STAP SCREENING TEMPLATE

GEF ID	**11697**
Project title	**Environmentally sound management and disposal of excess mercury and mercury waste from removing mercury electrolytic cells in Brazil's chloralkali sector (Chlor-alkali Brazil)**
Date of screen	**24 November 2024**
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1. Summary of STAP's views of the project

This proposal responds to the 2025 deadline of the Minamata Convention to phase out mercury cells in chlor-alkali plants used to produce caustic soda and chlorine. The proposal aims to assist with the decommissioning of mercury cells in 3 chlor-alkali plants that will be of benefit not only for reducing the use of mercury but also for improving the energy efficiency and reducing GHG emissions of these plants.

The proposal builds from other such projects conducted in line with the Minamata Convention, notably a similar GEF-funded project now underway in Mexico. However, the proposal does not indicate that "lessons learned" from these projects have been considered and incorporated so that the success of this project is maximized.

While ultimately the project will be of benefit, the project description and possibly design require improvements to justify the overall strategy of the project, that appropriate consideration has been given to the soundness of assumptions, and that sufficient consideration has been given to barriers and enabling elements, the financial viability of the project, and long-term outcomes. The need to build institutional capacity and develop coherent policies for the 3 site-specific plans requires justification.

Also, the project theory of change diagram and narrative is incomplete. It does not adequately present the causal pathways to the expected project output, outcome, and ultimate impact. Furthermore, the assumptions are not well grounded, and sometimes, the drivers and assumptions are mixed up.

While the proposal indicates that mercury will be treated by stabilization, it does not provide useful information about how this will be done or the specific technological/treatment options to be considered. Furthermore, a key element that was not discussed is that of risks and costs associated with long-term storage of mercury and how treated mercury will ultimately be disposed of.

Although STAP is rating this project as minor, mainly because some of the proposed activities/interventions are feasible and could deliver GEBs, the proponent needs to significantly revise the proposal (in line with comments above and Sections 2 and 3 of this screen) to ensure that it delivers a good return on GEF investments.

Note to STAP screeners: a summary of STAP's view of the project (not of the project itself), covering both strengths and weaknesses.

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?

See annex on STAP's screening guidelines.

1. *Systems thinking*. The proposal would benefit from adopting a systems thinking approach that links together, for example, the environmental need to reduce mercury use and release from these 3 chlor-alkali plants with gains in energy efficiency that presumably translate into greater profitability for these plants. Systems thinking also needs to include the elements to ensure the project's financial viability and justify the need to build regulatory capacity for these three site-specific and time-limited projects. Such thinking would foster the development of clear logic for each causal pathway that would promote project success.

2. *Barriers*. Several barriers require greater explanation and justification. The listed barriers are not sufficiently justified, including the current regulatory and policy framework that hampers enforcement and compliance and barriers to implementing legislation mandating BAT/BEP practices for handling and disposing of mercury due to a lack of governmental capacity for administration and coordination. Why are knowledge gaps on environmentally sound management (ESM) of mercury a barrier when numerous other projects in numerous countries have undertaken this? Financial constraints for mercury disposal are listed as a barrier which then requires some explanation as to how this barrier will be overcome. As noted below, the barrier of the lack of established service providers that can safely handle mercury and mercury-contaminated materials is mentioned inconsistently.

3. *Uncertain futures*. This was not discussed but should be. For example, an uncertain future could consider time lags between decommissioning and having secured storage and handling facilities available, as well as the time lag between storage and final treatment and disposal.

4. *Theory of Change (ToC)*
The ToC includes major elements, except enabling elements. However, the logic behind the causal pathways is incomplete. Some drivers are noted elsewhere as assumptions, while other drivers are not mentioned.

- Assumptions.

- A major assumption is that remediation and monitoring plants will be adopted (paid for?) by plant owners (ToC listing "financing is available" needs to be clarified – financing for what?)
- The proposal assumes "predictability and adequacy of costs." The proposal needs to clarify what is meant here and why these are reasonable assumptions. An "uncertain futures" analysis should consider the implications of this assumption not holding true.
- The proposal assumes that "vendors present a consistent and reliable service"; however, this assumption should be backed up by government oversight.
- Numerous other assumptions are listed in the ToC that require explanation, e.g., that the 3 chlor-alkali plants can finance the transition away from mercury cells.

- Causal pathways are short and incomplete by connecting single levels of outputs with outcomes. For example, it is assumed, but the project itself doesn't include activities related to providing or coordinating financing for either mercury cell conversion or decommissioning. A driver is predictable and reasonable costs, which is listed as, and does seem to be, a critical assumption but, again, does not include an activity to enable this.
- Barriers and enablers. Major barriers identified are limited administrative capacity, unclear regulatory and policy framework, and technical knowledge gaps regarding the ESM of mercury. The ToC is missing a discussion of enabling elements which could be learning from other Minimata-focused GEF projects on mercury ESM.
- Drivers. As noted above, some are assumptions rather than drivers. Not discussed is a driver, such as the benefit to the chloralkali plant owners of more cost-effective or efficient upgrading of the chloralkali process (is this a benefit?) or reduced liability due to mercury contamination.

5. *Project Components*
Component 1 of strengthening national capacity requires better justification. The proposal needs to justify the investment and activities related to policy development and capacity building for decommissioning three chlor-alkali plants, whereby other chlor-alkali plants in Brazil operate with technologies that do not rely on mercury cells. Did these other plants undergo a transition or were they opened with alternative technologies? Is the

development of a "good practice guide for decommissioning mercury chlor-alkali plants" needed when the GEF is funding a similar project in Mexico and the project in Brazil aims to develop site-specific plans for each site (Output 1.2)?
Component 2. It is unclear if the conversion from mercury cells to alternative technologies (which are already in use in the three plants) is within the scope of the project. (the proposal includes the information that the 3 plants have secured co-financing for new membrane technologies).
The proposal needs to resolve whether the barrier exists of not having established service providers that can safely handle mercury and mercury-contaminated materials vs Output 2.1, which relies on engaging "specialized contractors with technical expertise to manage mercury and mercury-contaminated wastes safely" (page 17).
Component 3 needs to include consideration of existing technologies for managing mercury-containing wastes and some explanation of ultimate mercury disposal, not just containment. The explanation needs to include what measures will be taken to create, for example, financial conditions necessary for ESM of 250 tons of mercury. The proposal should be explicit about who will be responsible for mercury monitoring, both technically and financially.
Component 4, regarding knowledge management and communication, should include existing repositories of information and what new information can be usefully communicated from this project. Who is the audience for the communication strategy if this project is tackling the last 3 mercury cell technologies in Brazil?

6. Sectors and stakeholders. Women are mentioned throughout the proposal, including that less than 20% of workers in these plants are women. The discussion of gender does not include a reason to include gender consideration and thus seems superfluous to this project.
The role played by the academic sector needs to be clarified. On the one hand, the proposal notes that research institutes and labs will be tentatively engaged to develop and implement monitoring and remediation plans. Yet, elsewhere (p19), the proposal notes that academics from the Federal University of Rio de Janeiro (UFRJ) "are among the leading experts in mercury contamination analysis" – perhaps the latter refers to mercury measurement but not treatment and containment technologies? It is puzzling that UFRJ experts in "mercury contamination analysis" are not mentioned in the activities related to mercury monitoring. The proposal needs more clearly explain how the executing agency Fundação Educacional Ciência e Desenvolvimento (FECD) will have or assemble the requisite expertise to execute this project since "FECD does not have direct experience in the chlor-alkali sector".

7. *Contribution to GEBs.* These contributions (reduced GHG emissions, energy saved (in calculations but not transferred to PIF), and reducing mercury, are reasonable. The assumptions underpinning the people benefiting from this project are unclear. However, this can be mute since all people and ecosystems globally benefit from mercury use and release reductions, given its ability for global transport and bioaccumulation.

9. *Policy coherence.* The lack of coherent legal regulatory and policy framework was cited as a barrier, but the proposal needs to explain why, in fact, this lack of coherence is a hindrance to achieving the goal of safe transitioning of mercury cells and handling and ultimately containment of mercury.

9. *Alignment with current GEF investments.* The proposal aligns with past and current GEF projects in Brazil (source identification and emissions apportionment, 2nd project on ESM of seized mercury) and Mexico (similar goals of managing mercury from chlor-alkali plants). However, an important point requiring attention is the demonstration that the proposal is learning from and thus maximizing these GEF investments.

11. *Knowledge management (KM).* This component requires better explanation and justification of the audience, the intention, and how knowledge management is a "two-way street." What has been learned from other GEF projects, and how will this be reflected in the current project?

12. *Innovation.* It is unclear what innovations are planned for this project as few details are presented on actual handling, storage, and final destruction technologies. What technologies will be considered, and are they adequate? Is technology transfer necessary, or are the relevant Brazilian companies at the technological forefront?

13. *Risks*. The discussion of financial risks needs to be expanded to consider financial mechanisms for hazardous waste handling and ultimate disposal since these activities do not ultimately deliver financial value under the current financial system. It is unclear how "monitoring, knowledge generation and dissemination efforts within the project will ensure sustainability and longevity of outcomes" – these efforts can assess but not ensure the longevity and effectiveness of the project. Risks of hazardous waste mismanagement, including theft, have not been considered.

Note: provide a general appraisal, asking whether relevant screening guideline questions have been addressed adequately – not all the questions will be relevant to all proposals; no need to comment on every question, only those needing more attention, noting any done very well, but ensure that all are considered. Comments should be helpful, evaluative, and qualitative, rather than yes/no.

3. Specific points to be addressed, and suggestions

There are several shortcomings of this proposal that need to be addressed.

1. The proposal should address all the issues in Section 2 above.

2. The proposal should draw on the considerable experience in other jurisdictions of the environmentally sound management (ESM) of mercury and mercury-containing wastes from chlor-alkali plants. This includes components and learning from a current GEF project regarding the decommissioning of mercury cell chlor-alkali plants underway in Mexico (GEFID 10526). What efficiencies and complementarity can be achieved by the proposal being developed by the Brazilian Ministry of Environment and Climate Change and UNEP, which will have the common element of developing "management procedures, logistics and infrastructure necessary to safely seize, handle, transport, store and eliminate current and future element mercury…"? Will both projects seek to develop the same or different locations for safe storage and ultimate disposal?

2. The proposal's Theory of Change (ToC) is incomplete. The causal pathways do not sufficiently connect barriers, enablers, and drivers with those pathways. Indeed, enablers are missing from the ToC. Some drivers have been identified as assumptions.
An example of the incomplete ToC and development of project logic is that GHG emissions will be reduced by 53,670 CO2e and 13,320 Mj of energy saved (listed in calculations but not PIF). The explanation of the GHG calculation indicates that these three plants will gain energy efficiency by converting old mercury cells to newer membrane technologies. These energy savings, and presumably cost savings to the industries, should be listed as an enabling element, if not a driver, for mercury cell decommissioning and technology upgrading. Further, these cost savings should be discussed in terms of the project's finance.

3. More consideration is required for financing this project. Financial risks are briefly discussed, but the strategy for securing adequate financing for hazardous waste handling and ultimate disposal is missing from the proposal.

Note: number key points clearly and provide useful information or suggestions, including key literature where relevant. Completed screens should be no more than two or three pages in length.

*categories under review, subject to future revision

ANNEX: STAP'S SCREENING GUIDELINES

Project rationale

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.)