 development, characterised by lower state capacity and a more reluctant business sector. Within Latin America, Peru is generally considered a weak capacity state, as several general indicators reveal (see Figure 1), and demonstrates low strategic, administrative and regulatory capacity in GH2 development (Table 3). Peru is, above all, an unstable and volatile state. Over the past decade, the country has seen six different governments and several changes in leadership within key ministries. Under these conditions, “state policies” are simply unthinkable. Bureaucratic capacity is among the lowest in the region (Hanson and Sigman 2021). Regarding energy policies, in this unstable political environment, the central government has primarily adhered to the 2014–2025 Energy Plan, drafted under the considerable influence of the gas lobby (see below; Saldarriaga 2022).

Peru’s economic development strategy has traditionally centred on the mining sector, the country’s most important source of export revenue and employment. In this context, energy transitions and the promotion of new decarbonized industrial sectors have not figured prominently in the national development agenda. Crucially, the Peruvian state has shown a longstanding reluctance to allocate public funds to initiatives perceived as uncertain, risky, or long-term in nature, preferring instead to leave economic development in the hands of the private sector. Where engagement does occur, it aims at removing regulatory barriers for private investment, as illustrated by recent developments in the GH2 sector: in 2024, the Peruvian central government supported a privately initiated GH2 and ammonia project in Arequipa,

18 Interview H2 coordinator, Santiago de Chile, 22.11.2024

Table 3: State capacity for advancing the green hydrogen sector in Chile and Peru.

| Dimensions of state capacity | Instruments/Programs | Observable implications for state capacity |
|-------------------------------------|--|---|
| CHILE | | |
| Strategic capacity | <ul style="list-style-type: none"> – Green H2 FUND I – Green credit – Chile green hydrogen facility – International agreements (MoUs and declarations) – Participation in international platforms | Demonstrates high strategic and technical capacity, with strong cross-sectoral planning. Involves multiple levels of government, active international cooperation, and alignment with global actors in the hydrogen value chain through financial mechanisms and diplomacy. |
| Administrative capacity | <ul style="list-style-type: none"> – CORFO funding rounds – Technological program for the use and adoption of green hydrogen – R&D programs and calls – Financing for hydrogen transport and storage infrastructure – Interministerial collaboration agreements | Reflects robust administrative and technical capacity for the design and implementation of targeted financial instruments, enabling coordination across public agencies and private stakeholders to support hydrogen development. |
| Regulatory capacity | <ul style="list-style-type: none"> – National Green Hydrogen Strategy (2020) and Action Plan 2023–2030 (2024) – Financing for hydrogen transport and storage infrastructure | Illustrates emerging regulatory capacity aimed at creating an institutional framework that reduces investment uncertainty, establishes clear incentives, and fosters business compliance with evolving hydrogen market standards. |
| PERU | | |
| Strategic capacity | <ul style="list-style-type: none"> – Participation in international forums (World Hydrogen Summit 2025) – MoU between clean hydrogen action and hydrogen Europe (2025), with potential implications for Peru (declarative) | Reflects mostly symbolic participation, with indirect involvement in multilateral agreements and limited domestic energy diplomacy. Lacks formal commitments or concrete cooperation mechanisms. |
| Administrative capacity | <ul style="list-style-type: none"> – Renewable energy executive board (2024) – Proposed national hydrogen roadmap | Shows nascent administrative capacity that has not yet translated into operational policies. The roadmap was developed by H2 Peru, highlighting the institutional gap within the state to design and implement such strategies. |
| Regulatory capacity | <ul style="list-style-type: none"> – Pilot projects enabled by sectoral approvals (2023–2025) – Green Hydrogen Promotion Law (Law N°31.992/2024) | Reveals fragmented but existing environmental sectoral capacity for inter-institutional management. While the law marks a relevant legal step, it remains unregulated and lacks operational implementation. |

Source: Author's Elaboration based on different secondary sources

Table 4: Green hydrogen events in Chile (2023–2024).

| Year | Number of events | Event details |
|------|------------------|---|
| 2023 | 8 events | <ul style="list-style-type: none"> – Fichtner Forum Hydrogen Chile (Mar 21) – HyVolution Chile (Jun 28) – RENMAD H2 and energy storage (Aug 2) – International Hydrogen Seminar–U. Autónoma Chile (Dec 4) – World Hydrogen Latin America (Dec 12) – Webinars (Oct 23) and technical panel (Oct 26) |
| 2024 | 9 events | <ul style="list-style-type: none"> – 4th Hydrogen Congress for Latin America & the Caribbean: H2LAC 2024 (Jun 5) – Seminar: Green Hydrogen in Chile–Actions to seize the window of opportunity (Aug 8) – Hyvolution Chile 2024 (Sep 3) – 1st and 2nd Socio-environmental forum on green hydrogen in magallanes (Aug 22 and Nov 5) – 2nd Educational green hydrogen fair magallanes (Nov 22) – Webinars (May 29 – 31 and Nov 26) |

valued at approximately USD 11.2 billion, by facilitating fast-track environmental licensing (Salazar 2025).

The lack of a central state agenda for GH2 industrialization, combined with the political instability and weakness of Peru’s institutions, has also significantly hindered international cooperation in the GH2 sector. Notably, GH2 is absent from the agenda of German cooperation in Peru.¹⁹ Reflecting the government’s lack of interest and initiative, Peru has never requested assistance for establishing a GH2 sector and efforts to formalise cooperation by the Chilean GIZ office have not flourished.²⁰ International cooperation representatives also point to the absence of robust technological and research capabilities in Peru as a barrier to collaboration.

Business positioning regarding GH2 development is hesitant and fragmented. Peru’s business sector is divided on the issue. The mining sector expresses interest in incorporating GH2 into its energy matrix, primarily because it would help companies comply with international decarbonisation agreements.²¹ However, in the absence of state incentives, this interest does not extend to a direct engagement with GH2. Most importantly, the country has a very powerful and politically influential gas industry mobilising business power to maintain the status quo. So far, the strong influence of

¹⁹ Interview, GIZ Peru official, virtual, 12.11.24.

²⁰ Interview, GIZ Chile official, virtual, 04.12.24.

²¹ Interview, SNMPE member, Lima, 3.12.24.

gas producers has hindered the development of renewable energies and also prevents a stronger commitment to GH2 (Campodónico and Carrera 2022).

Fossil industries are organised in the Sociedad Nacional de Minería Petróleo y Energía (SNMPE), which maintains direct access to state institutions. Since 2014, the Peruvian government has relied heavily on these firms to shape the sector, granting them substantial influence over the 2014–2025 energy plan, which defined the massification of gas as a political priority. The lobbying efforts of these companies have entrenched the narrative that natural gas should remain the cornerstone of the country's energy policy, thereby impeding efforts to diversify the energy matrix. The gas companies argue that, given Peru's weak state institutions and persistent political instability, prioritizing the consolidation of the gas sector is a safer strategy than committing resources to developing new sectors (Energiminas 2022). However, the gas industry does not entirely reject hydrogen development, which is already being produced in Peru. Yet, they advocate for low-emission, “grey” hydrogen produced with gas, aligning with broader Latin American (Dorn 2024a) and global (Schmidt and Maggiore 2020) fossil sector discourses.

Institutional weakness and volatility strengthen the influence of corporate experts over the Ministry of Energy and Mines' (MEM) energy plans and policies. However, the persistent institutional volatility also somewhat limits businesses' capacity to shape energy policies consistently since state agendas frequently shift in priority and scope with each change of government and rotation of MEM ministers (which also occur frequently during the same government). Thus, while in power, state authorities occasionally support specific initiatives, without transforming the main thrust of sectoral policies, such as the focus on gas in energy policies, which recently happened in GH2 development.

While the Peruvian business community in general remains sceptical of the viability of GH2, aligning with the narrative promoted by the gas lobby, scepticism about GH2 is not shared across the entire business sector. A small group of private entrepreneurs actively advocates for GH2 production in Peru, stressing the country's exceptional natural conditions, the existing local expertise in hydrogen production (in the Cusco region), and the enormous economic potential of the GH2 market.

The business community advocating for the development of GH2 in Peru is centred around the H2 Association, founded in 2021 by entrepreneur Daniel Camac “inspired by Chile”²² and through exchange with the founder of H2 Chile, Hans Kulenkampff (Revista Electricidad 2021). Camac's vision was to replicate the successful H2 Association model established in the neighbouring country. Today, H2 Peru consists of 39 companies with varying interest levels in establishing a GH2 sector. In contrast to the Chilean H2 association, the Peruvian association organises

22 Interview, H2Peru Coordinator, Lima, 27.11.24.

only a few events on its own. On their webpage, they advertise a wide range of events, many of which are not held in Peru and often are not even related to GH2. During 203–2024, only two events specifically focused on GH2 in Peru were announced: the *International Forum H2V Insights Lima* (July 20, 2023) and the webinar *Perspectives on Natural Hydrogen* (April 17, 2024).²³

This private initiative has been pivotal in advancing the GH2 agenda, although much more moderately than in Chile. Their most significant achievement to date has been passing a law to promote the GH2 sector. To accomplish this, the association hired specialized lawyers to draft and revise the legislation while lobbying congressional representatives to secure its presentation and approval in Congress. Despite facing multiple setbacks and requiring amendments, the law was eventually passed. Mirroring the power of the gas lobby, the text defines GH2 as an “energy vector produced with low greenhouse gas emission technologies”, an apparent inconsistency with the global definition of “green” hydrogen (Francovich 2024). The Laws’ regulation is still pending.

The interaction between the central government and the association has been inconsistent, exemplifying the impact of institutional volatility on the sector in construction. The H2 Association occasionally engages with representatives from the MEM. During the association’s inauguration, the Energy Minister attended due to personal relationships with association members, but subsequent government changes reduced this engagement. Now, only second-tier officials occasionally participate in H2Peru initiatives, contrasting sharply with the sustained presence of the fossil lobby in the Energy Ministry.²⁴

Relations between GH2 advocates and the government have been closer at the subnational level, particularly in the Southern region of Arequipa. The region is regarded by Peruvian hydrogen advocates as one of the most promising locations for GH2 development due to its favourable natural conditions. Members of the Peruvian H2 Association have actively promoted the development of a GH2 project in the region, engaging extensively and strategically with the regional business community and the subnational state to build support and momentum (Gobierno de Peru, 2024). Motivated by the pro-hydrogen lobby, the regional government has enthusiastically embraced the initiative.²⁵ It allocated 4,000 ha of land for the development of the projects “La Joya” and “Horizonte de Verano”. Additionally, Arequipa has established an Innovation Management Office focused on hydrogen development, that has elaborated a regional GH2 promotion policy and organises discussion forums.²⁶ As

²³ See <https://h2.pe/>

²⁴ Interview, H2Peru Coordinator, Lima, 12.12.2024.

²⁵ Interview, H2Peru Coordinator, Lima, 27.11.24. Interview, Arequipa Chamber of Industry and Commerce member, virtual, 27.11.2024.

²⁶ Interview, SNMPE member, Lima, 3.12.2024.

mentioned, recently the Production Ministry has also become involved in the projects by facilitating a fast-track process for environmental licensing of the “Horizonte de Verano” project (Salazar 2025).

In sum, Peru has moved from an absence of GH₂ development reflecting the disinterest from both the state and business (non-alignment/non-development) to a business-driven/project-based pathway. Given the announced substantial private investments, the Peruvian government has timidly started to facilitate GH₂ production. If effective, the initiative might scale up from there, probably strongly influenced by the gas lobby.

5 Conclusions

Around 2020, a global momentum emerged around the development of GH₂, driven by a combination of ecological imperatives and economic opportunities. This article focuses on Latin America, considered a global hot spot to produce GH₂ due to its favourable natural conditions. However, among Latin American states, GH₂ ambitions vary considerably.

We investigate the divergent GH₂ ambitions and seek to identify the factors shaping sectoral trajectories. Drawing on a political economy perspective, we develop a theoretical typology that distinguishes four distinct pathways of GH₂ development, based on the interaction between state capacity (high vs. low) and business sector positioning (supportive vs. oppositional). The typology challenges accounts that attribute sectoral development to either state capacity or business engagement in isolation. Instead, it argues that the specific configuration of state-business relations conditions how countries engage in GH₂ development.

The typology outlines four ideal types: (1) cooperative GH₂ development, (2) contentious GH₂ development, (3) business-driven/project-based GH₂ development, and (4) non-alignment/non-GH₂ development. These categories are not intended to be normative or hierarchical; none is inherently superior. While some configurations may provide more favourable conditions for sectoral advancement, they do not guarantee successful or economically viable outcomes. Such outcomes ultimately depend on a broader set of contextual variables, technological, geopolitical, ecological, and social, that lie beyond the explanatory scope of this framework. Indeed, Peru’s more cautious approach may prove reasonable if the global GH₂ market fails to materialize at the anticipated scale. The typology proposed in this article should therefore be understood as a heuristic tool for capturing different pathways of engagement with GH₂, rather than as a predictive model of specific outcomes.

Empirically, this study focuses on Chile and Peru, two countries that possess highly favourable natural conditions for GH₂ production yet exhibit markedly

different levels of ambition in developing the sector. In Chile, substantial efforts to establish a GH2 industry are underpinned by a cooperative relationship between a high-capacity state and a supportive business sector. By contrast, Peru has adopted a more cautious and fragmented approach, shaped by limited state capacity and a largely hesitant business sector, strongly influenced by the entrenched interests of the natural gas industry. In the absence of coherent policy direction, GH2 advocates in Peru have resorted to a project-based strategy, relying on individual initiatives rather than coordinated state-led development.

GH2 development pathways are dynamic and may shift over time, particularly in response to changes in business positioning. In Peru, the initial configuration of state-business non-alignment has evolved into a business-driven, project-based pathway, led by business actors who successfully engaged the regional government. As these initiatives gained traction, the central government began to adopt a more facilitative role. In contrast, Chile's state-led and cooperative approach to GH2 development has faced delays and setbacks. These challenges raise the possibility that the current cooperative configuration between the state and business sector may shift toward a more contentious trajectory.

GH2 development remains a high-risk endeavour, and it is still uncertain whether current efforts to establish the sector will ultimately yield the anticipated benefits. This article argues that state capacity and business positioning are central factors shaping GH2 ambitions. The growing literature has also highlighted the role of external involvement, including extra-state actors such as the German development agency GIZ and bilateral forms of "hydrogen diplomacy" as promoting GH2 ambitions. However, their presence also depends on perceived state capacity and a conducive business environment in the host country, as our analysis shows.

Our article suggests several avenues for future research on GH2 in Latin America and beyond. In Peru, the gas industry is a potent shaper of the country's energy policies, including GH2 development. Scholars should examine more closely the role of fossil fuel industries in influencing the trajectory of GH2 development, whether as obstacles, enablers, or potential partners in sectoral transformation. Additional explanatory variables such as policy and institutional legacies also warrant further exploration. For example, Chile's comparatively rapid progress may be partly attributable to its earlier experience with large-scale transformations in the renewable energy sector.

Another important factor that may shape the development of GH2 sectors is civil society. The establishment of GH2 infrastructure involves substantial local interventions and, as seen in other large-scale projects such as mining and wind energy parks, holds the potential to provoke significant social contestation. These projects frequently encounter resistance driven by redistributive concerns, land-use conflicts, and environmental impacts (e.g., Dorn 2024a, 2024b; Carrasco 2025; Dunlap

2019). To date, however, this factor has remained largely latent. GH2 pilot projects in Chile and Peru have thus far been either small in scale or limited to planning stages, with few observable negative effects. Moreover, public awareness regarding the technical, social, economic, and ecological implications of GH2 remains low. As the sector grows and its impacts become more visible, social contestation is likely to intensify. In such a scenario, civil society mobilization could emerge as a force shaping the sector's future. This projection also underscores the importance of early and sustained engagement with local communities and non-business actors throughout the policy formulation and implementation process. Likewise, it reinforces the broader understanding of strategic state capacity, not only as the ability to coordinate with business actors, but also to anticipate and manage territorial conflicts and social demands.

Despite existing challenges and delays, current trends suggest that GH2 is poised to remain a significant element of future energy and industrial strategies. Whether and how the initial pathways identified in this article continue to shape long-term sectoral dynamics remains another key question for future research.

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References

- Allain, M., and A. Madariaga. 2020. "Understanding Policy Change through Bricolage: The Case of Chile's Renewable Energy Policy." *Governance* 33 (3): 675–92.
- Allan, B., J. I. Lewis, and T. Oatley. 2021. "Green Industrial Policy and the Global Transformation of Climate Politics." *Global Environmental Politics* 21 (4): 1–19.
- Ariztía T., & Undurraga, T. 2025a. "Interrogating Green Hydrogen Roadmaps: Narratives of Imminence and the Anticipation of Asymmetric Energy Futures." *Extractive Industries and Societies* Forthcoming.
- Ariztía, T., and T. Undurraga. 2025b. "Anticipating Green Hydrogen Futures: Exploring the Socio-Material Production of a New Clean Fuel." *Journal of Cultural Economy*: 1–18. <https://doi.org/10.1080/17530350.2025.2485999>.
- Atria, J. 2023. "No Taxation without Efficiency? Elite Perceptions of Redistribution and Progressivity in Chile." *Journal of Latin American Studies* 55 (1): 103–28.
- Baker, L., P. Newell, and J. Phillips. 2014. "The Political Economy of Energy Transitions: The Case of South Africa." *New Political Economy* 19 (6): 791–818.
- Breetz, H., M. Mildenerberger, and L. Stokes. 2018. "The Political Logics of Clean Energy Transitions." *Business and Politics* 20 (4): 492–522.
- Brinks, D. M., S. Levitsky, and M. V. Murillo. 2020. "The Political Origins of Institutional Weakness." In *The Politics of Institutional Weakness in Latin America*, 1–40. Cambridge University Press.

- Busemeyer, M., and K. Thelen. 2020. "Institutional Sources of Business Power." *World Politics* 72 (3): 448–80.
- Campodónico, H., and C. Carrera. 2022. "Energy Transition and Renewable Energies: Challenges for Peru." *Energy Policy* 171 (113261). <https://doi.org/10.1016/j.enpol.2022.113261>.
- Carrasco, S. 2024. "State Capacity for Green Growth: Analyzing Industrial Policy in the Latin American Lithium Triangle." *Competition & Change*.10245294241249202
- Carrasco, S. 2025. *From (De)regulation to Industrialization? Chilean Lithium Policy in Comparative Perspective*. Palgrave.
- Collington, R. 2025. "The Limits to Derisked Decarbonization: State Capacity Unevenness in Domestic Green Transition Strategies." *Review of International Political Economy*: 1–24. <https://doi.org/10.1080/09692290.2025.2505785>.
- Coppedge, M., J. Gerring, C. Knutsen, S. Lindberg, S. Skaaning, J. Teorell, et al. 2025. "V-dem Country-Year Dataset V15." *Varieties of Democracy (V-Dem) Project*. [Data set] <https://doi.org/10.23696/vdemds25>.
- Cruz, O., E. Konstantinou, and J. McArthur. 2023. "Legitimising the Emerging Green Hydrogen Industry: The Case of Chile." In *Complexity and Sustainability in Megaprojects. MERIT 2023 (Lecture Notes in Civil Engineering*, Vol. 493, edited by F. Cantoni, L. Corazza, E. De Nito, P. Di Nauta, and E. Favari. Cham: Springer.
- Day, P. 2024. "Chile Leads Latin American Push to Clean Hydrogen." *Reuters*. <https://www.reuters.com/business/energy/chile-leads-latin-american-push-clean-hydrogen-2024-10-22/>
- Dietz, K. 2022. "Transición energética y extractivismo verde. La transición energética en Europa anuncia el extractivismo verde en América Latina." *Rosa Luxemburg Stiftung* 39. <https://rosalux.org.ec/pdfs/transicion-energetica-y-extractivismo-verde.pdf>.
- Dorn, F. M. 2024a. "Towards a Multi-Color Hydrogen Production Network? Competing Imaginaries of Development in Northern Patagonia, Argentina." *Energy Research & Social Science* 110: 103457.
- Dorn, F. M. 2024b. "¿Descarbonización o despojo? : La economía política de litio e hidrógeno verde en Argentina." *Revista de Ciencias Sociales* 37 (55). <https://doi.org/10.26489/rvs.v37i55.5>.
- Dunlap, A. A. 2019. *Renewing Destruction: Wind Energy Development, Conflict and Resistance in a Latin American Context*. Rowman & Littlefield.
- Energiminas. 2022. Editorial „Hidrocarburos“. Accessed June 2015: https://digital.energiminas.com/edicion/98?utm_source=
- European Union. 2020. *EU Hydrogen Strategy for a Climate-Neutral Europe*. Brussels: EU.
- Evans, P. B. 1995. *Embedded Autonomy: States and Industrial Transformation*. Princeton University Press.
- Fairfield, T. 2015. *Private Wealth and Public Revenue in Latin America: Business Power and Tax Politics*. Cambridge University Press.
- Francovich, G. 2024. "SPR advierte que un error conceptual podría anular el proyecto de ley de hidrogeno en Perú." *Energía Estratégica*. <https://www.energiaestrategica.com/spr-advierte-que-un-error-conceptual-podria-anular-el-proyecto-de-ley-de-hidrogeno-en-peru/>.
- Gabor, D., and N. Sylla. 2023. "Derisking Developmentalism: A Tale of Green Hydrogen." *Development and Change* 54 (5): 1169–96.
- Gobierno de Chile. 2024. *Green Hydrogen Action Plan 2023-2030*. Santiago: Gobierno de Chile. https://energia.gob.cl/sites/default/files/documentos/green-hydrogen_action-plan.pdf.
- Gobierno de Perú. 2024. *Empresarios inspeccionan terreno donde se construirá planta de hidrogeno verde*. Lima: Gobierno de Perú. <https://www.gob.pe/institucion/regionarequipa/noticias/978238-empresarios-inspeccionan-terreno-donde-se-construira-planta-de-hidrogeno-verde>.
- Gómez, J., L. G. Marín, H. K. Morales, A. Llor, V. Hincapié, J. Vuelvas, et al. 2025. "Fueling the Transition: A Comprehensive Analysis of Hydrogen Roadmaps in Chile, Brazil and Colombia." *Renewable and Sustainable Energy Reviews* 222: 115885.

- Gopalakrishnan, T., and J. Miller. 2024. "New Climate Dis-Economies: The Political Economy of Energy Transitions in Fragile Fossil Fuel Producers." *Environment and Security* 2 (3): 348–74.
- Gordon, J. A., N. Balta-Ozkan, and S. A. Nabavi. 2024. "Towards a Unified Theory of Domestic Hydrogen Acceptance: An Integrative, Comparative Review." *International Journal of Hydrogen Energy* 56: 498–524.
- Hanson, J. K., and R. Sigman. 2021. "Leviathan's Latent Dimensions: Measuring State Capacity for Comparative Political Research." *The Journal of Politics* 83 (4): 1495–510.
- Hanusch, F., and M. Schad. 2021. "Hydrogen Research: Technology First, Society Second?." *GAIA - Ecological Perspectives for Science and Society* 30 (2): 82–6.
- Häußermann, J. J., M. J. Maier, T. C. Kirsch, S. Kaiser, and M. Schraudner. 2023. "Social Acceptance of Green Hydrogen in Germany: Building Trust through Responsible Innovation." *Energy Sustainability and Society* 13 (1): 22.
- Hochstetler, K. 2020. *Political Economies of Energy Transition: Wind and Solar Power in Brazil and South Africa*. Cambridge University Press.
- Hochstetler, K., and G. Kostka. 2015. "Wind and Solar Power in Brazil and China: Interests, State–Business Relations, and Policy Outcomes." *Global Environmental Politics* 15 (3): 74–94.
- International Renewable Energy Agency (IRENA). 2020. *Green Hydrogen: A Guide to Policy Making*. Abu Dhabi. IRENA. <https://www.irena.org/publications/2020/Nov/Green-hydrogen>.
- Hydrogen Council and McKinsey & Company. 2024. *Green Hydrogen Insights 2024*. <https://hydrogencouncil.com/en/hydrogen-insights-2024/> (accessed May 2025).
- International Energy Agency (IEA). 2022. *Global Hydrogen Review 2022*. Paris: IEA. <https://www.iea.org/reports/global-hydrogen-review-2022>.
- InvestChile. 2024. "Green Hydrogen in Chile: An Opportunity to the World." *InvestChile*. https://h2news.cl/wp-content/uploads/2024/05/INVEST-CHILE_ebook_hidrogeno-verde_ENG.pdf.
- Kavelage, L., and B. Walker. 2024. "Strategic Coupling beyond Borders: Germany's Extraterritorial Agency in Namibia's Green Hydrogen Industry." *Journal of Economic Geography* 24 (6): 921–41.
- Lebdoui, A. 2024. *Survival of the Greenest: Economic Transformation in a Climate-Conscious World*. Cambridge University Press.
- Lehmann, R., and P. Alarcón. 2023. "'Just Transition' in the Global South: Mission Impossible? the Perils of the Transition in Mexico and Ecuador." *Journal für Entwicklungspolitik* 39 (3): 37–61.
- Madariaga, A. 2020. *Neoliberal Resilience. Lessons in Democracy and Development from Latin America and Eastern Europe*. Princeton University Press.
- Madariaga, A., and M. Rangel-Padilla. 2025. "From Hierarchical Capitalism to Developmental Governance: The Emergence of Concerted Skills Formation in Middle-Income Countries." *Regulation & Governance* 1–20. <https://doi.org/10.1111/rego.70015>.
- Maillet, A., and J. Rozas Bugueño. 2019. "Hibridación de las políticas neoliberales: El caso de la reforma a la política eléctrica en Chile (2014-2016)." *Gestión y Política Pública* 28 (1): 207–35.
- Marca Chile. 2022. "The Six Projects that Will Mark the Launch of Green Hydrogen in Chile." *Marca Chile*. <https://www.marcachile.cl/en/the-six-projects-that-will-mark-the-launch-of-green-hydrogen-in-chile/>.
- Mazzucato, M. 2018. "Mission-Oriented Innovation Policies: Challenges and Opportunities." *Industrial and Corporate Change* 27 (5): 803–15.
- Meckling, J., and J. Nahm. 2022. "Strategic State Capacity: How States Counter Opposition to Climate Policy." *Comparative Political Studies* 55 (3): 493–523.
- Moe, E. 2015. *Renewable Energy Transformation or Fossil Fuels Backlash: Vested Interests in the Political Economy*. Palgrave Macmillan.
- Newell, P. 2021. *Power Shift: The Global Political Economy of Energy Transitions*. Cambridge University Press.

- Odenweller, A. and F. Ueckerdt. 2025. "The Green Hydrogen Ambition and Implementation Gap." *Nature Energy* 10: 110–23.
- Orihuela, J. C. 2014. "Crossing Boundaries to Understand Change: Varieties of Developmental State Structures in Chile and Peru." In *Peru in Theory*, 49–73. Palgrave Macmillan.
- Orihuela, J. C., and S. Serrano. 2024. Rules, Institutions and Policy Capacity: A Comparative Analysis of Lithium-Based Development in Argentina, Bolivia and Chile. *Energy Research & Social Science* 118: 103761.
- Palma-Behnke, R., R. Abarca del Río, C. Agostini, C. Alvear, J. Amaya, P. Araya, et al. 2021. "The Chilean Potential for Exporting Renewable Energy (Mitigation and Energy Working Group Report)." *Comité Científico de Cambio Climático; Ministerio de Ciencia, Tecnología, Conocimiento e Innovación*. Santiago
- Revista Electricidad. 2021. Nace la Asociación Peruana de Hidrogeno: "H2 Chile forma parte de nuestros aliados". <https://www.revistaei.cl/nace-la-asociacion-peruana-de-hidrogeno-h2-chile-forma-parte-de-nuestros-aliados/>.
- Riofrancos, T. 2022. "The Security-Sustainability Nexus: Lithium Onshoring in the Global North." *Global Environmental Politics* 23 (1): 20–41.
- Rodrik, D. 2014. "Green Industrial Policy." *Oxford Review of Economic Policy* 30 (3): 469–91.
- Salazar, E. 2025. "Perú tendrá la planta de hidrógeno verde más grande de Latinoamérica por US\$11.200 millones: EIA-d ya fue aprobado, ¿Dónde queda?." *Info*. <https://www.infobae.com/peru/2025/03/06/peru-tendra-la-planta-de-hidrogeno-verde-mas-grande-de-latinoamerica-por-us11200-millones-eia-d-ya-fue-aprobado-donde-queda/>.
- Saldarriga, J. 2022. "Gas natural: ¿Cuántos años más de producción le quedan realmente a Camisea?." *El Comercio*. <https://elcomercio.pe/economia/dia-1/gas-natural-cuantos-anos-mas-de-produccion-le-quedan-realmente-a-camisea-noticia/>.
- Schmidt, N., and M. Maggiore. 2020. "Loopholes and Lobbies: An Explainer of the European Commission's Hydrogen Strategy." *Investigate Europe*. <https://www.investigate-europe.eu/de/posts/hydrogen-strategy-explainer-de>.
- Schneider, B. R. 2013. *Hierarchical Capitalism in Latin America*. Cambridge University Press.
- Scholvin, S. 2024. "Green Hydrogen and Linkage-Based Development in Antofagasta, Chile." *Local Economy* 38 (5): 506–17.
- Singh, M. K. 2023. "What Is State Capacity and How Does it Matter for Energy Transition?." *Energy Policy* 183: 113799.
- Skocpol, T. 1985. "Bringing the State Back in: Strategies of Analysis in Current Research." In *Bringing the State Back in*, edited by P. Evans, D. Rueschemeyer, and T. Skocpol, 3–43. Cambridge: Cambridge University Press.
- Soifer, H. D. 2012. "Measuring State Capacity in Contemporary Latin America." *Revista de Ciencia Política* 32 (3): 585–98.
- Sovacool, B., M. Martiskainen, A. Hook, and L. Baker. 2019. "Decarbonization and its Discontents: A Critical Energy Justice Perspective on Four Low-Carbon Transitions." *Climatic Change* 155: 581–619.
- Ulloa, A. 2023. "Aesthetics of Green Dispossession: From Coal to Wind Extraction in La Guajira, Colombia." *Journal of Political Ecology* 30 (1): 743–64.
- Vallejos-Romero, A., M. Cordoves-Sánchez, C. Cisternas, F. Sáez-Ardura, I. Rodríguez, A. Aledo, et al. 2022. "Green Hydrogen and Social Sciences: Issues, Problems, and Future Challenges." *Sustainability* 15 (1): 303.
- Van de Graaf, T., I. Overland, D. Scholten, and K. Westphal. 2020. "The New Oil? the Geopolitics and International Governance of Hydrogen." *Energy Research & Social Science* 70: 101667.
- Wood, G., J. J. Finnegan, M. L. Allen, M. M. Allen, D. Cumming, S. Johan, et al. 2020. The Comparative Institutional Analysis of Energy Transitions. *Socio-Economic Review* 18 (1): 257–94.

Zhu, Kayla. 2024. "Mapped: Global Hydrogen Production by Region." In *Visual Capitalist*. *Visual Capitalist*. Last seen <https://www.visualcapitalist.com/mapped-global-hydrogen-production-by-region/> (May 19, 2025).

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