REVISED STAP SCREENING TEMPLATE

GEF ID	**11065**
Project title	**Chile Green Hydrogen Facility Project**
Date of screen	**13 June 2023**
STAP Panel Member	**Ngonidzashe Chirinda**
STAP Secretariat	**Sunday Leonard**

1. Summary of STAP's views of the project

This project aims to support the development of the green hydrogen industry in Chile. The project proponent seeks to use the requested funding to develop risk-mitigating instruments. Specifically, the project resources will be used to provide risk-sharing reserve accounts to boost confidence in lenders and catalyze investment of additional resources. The proponents assume that the project resources will support lower-cost debts from commercial banks that will facilitate scaling up the clean hydrogen technology. Moreover, the requested resources are expected to alleviate pressure on other resources acquired for the Chile Green Hydrogen Facility. The overall project has two components: provision of green hydrogen investment sub-loans and *risk-mitigation instruments* and supporting capacity building and project management.

The proposal is well-prepared, although the needed project information is provided across various documents instead of all in the GEF template, making it more challenging to review. The results chain presents how the project would achieve its objectives, including the causal pathways and assumptions. The greenhouse gas emissions reduction GEB expected from the project and the assumptions and basis behind the estimate were well presented.

The project is innovative, and the proponents expect the attractiveness of hydrogen as a green energy source to attract additional resources from the private sector. It is unambiguous that through their focus on financial innovation, the project proponents understand the high initial investment costs of green hydrogen production and its attractiveness to investors due to the potentially high returns.

The proposal will benefit from considering the different ways the future could play out under different drivers of change outside the project's control, such as climate change, price of renewables, demand and markets for renewables, and investors' continued interest. Also, the assumption in the results chain must be strengthened to acknowledge the challenges and uncertainties associated with this type of project or technology.

STAP's assessment*

- ✓ **Concur - STAP acknowledges that the concept has scientific and technical merit.**
  Minor - STAP has identified some scientific and technical points to be addressed in project design
  Major - STAP has identified significant concerns to be addressed in project design

Please contact the STAP Secretariat if you would like to discuss.

2. Project rationale, and project description – are they sound?

The proposal focuses on establishing risk-mitigation instruments for the high-risk yet potentially high-return green hydrogen value chain. The project ideas, objectives, justification, and components are well explained, although this information is scattered across several documents. It would have been better to provide all the information in our place using the GEF PIF template.

The project will build on other prior investments and complement current activities funded through IBRD. The green hydrogen facility represents the first-of-its-kind facility for green hydrogen financing. Hence this project will demonstrate the chosen approach's viability (and potential scalability and replicability). While the project is aligned with current government policy, there is a need to map policy gaps and coherence during project implementation.

The financial investment challenges are clearly explained. The GEF funds will leverage actions in a larger project that includes components aimed at (1) accelerating the development of green hydrogen production and mobilizing commercial finance and (2) contributing to capacity building and strengthening along the hydrogen value chain. While the GEF funding will be used for part of component 1, these two components are aligned and are expected to be synergistic during project implementation.

The baseline case was defined as grey hydrogen production in Chile. The project seeks to displace existing grey hydrogen production partially. The assumption is that without this project, investors will not invest in green hydrogen, making it challenging to scale green hydrogen production.

Aligned with the national objective to achieve carbon neutrality by 2050, the proponents assume that green hydrogen will result in a 21% GHG emission reduction by 2050 with appropriate investments and scaling of actions. However, using GEF resources for financial risk mitigation to reduce investors' risk is an acknowledgment of uncertainties linked to limited investments. There is a need to reflect on actions to promote and foster the acceptance of green hydrogen as an energy source as it competes with other cheaper energy sources.

The proposal presented the rationale for the project using a systems thinking approach connecting the need to transition to green hydrogen with the economic, environmental, and social dimensions in the context of the country. It also identifies the drivers of change and highlights the political factors and supportive policy and regulatory environment already in place for achieving project success. The proposed green hydrogen technology is grounded on a solid scientific foundation and is aligned with current scientific knowledge. However, it still has some challenges and uncertainties, including technical, economics (e.g., success depends on continued lowering of the cost of renewables), and sociocultural acceptance among key actors, etc., as have been highlighted, for example, in Hoyland et al., 2023; Eljack and Kazi, 2021; IEA, 2022, PWC, and even the project proponent (Kane and Gil, 2022).

Further to the above, there is a need to consider the drivers of change and associated uncertainties outside the control (or partly outside the control) of the project, for example, economics related to the price of renewables, changing climate, demands and markets for green hydrogen, and investors continued interest, etc., in designing the interventions. Specifically, the proposal could benefit from developing a narrative of plausible futures that considers the potential effects of these drivers and associated uncertainties on achieving the project's goal. This could inform the design of robust intervention options to the different ways the future could play out. See STAP's primer on future narratives for more guidance.

The proposal includes a result chain diagram (like a theory of change) that shows the causal pathway to achieving the expected outcome and long-term impact, including two underlying assumptions related to transparency and demand. However, the underlying assumptions need to acknowledge the uncertainties still associated with green hydrogen technology, including technical, economic, and sociocultural acceptance among key actors, as was highlighted earlier. Hence, the assumption in the results chain must be strengthened to acknowledge these challenges and include measures to address them.

The project components are described in sufficient detail to understand the proposed solutions, their justification, and risks. GEF finance will support Component 1 focuses on sub-loans to support green hydrogen development and risk mitigation. On the other hand, component 2 will finance several capacity-building and strengthening activities to create an enabling environment for green hydrogen adoption and scale-up. Linkages to the key stakeholders and institutions will also be crucial for the project's success, and there has been

encouraging stakeholder engagement. The proponents acknowledge the need for reskilling and upskilling for green hydrogen and its derivatives. Component two also includes elements of knowledge management and learning which are very important for replication and scaling. While GEF finance is mainly focused on Component 1, all components need to be designed and implemented in a way that focuses on GEF's objectives of generating Global Environmental Benefits, including ensuring that the project can be catalytical in making opportunities along the green hydrogen value chain attractive to investors, thereby maximizing the impacts of this investment.

The main GEBs described are emission reductions linked to the switch from grey to green hydrogen. The proposal clearly explained how the expected GEB was estimated, including the scientific basis, baselines, boundaries, and underlying assumptions. This is encouraging. The proposal also noted possible co-benefits of employment creation for local communities.

The innovation element of the proposed project is linked to risk-mitigating and financial instruments. These instruments should support scaling as they create a sense of security in investors. Additionally, green hydrogen production is also an innovation. Removing financial barriers can contribute to scaling an innovative and game-changing greenhouse gas emission-reducing technology that can transform the energy and industrial sector in the country.

The project's environmental and social risks have been acknowledged as substantial, and some mitigation measures have been proposed. As the project is prepared further, the social and post-decommissioning environmental risks should be fleshed out.

3. Specific points to be addressed, and suggestions

To further strengthen this project, STAP recommends the following:

1. Consider developing a narrative of plausible futures that considers the potential effects drivers of change and their associated uncertainties on achieving the project's goal and use this to inform intervention options. See STAP's primer on future narratives for more guidance.
2. Consequent to the above, strengthen the results chain (theory of change) causal pathways and assumptions to acknowledge the challenges and uncertainties associated with technical, economic, and sociocultural issues related to green hydrogen technology.
3. Consider undertaking a policy gap analysis to understand where conflicting policies can hinder the achievement of the expected outcomes and ensure these are addressed appropriately. See STAP's paper on policy coherence for more guidance.
4. Develop a detailed project risk mitigation plan, including for decommissioning.

*categories under review, subject to future revision

ANNEX: STAP'S SCREENING GUIDELINES

1. How well does the proposal explain the problem and issues to be addressed in the context of the **system** within which the problem sits and its drivers (e.g., population growth, economic development, climate change, sociocultural and political factors, and technological changes), including how the various components of the system interact?

2. Does the project indicate how **uncertain futures** could unfold (e.g. using simple **narratives)**, based on an understanding of the trends and interactions between the key elements of the system and its drivers?

3. Does the project describe the **baseline** problem and how it may evolve in the future in the absence of the project; and then identify the outcomes that the project seeks to achieve, how these outcomes will change the baseline, and what the key **barriers** and **enablers** are to achieving those outcomes?

4. Are the project's **objectives** well formulated and justified in relation to this system context? Is there a convincing explanation as to **why this particular project** has been selected in preference to other options, in the light of how the future may unfold?

5. How well does the **theory of change** provide an "explicit account of how and why the proposed interventions would achieve their intended outcomes and goal, based on outlining a set of key causal pathways arising from the activities and outputs of the interventions and the assumptions underlying these causal connections".

   - Does the project logic show how the project would ensure that expected outcomes are **enduring** and resilient to possible future changes identified in question 2 above, and to the effects of any conflicting policies (see question 9 below).
   - Is the theory of change grounded on a solid scientific foundation, and is it aligned with current scientific knowledge?
   - Does it explicitly consider how any necessary **institutional and behavioral** changes are to be achieved?
   - Does the theory of change diagram convincingly show the overall project logic, including causal pathways and outcomes?

6. Are the project **components** (interventions and activities) identified in the theory of change each described in sufficient detail to discern the main thrust and basis (including scientific) of the proposed solutions, how they address the problem, their justification as a robust solution, and the critical assumptions and risks to achieving them?

7. How likely is the project to generate global environmental benefits which would not have accrued without the GEF project (**additionality**)?

8. Does the project convincingly identify the relevant **stakeholders**, and their anticipated roles and responsibilities? is there an adequate explanation of how stakeholders will contribute to

the development and implementation of the project, and how they will benefit from the project to ensure enduring global environmental benefits, e.g. through co-benefits?

9. Does the description adequately explain:

   - how the project will build on prior investments and complement current investments, both GEF and non-GEF,
   - how the project incorporates **lessons learned** from previous projects in the country and region, and more widely from projects addressing similar issues elsewhere; and
   - how country policies that are contradictory to the intended outcomes of the project (identified in section C) will be addressed (**policy coherence**)?

10. How adequate is the project's approach to generating, managing and exchanging **knowledge**, and how will lessons learned be captured for adaptive management and for the benefit of future projects?

11. **Innovation and transformation:**
    - If the project is intended to be **innovative:** to what degree is it innovative, how will this ambition be achieved, how will barriers and enablers be addressed, and how might scaling be achieved?
    - If the project is intended to be **transformative:** how well do the project's objectives contribute to transformative change, and are they sufficient to contribute to enduring, transformational change at a sufficient scale to deliver a step improvement in one or more GEBs? Is the proposed logic to achieve the goal credible, addressing necessary changes in institutions, social or cultural norms? Are barriers and enablers to scaling be addressed? And how will enduring scaling be achieved?

12. Have **risks** to the project design and implementation been identified appropriately in the risk table in section B, and have suitable mitigation measures been incorporated? (NB: risks to the durability of project outcomes from future changes in drivers should have been reflected in the theory of change and in project design, not in this table.)