Project Information Document (PID)

Concept Stage | Date Prepared/Updated: 23-Dec-2021 | Report No: PIDC32589

BASIC INFORMATION

A. Basic Project Data

Country	Project ID	Parent Project ID (if any)	Project Name
Chile	P177533		Chile Green Hydrogen Facility to Support a Green, Resilient and Inclusive Economic Development (P177533)
Region	**Estimated Appraisal Date**	**Estimated Board Date**	**Practice Area (Lead)**
LATIN AMERICA AND CARIBBEAN	Feb 14, 2022	Apr 28, 2022	Energy & Extractives
Financing Instrument	**Borrower(s)**	**Implementing Agency**	
Investment Project Financing	Ministerio de Hacienda	Corporación de Fomento de la Producción - CORFO	

Proposed Development Objective(s)

The Project Development Objective (PDO) is to accelerate the development of green hydrogen production, mobilize commercial finance, and contribute to strengthening the enabling environment for building local capacity on green hydrogen in Chile.

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	115.00
Total Financing	115.00
of which IBRD/IDA	100.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	100.00

Non-World Bank Group Financing

Counterpart Funding	15.00

Borrower/Recipient	15.00

Environmental and Social Risk Classification	Concept Review Decision
Substantial	Track II-The review did authorize the preparation to continue

Other Decision (as needed)

B. Introduction and Context

Country Context

1. **Chile stands out as a Latin American country with strong institutions and a history of an investor-friendly environment.** Chile's market-oriented reforms paired with social policies have spurred economic growth and significantly reduced poverty in the country. Chile's extreme poverty rate (measured by the share of the population living on less than US$1.90 a day) plummeted from 45 percent in the 1980s to 8.6 percent in 2017,[1] becoming one of the lowest in the Latin American region. However, Chile remains one of the most unequal countries among member countries of the Organization for Economic Co-operation and Development (OECD), with an income gap 65 percent wider than the average.[2] While Chile is well known as one of the most prosperous countries in Latin America, it has a 2019 Inequality-adjusted Human Development Index (IHDI)[3] of 0.709, compared with 0.729 and 0.712 for neighboring Argentina and Uruguay, respectively.

2. **Chile is confronting fundamental challenges regarding its social contract and economic model, in the wake of ongoing social unrest and the pandemic**. Despite sustained economic progress and poverty reduction over the last few decades, the existing policy framework has been insufficient to foster productivity growth and economic diversification, improve labor market outcomes, and tackle deep-rooted inequality. The 2019-20 social unrest exposed the vulnerability of the socio-economic system, with protesters demanding several changes to the country's political and social direction. Since May 2021, a Constitutional Convention has been tasked with drafting the country's new constitution in an attempt to meet demands triggered by the social protests. Constituents will present a new draft constitution for approval by plebiscite to be held no later than August 2022. In the recent elections held in December 2021, Mr. Gabriel Boric was elected president, who is supportive of a tax and pension reform, rights of women and micro-SMEs, access to healthcare, and a green and sustainable recovery to reach a more equal country.

3. **Following a deep recession in 2020, GDP recovered strongly in the first half of 2021 and economic activity is already above pre-pandemic levels, although still facing important employment and social challenges.** Growth is expected to decelerate in 2022 due to the negative impact of the fading of emergency measures and political uncertainty on investment. Fiscal deficit remained above 7 percent of GDP in the first half of 2021 due to high public spending and

[1] World Bank Group, *The Republic of Chile—Systematic Country Diagnostic June 2017* (Washington, DC: World Bank, 2017); and World Bank Group's World Development Indicators database.
[2] OECD, *Economic Survey of Chile, 2021* (Paris: OECD, 2021).[3] According to the UNDP 2019 Human Development Report.
[3] According to the UNDP 2019 Human Development Report.

is projected to reach 8 percent of GDP in 2021. Although the authorities tapped heavily into saving funds, public debt will increase above 36 percent of GDP, up 8 percentage points over 2019 levels. Growth was propelled by consumption, massive fiscal transfers, and pension fund withdrawals. However, labor market recovery has lagged, resulting in unemployment levels not seen since the 2008 global financial crisis.

4. **Chile has committed to reaching carbon neutrality by 2050 and developed a vision of greening its economy as an engine of growth and competitiveness.** Chile has been increasingly exposed to the impacts of climate change and experienced higher climate vulnerability**.** Chile has updated its Nationally Determined Contributions (NDCs) where it established an emission maximum of 95 MtCO2eq by 2030[4] and has committed to reaching carbon neutrality by 2050, also presenting a clear roadmap for the decarbonization of specific sectors.[5] In terms of mitigation, the roadmap established that by: (i) 2030 renewable sources will account for 80 percent of power generation and will achieve complete zero emission vehicle fleet in mining hauling trucks (i.e. *Camión de Extracción,* CAEX trucks); (ii) 2040 green hydrogen would account for 20 percent of the country's fuel matrix, and achieve a complete net-zero public transport sector; and (iii) 2050, the strategy sets out that Chile's energy matrix will be 100 percent zero emissions and that emissions from industry and mining will be cut by 70 percent.[6] These commitments will require a set of interrelated actions and significant green investment and financing. Although the upcoming elections will influence investment policy, the prospective programs presented by presidential candidates are strongly considering sustainable investments and efforts towards decarbonizing the sector.[7]

Sectoral and Institutional Context

5. **The Ministry of Energy (MoE) is highly committed to promoting enabling policies for decarbonizing the energy sector in support of the climate change agenda, while also maintaining energy security and affordability.** Chile is heavily dependent on imported fossil fuels, which account for 65 percent of total primary energy supply (PES) and generate 77 percent of greenhouse gas (GHG) emissions. Electricity generation still relies heavily on coal and gas, which amount to 55 percent of generation, and with the prolonged drought affecting the country, the availability of hydroelectricity is continuously at risk. Chile has experienced a strong development of non-conventional renewable energy[8] (NCRE) with an installed capacity of 8,360 MW that accounts for 21 percent of generation. The Ministry of Energy has committed to increasing renewable generation by 80 percent by 2030 and, together with the private sector, committed to the phasing-out of all coal-fired plants by 2040. Furthermore, the MoE together with the Ministry of Environment have spearheaded efforts to implement carbon pricing instruments to provide the incentives for a cleaner energy sector through improvements to the existing carbon tax, and assessing the incorporation of other complementary mechanisms that can promote a level a playing field for innovative low-carbon technologies.

6. **Cognizant of the need to decarbonize other harder-to-abate sectors, Chile has identified a key role for green hydrogen (GH), which could reduce 21 percent of the greenhouse gas (GHG) emission by 2050.**[9] GH is produced from electrolyzers that use renewable energy to separate water into oxygen and hydrogen. It is an energy vector that can be used directly or in any of its derivatives (such as green ammonia for feedstock, green methane for clean fuels) to replace fossil fuels and thus reduce GHG emissions in hard-to-abate sectors. The versatility of GH makes it an important element to decarbonize those sectors where electrification cannot produce the high temperatures needed for manufacturing or

[4] https://www.ndcs.undp.org/content/ndc-support-programme/en/home/our-work/geographic/latin-america-and-caribbean/Chile.html
[5] https://unfccc.int/sites/default/files/resource/CHL_LTS_2021.pdf
[6] https://cop25.mma.gob.cl/en/chile-delivers-long-term-climate-strategy-to-the-executive-secretary-of-un-climate-change/
[7] http://www.derecho.uchile.cl/centro-de-derecho-ambiental/columnas-de-opinion/cdaenlosmedios-v-duran-y-compromisos-de-candidatos-presidenciales
[8] NCRE includes solar, wind, biomass, geothermal and small-scale hydroelectricity (up to 20 MW).
[9] MoE: http://www.precioalcarbonochile.cl/wp-content/uploads/2020/10/Informe-Resumen-CN-2019.pdf

chemical processes. GH could help reduce 21 percent of national emission with the highest potential for demand being heavy industries, such as mining, refineries, and long-haul transport. Moreover, GH can also help integrate higher shares of renewable energy, tackling their intermittency and avoiding curtailment, by providing longer-duration energy storage and a better balancing of the power grid.

7. **The MoE launched an ambitious National Green Hydrogen Strategy (NGHS),[10] with the aim of becoming a global leader in its production by leveraging the abundance and low cost of renewable energy as a key component of GH production.** The main objectives of the NGHS include: (i) reaching 5GW of electrolysis capacity under construction by 2025; (ii) producing the cheapest hydrogen globally by 2030; and (iii) being among the top three global hydrogen exporters by 2040. Key sectors identified by the NGHS to develop green hydrogen demand are in oil refineries and chemical industries (including ammonia and methanol), mining haul trucks (*Camión de Extracción, CAEX*), heavy-duty trucking and long-range buses, and blending into natural gas pipelines. According to the NGHS the development of a GH industry could lead to US$200 billion private investment opportunities and exports of about US$30 billion, representing 10 percent of GDP by 2050.

8. **Chile's unparalleled renewable resources in the Atacama and Patagonia regions supports the NGHS, which forecasts the country as the lowest cost place to produce green hydrogen globally by 2030.** The country has a large potential to produce green hydrogen at competitive prices due to its highly favorable renewable energy resources with high-capacity factors. The most recent electricity bid saw record low prices for solar generation of US$13.32/MWh, and the country has renewable sources capacity of 70 times its current demand, which can translate into low production costs for green hydrogen, even considering transportation costs to overseas off-takers. Moreover, the estimated low costs of green hydrogen production make Chile competitive compared with other producers closer to the import markets, as exporting hydrogen as green methanol to Germany or Japan has a shipping cost that are estimated to be about 5 percent of the total cost and less than 6 percent in the case of exports of hydrogen through ammonia.

9. **The development of green hydrogen could contribute to the creation of green value chains for local and international markets, allowing Chile to maintain its competitive advantages on the export commodity market.** The introduction of green hydrogen in Chile can help the country enter a new commodity market with strong export potential, and decarbonize its existing exports. In addition, it is an opportunity to foster a just transition in the context of absorption of fossil related jobs such as the planned closure of coal-fired thermal plants, and providing new labour opportunities into the green hydrogen industry. Moreover, the development of green hydrogen and its derivatives can help decarbonize key industries and their value chains to help the country maintain its competitive edge in key productive areas such as low-emission copper, iron, ammonia, fertilizers or cement, which are consumed domestically and traded internationally.[11]

10. **To support the NGHS, the MoE is leading regulatory work to help mobilize demand for GH and the World Bank (WB) is providing technical assistance to help strengthen the regulatory framework.** In Chile, the current regulatory framework already includes changes so that hydrogen can be used as a fuel, as well as norms and regulations for the safe use of hydrogen, including its management, storage, production and transportation. In addition, the MoE is implementing a Regulatory Action Plan that recognizes green hydrogen and its energy carrier derivatives as a source of energy.[12] This allows the MoE to drafting norms to: (i) allow blending green hydrogen into natural gas pipelines;[13] and (ii) set guidelines on installing or refurbishing infrastructure to produce, store, transport and use green hydrogen 2024.[14] The WB is supporting the MoE's regulatory efforts through technical assistance (TA) in the following areas: (i) key

[10] https://energia.gob.cl/sites/default/files/national_green_hydrogen_strategy_-_chile.pdf
[11] https://chile.gob.cl/francia/asuntos-comerciales/oficina-comercial/exportaciones-importaciones
[12] Law 21305 (2021) Article 3: https://www.bcn.cl/leychile/navegar?idNorma=1155887&idParte=10204488&idVersion=2021-02-13
[13] Expected to be effective in 2023.
[14] Expected to be effective in 2024.

elements for the development of green hydrogen certification;[15] (ii) an assessment of the alternative uses of green hydrogen in the fuel sector and isolated electricity grids; (iii) the design of economic instruments to promote decarbonization and the use of green hydrogen; and (iv) an assessment of green hydrogen use in mining operations and related safety issues.

11. **Currently, Chile has preliminary identified 36 pilot projects in different stages of development and covering different parts of the green hydrogen value chain.** Most of these projects are at a very early stage;[16] with one project expected to be operational in 2022 and four projects aiming to initiate operations by 2025. Sponsors are mainly international companies in the energy field that have created consortiums to participate in the green hydrogen industry. Some of the main international players involved in the development of these pilot projects include Engie, Enel, Siemens, Hydrogene de France, Mitsui, Ballard, Enaex, and AES. The IFC is also evaluating the possibility of providing financial support to specific pilot projects to produce green hydrogen in the country. For Chile to realise its ambitious GH strategy, it is imperative to reach green hydrogen production costs lower than 1.6 USD/kg to compensate for higher transportation costs to supply European, Asian or US markets. The faster it can reach these lower costs of production, the earlier it can enter international markets to further scale up production.

12. **In order to reach the economies of scale needed to establish a competitive GH price, Chile must accelerate the transition from the pilot projects stage to the industrial phase and address risks perceived by developers, financial institutions and other stakeholders.** A robust market sounding done by the WB identified main challenges perceived by developers, financial institutions and other stakeholders when developing green hydrogen projects in Chile: The main challenges identified are the: (i) high cost of electrolyzers; (ii) relative uncertainty regarding technical performance of the production of green hydrogen and/or its derivatives due to limited track record of the technology; (iii) novelty of the industry due to limited track record of large-scale projects; (iv) high cost of transportation infrastructure & logistics; (v) scarcity of specialized personnel & cost of international experts.

13. **A Green Hydrogen Facility (GHF) can help mitigate the risks perceived by private developers and financiers and thereby accelerate the transition from pilot projects to industrial scale.** Despite the comparative advantages of Chile, which are evident throughout the hydrogen value chain, and the fact that private developers are already actively considering opportunities to invest in the sector, a key challenge is to lower the capital costs and increase the efficiency gains needed to scale-up the industry. A GHF can enable the development of green hydrogen projects by: (i) providing catalytic capital; (ii) acting as an anchor investor; (iii) supporting the construction of an initial portfolio; (iv) supporting the country's enabling environment. In addition, by facilitating the deployment of green hydrogen projects in Chile, the GHF can help create a track record for these projects and thus reduce the risk perception from commercial financers, thus helping accelerate the country's transition from pilots to industrial scale.

14. **There is a strong institutional support from key government agencies to advance the green hydrogen industry and to help secure market conditions that enable private investments.** Key sector entities are committed to advancing the green hydrogen industry as a key State policy that will generate major economic, social and environmental impacts in the country, including among other, the MoE, Ministry of Finance (MoH), Ministry of Foreign Affairs, Ministry of Environment, National Energy Commission (CNE), Superintendency of Electricity and Fuels (SEC), National Petroleum Company (ENAP), and the Economic Development Agency (CORFO).

15. **Chile's incipient green hydrogen industry and innovative financing mechanisms to support economy-wide decarbonization will generate institutional capacities that can be shared and replicated with other countries, thereby creating a valuable global public good.** The consumption of green hydrogen and its derivatives includes various uses that can impact different sectors of the economy (e.g., in the transport, mining, industrial, energy and agro-industrial sectors) and help decarbonize global value chains. Development of local capacities will be critical for Chile to train people

[15] https://www.bancomundial.org/es/events/2021/05/25/webinar-construyendo-un-esquema-de-certificaci-n-en-hidr-geno-verde-para-chile
[16] Thirty-two projects are pilots, four projects aim to achieve commercial scale, and one is at a bankable stage.

that will be able to operate and maintain production plants, storage facilities and transport infrastructure for green hydrogen and its derivates. Building the institutional capacity of government agencies, academic and technical education centers, project developers, financiers and off-takers to design, finance, monitor and operate these investments will be critical for the development of the industry, can serve as an important reference for other countries, and can also provide global services. In addition, developing a green hydrogen industry in Chile countries to generate global public goods, offer multiple opportunities for lessons learned and replicability.

Relationship to CPF

16. **The Systematic Country Diagnostic (SCD) 2017 is the guiding document for development in Chile while a new Country Partnership Framework (CPF) for FY23-26 is being prepared.** Chile has an intensive knowledge program that is guided and oriented by the Graduation Discussion Income (GDI) criteria. Policy notes were prepared to inform the upcoming constitutional assembly as well as new regional governors and presidential candidates. Discussions with the incoming administration are expected to be informed by these notes, the Systematic Country Diagnostic (SCD 2017) and the upcoming Chile Country Partnership Framework FY23-FY26 (P500085). Despite the current Gross National Income (GNI) per capita level for Chile, which exceeds the WB Graduation Discussion Income (GDI), the discussion about IBRD graduation has been postponed due to the COVID-19 health emergency. In addition, Chile has served as a laboratory for testing successful public policies as response to many of the development challenges facing the WB's client countries globally.

17. **The proposed Project is well aligned with the SCD's priority areas related to "enhance the conditions to boost productivity growth: innovation, diversification and energy" and to "strengthening management of environmental resources and climate change adaptation."**[17] Under the priority area "Enhance the conditions to boost productivity growth: innovation, diversification and energy" the Project will contribute to meeting the goal of "Promoting export diversification" by supporting the export of green hydrogen, its derivatives and lower-carbon commodities (such as a green value chain for low-carbon copper) and by helping improve human capital and technological innovation. It will also contribute to the priority 'Continue strengthening, modernizing and improving the energy sector' by the development of a new innovative energy vector and industry, enhancing and supporting the continued expansion of renewable energy deployment. Finally, under the SCD's priority area "Strengthen management of environmental resources and climate change adaptation", the Project will contribute to advancing mitigation actions by using green hydrogen and its derivatives to decarbonize the country's industry and energy matrix, while also contributing to the creation of green and better-quality jobs in a decentralized and inclusive context, thus supporting a just energy transition. In addition, the Project is also aligned with the country's updated NDC and its commitment to reach carbon neutrality by 2050, as well as its Long-term Climate Strategy with a clear role for green hydrogen in the decarbonization of certain hard-to-abate sectors, such as the industrial and mining sector and heavy transport, where it could mitigate 21 percent of national GHG emissions.

18. **In addition, the proposed Project is aligned with the Country Private Sector Diagnosis (CPSD) as it focuses on the potential of Chile to enable private sector participation in the demand side of the green hydrogen industry.** The joint IBRD-IFC CPSD identified green hydrogen as a source of future growth opportunity in Chile, and has been identified as a priority area given its potential for private sector development and decarbonization. In addition, the Project is in line with the private capital mobilization (PCM) approach, as it aims to address binding constraints to leverage private sector financing to a nascent industry.

19. **The proposed Project is aligned with the WB's priorities stated in the 'Green, Resilient and Inclusive Development (GRID)' approach** as it: (i) leverages the new green hydrogen technology to decarbonize Chile's economy;

[17] https://openknowledge.worldbank.org/bitstream/handle/10986/27150/107903-SCD-PUBLIC-SecM2017-0182.pdf?sequence=1&isAllowed=y

(ii) boosts private sector solutions that advance the county's energy transition; (iii) builds technical capacities for adopting advanced clean energy technologies, such as modern and reliable power storage systems; (iv) executes plans that account for clean energy scenarios, contribute to decarbonization pathways, and expand access to cost-effective energy sources in poor and marginal communities.[18]

C. Proposed Development Objective(s)

20. The Project Development Objective (PDO) is to accelerate the development of green hydrogen production, mobilize commercial finance, and contribute to strengthening the enabling environment for building local capacity on green hydrogen in Chile.

Key Results (From PCN)

21. The proposed PDO-level indicators are as follows:

- Installed electrolyzer capacity (MW);
- Commercial finance mobilized for green hydrogen projects and its derivates (US$);
- Capacity building and technology transfer to regions (number of specialists trained);
- Net greenhouse gas (GHG) emissions reduction (tons of carbon dioxide equivalent avoided per year).

D. Concept Description

22. **The proposed Project will support the early deployment of green hydrogen supply investments in Chile through the creation of a Green Hydrogen Facility (GHF) and supporting the enabling environment for green hydrogen development.** The Project would comprise a US$100 million IBRD loan to be channelled through the Economic Development Agency (Corporación de Fomento de la Producción, CORFO), where the GHF would be established as the wholesale financial institution providing partial financing to retail financial intermediaries who would blend their commercial financing to achieve a lower cost for green hydrogen production. The proposed GHF will focus on the development of green hydrogen projects in Chile that have the highest potential to generate an impact on the industry during its implementation period (2022-2027). It will do so by: (i) providing catalytic capital; (ii) acting as an anchor investor and supporting construction of an initial portfolio; and (iii) supporting the country's enabling environment for green hydrogen development.

23. **Component 1: Risk-mitigation facility (estimated US$ 95 million IBRD; US$15 million GoCl).** The component will mitigate the financial and early-stage constraints currently faced by potential green hydrogen commercial projects. To achieve this, the GHF would provide partial funding at WB's concessional terms to retail financial intermediaries which will complement with their commercial finance to provide blended finance to individual subprojects with the aim to lower the levelized cost of green hydrogen production costs. The GHF would provide funding for:

- *Up to 25% of the investment costs of electrolysis equipment*, with investment instruments having a duration of 10 years, with 2 optional one-year extensions. This will mitigate the current high cost of critical hydrogen production equipment (electrolyzers), which increases overall costs and thus the final cost of GH. The remaining balance of subproject debt would be provided by retail FIs on commercial terms to get a more concessional blended finance.
- *A Liquidity Reserve Account (LRA)* intended to cover unexpected or untimely cash needs. The LRA is intended to mitigate uncertainty regarding the technical underperformance of green hydrogen plants due to its limited track record, is expected to lower the cost of performance guarantees provided by EPC companies and would

[18] https://openknowledge.worldbank.org/bitstream/handle/10986/36322/Green-Resilient-and-Inclusive-Development.pdf?sequence=1&isAllowed=y

thus help reduce the total project cost. The LRA amount would be established for a percentage of expected revenues (to be defined with the government) for the first initial 2 to 3 years of project operation.

- *A Debt Service Reserve Account (DSRA)* to mitigate risk perception by commercial lenders. This will mitigate the potential high-risk perception by lenders due to the uncertainty related to the technology, including off-taker risks. The DRSA would cover a period of 6 to 9 months as commonly used in project finance.

24. **Component 2: Capacity building (estimated US$ 5 million IBRD).** This component will finance capacity building to support the development of highly specialized professional and technical skills required for the green hydrogen plants and overall industry. Lack of locally-available medium and highly-specialized capacity needed for the installation, operation and maintenance of green hydrogen projects results in higher project costs, increased risks of project delays, and low quality of final projects. The TA component will support institutional and industrial capacity building, including inter alia: through local universities and/or technical institutions to develop or support educational programs specifically intended for this purpose, including in the context of the just transition and reskilling of former coal energy industry workers. This component could potentially support a certification program to be implemented by the government. These will be essential to accelerate domestic market penetration and to achieve a wide economic impact. The component would also support closing gaps identified during Project preparation related to the strengthening of the implementing agency, including its technical capacities for preparation of project pipeline, project assessment and monitoring, and for environmental and social capacities to ensure compliance with WB policies and standards.

25. **The proposed Project is expected to finance an estimated 210 MW electrolyzer capacity and help achieve a lower price of final product**. The GHF will support subprojects ranging from about 10MW to about 100MW for the production of green hydrogen towards: (i) exporting green ammonia and green methanol; (ii) replacing fossil fuels in industrial processes (i.e., in mining and cement production); (iii) powering fuel cells in the CAEX mining trucks to replace fossil fuels; and (iv) electricity storage in isolated electricity systems. The Project would finance a share of the electrolyzers cost including replacement of electrolyzer's stack, desalinated water, associated cooling equipment and circuits. The GHF would issue calls for proposals and select subprojects based on, inter alia, the following criteria: technical adequacy of the proposal and nominal electrolyzer capacity (MW); developers' technical experience, in particular with renewable energy; robustness of the financial proposal and efficiency of contribution requested for the subproject. It will also provide risk mitigation instruments.

26. **By mitigating the financial and early-stage constraints faced by supply side green hydrogen subprojects, the Project will help avoid transferring early technology costs to the end-user, lower the levelized cost of hydrogen and allow for a faster market entrance.** This is expected to enable faster adoption of the technology, support a steady increase in green hydrogen supply, generate economies of scale and promote the reduction of electrolyzer costs, engineering, procurement and construction (EPC) contracts, and operation and maintenance (O&M) costs that can have a major impact in the final levelized cost per kg. of green hydrogen produced. The lower cost of GH is expected to facilitate the country to become an early GH exporter and secure international markets, while also helping to develop the domestic market. In addition, the development of a GH industry in Chile will generate institutional capacities, technical knowledge, a financing and operational mechanism that can be shared and replicated with other countries, in the LAC region and globally, thereby creating a valuable public good towards achieving carbon neutrality. The Project is highly relevant to unlock private sector financing in GH subprojects and to develop a track record for the GH subprojects, which is a critical element to help develop this nascent industry.

27. **Private capital mobilization.** A first assessment on potential for mobilizing private sector financing indicates that it could leverage about US$250 million. The Project will deploy blended finance mechanisms to attract private investors by mitigating perceived risks and reduce market uncertainty. The GHF can catalyze and unlock the implementing agency's capacity to crowd-in private capital, which will be essential to develop the pipeline of GH

projects. Therefore, the GHF has the potential to leverage funds from private institutions that have experience in financing new technologies and have expressed their interest to invest in GH projects.[19] [20] [21]

28. **Climate change co-benefits and screening for climate and disaster risks**. The Project aims to support the development of green hydrogen production and thus help decarbonize the economy in Chile, in particular in hard-to-abate sectors such as the industrial and transport sectors. It is anticipated to have significant climate change co-benefits. The task team will work with the Climate Change Task Force to maximize these anticipated co-benefits. The Project has also been screened using the "Climate and Disaster Risk Screening Tool" and the risk to the Project is classified as moderate. This will be further confirmed during project preparation.

29. **Gender and citizen engagement considerations**. The Project aims to expand Chile's local capacities in the green hydrogen industry by supporting the development of professional and highly-specialized technical skills in this new sector (under Component 2), while simultaneously increasing women's participation in the sector. The Project would support educational programs focused on building capacity in the green hydrogen industry. The Project will track the number of male and female students successfully completing project-supported programs (receiving a certificate) as part of activities under Component 2.

30. The team will work with the Citizen Engagement team to explore the highest-potential opportunities for engaging citizens in the project. The Project will incorporate into its design best practice from other energy operations (including in terms of specified indicators), and from previous experiences of the WB and MoE in Chile. In particular, the project will ensure that the stakeholder engagement and consultations activities and the Grievance Redress Mechanisms described in the Stakeholder Engagement Plan (SEP) allow for adequate feedback loops between citizens, workers, and government, both during sub-project preparation and implementation to ensure that citizen voices are considered, including disadvantaged and vulnerable people.

Legal Operational Policies	Triggered?
Projects on International Waterways OP 7.50	TBD
Projects in Disputed Areas OP 7.60	No

Summary of Screening of Environmental and Social Risks and Impacts

31. **The combined Environmental and Social Risk is rated as Substantial (Environmental risk is rated Substantial and Social risk is rated Substantial).** Based on the information available at the Concept stage, the environmental and social risk classification is Substantial under the Environmental and Social Framework (ESF)[22]. Classification is based on the following considerations: (i) The wide range of expected environmental, social, health, and safety (ESHS) risks and adverse impacts, considering that the scope of eligible FI subprojects could involve one or more stages of the GH value chain and the vast array of end-use sectors that could be targeted. Types, scope, components, and technology of the FI subprojects to be financed and the final uses of the produced GH and/or its derivatives will be only known during project

[19] https://www.brookfield.com/insights/making-leap-clean-energy-and-net-zero
[20] https://www.blackrock.com/corporate/newsroom/press-releases/article/corporate-one/press-releases/blackrock-foundation-grants-100m-to-breakthrough-energy
[21] https://www.ircp.com/news/end-year-letter-infrareds-chief-executive-werner-von-guionneau/
[22] The proposed E&S risk classification will be revisited, and if necessary updated, during the project preparation phase, as more information becomes available.

execution; (ii) The potential E&S sensitivity of the specific locations for these FI subprojects, considering that the FI subprojects could be implemented anywhere in the country and that at the moment these locations are unknown; iii) The expected complex interinstitutional arrangements necessary to ensure appropriate management, monitoring, and oversight of the environmental, social, health, and safety (ESHS) aspects of the FI subprojects; and (iv) The novelty of the GH industry in Chile, which is accentuated when considering large-scale projects.

32. Relevant positive environmental impacts (benefits) are also expected, as long-term outcomes associated with the operation include, among others, climate change mitigation and cleaner air.

33. The proposed social risk classification will be revisited during due diligence, and if necessary updated, as more information becomes available.

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