

Scientific and Technical Advisory Panel

The Scientific and Technical Advisory Panel, administered by UNEP, advises the Global Environment Facility
(Version 5)

STAP Scientific and Technical screening of the Project Identification Form (PIF)

Date of screening: November 08, 2017
Screener: Sunday Leonard
Panel member validation by: Ralph E. Sims
Consultant(s):

I. PIF Information *(Copied from the PIF)*

| FULL-SIZED PROJECT | GEF TRUST FUND |
|---------------------------|---|
| GEF PROJECT ID: | 9683 |
| PROJECT DURATION: | 4 |
| COUNTRIES: | Congo DR |
| PROJECT TITLE: | Promotion of Waste to Energy Options for Sustainable Urban Management in the Democratic Republic of the Congo |
| GEF AGENCIES: | UNIDO |
| OTHER EXECUTING PARTNERS: | 1. Ministry of Industry and SMEs 2. Ministry of Energy and Water Resources 3. City provincial government of Kinshasa 4. Sanitation Board and Public Works - Kinshasa |

GEF FOCAL AREA: Climate Change

II. STAP Advisory Response *(see table below for explanation)*

Based on this PIF screening, STAP's advisory response to the GEF Secretariat and GEF Agency(ies):
Minor issues to be considered during project design

III. Further guidance from STAP

1. This project aims to promote waste to energy technologies for sustainable waste management in the Democratic Republic of Congo (DRC).
2. Municipal solid waste (MSW) management can be improved in urban areas of the DRC by policies that are to be drafted for consideration by the Government. Much of the solid waste is currently burned or dumped, both resulting in high pollution. Demonstrations of collection and sorting techniques will be established in the largest city of Kinshasa with USD 5.4M of co-financing (mainly from the private sector Fond de Promotion de l'Industrie and government) to develop infrastructure. A further USD 9.1M will be used to install an improved landfill gas collection and electricity generation system at the Mpsa landfill site**. This will also help meet the deficit of electricity generation capacity in the country. An RDF processor is also planned, as well as an aerobic digester for the food waste component of the MSW.
3. Currently, MSW is poorly managed, and related contamination of water supplies leads to sickness and deaths. The challenge is to reduce the waste volumes (despite the projected population growth in urban areas) and manage what wastes cannot be reduced or recycled. The Congo River is heavily polluted from discarded wastes and implementing a landfill charge (as in several other countries) could serve to exacerbate the problem of dumping by people unwilling to pay the charge.
4. An overall national waste strategy is one aim of the GEF project to assess the replication potential. A national assessment of waste generation will be made, and replication projects will be encouraged through knowledge sharing, workshops, and training.

5. The existing European Commission-funded project was instigated in 2011 to collect waste in many communes of Kinshasa and deliver to a managed landfill site. However, since management of the project moved to the Board of Sanitation and Public Works in 2015, the gas collection system has failed (possibly due to increased gas pressure), and the methane is no longer collected and flared or utilized, but released to the atmosphere.

6. The GEF project involves the successful contractor collecting and using this methane to run a 2MW power generation plant, although if the current landfill is anticipated to "exhaust in 2018, and new sections must be developed for landfill of future wastes", then it is not clear how this will be achieved successfully in such a short time frame. Landfill gas volumes reach a peak soon after a cell is sealed, and is then only produced for a limited time as volumes decline. The period of gas production varies with the type of organic waste, ambient temperature, collection systems, etc. but the decline in gas production is well understood and has to be anticipated at the project design stage and when calculating revenue from sales of gas or electricity. Has this been accounted for in the feasibility study where it states, "The proposed output will capture an average of 5.5 million cubic meters of CH4 per annum"? It is not clear who conducted the study or what the decline rate is.

7. Furthermore, the project will seek to segregate organic waste for biomethanization. This means that the total organic volume that will be landfilled will be significantly reduced, which is a good thing. However, was this reduction in organic content, and consequently reduction in the volume of landfill gas to be generated from the landfill, considered when estimating the amount of methane expected from the landfill, as well as the amount of power to be generated and the expected revenue resulting?

8. A detailed analysis of the expected volume of landfill gas, the anticipated MWh of electricity generated, and consequently the anticipated revenue need to be carried out for both the short and long terms, as the project is planned further. It is good that international best practices and knowledge will be sought from the successful tenderer since it is a specialist area. This analysis must be rigorously done to attract the private sector as desired and ensure project success.

9. It is planned to produce biogas from the food waste component in the future. Has a cost/benefit analysis been undertaken to compare this option with putting this food waste into the landfill and hence generating more landfill gas and avoiding the investment, operation and maintenance costs of the anaerobic digester and 1 MW generation plant? STAP recommends reviewing whether similar combinations of producing both landfill gas and biogas at the same site have been successfully conducted elsewhere to give the optimum return on investment.

10. It is not clear who will purchase the RDF or for what applications it will be used for. 300 t/day is a considerable amount, so ideally it will require long-term purchase contracts to be put in place.

11. Around 2.5 Mt CO2-eq of direct emission reductions are projected as a result of project implementation with an additional 3.3 Mt CO2-eq of indirect emissions. This equates to around USD 3.5 /t CO2-eq but this figure excludes possible revenue from the RDF and electricity sales and any monetary value for the additional co-benefits such as improved health and clean rivers.

12. Overall, the project will focus on managing the generated wastes and ultimately converting them to useful resources. However, it is also pertinent to create upstream solutions that prevent waste generation and promote resource-use efficiency. It is recommended that this should be built into the project.

**Note the term "waste-to-energy" usually applies to a waste incineration plant where the heat produced is used directly and/or through a steam turbine for power generation, and not to a landfill gas system as described here.

| <i>STAP advisory response</i> | <i>Brief explanation of advisory response and action proposed</i> |
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| 1. Concur | In cases where STAP is satisfied with the scientific and technical quality of the proposal, a simple "Concur" response will be provided; the STAP may flag specific issues that should be pursued rigorously as the proposal is developed into a full project document. At any time during the development of the project, the proponent is invited to approach STAP to consult on the design prior to submission for CEO endorsement. |
| 2. Minor issues | STAP has identified specific scientific /technical suggestions or opportunities that should be discussed |

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| <p>to be considered during project design</p> | <p>with the project proponent as early as possible during development of the project brief. The proponent may wish to:</p> <p>(i) Open a dialogue with STAP regarding the technical and/or scientific issues raised. (ii) Set a review point at an early stage during project development, and possibly agreeing to terms of reference for an independent expert to be appointed to conduct this review.</p> <p>The proponent should provide a report of the action agreed and taken, at the time of submission of the full project brief for CEO endorsement.</p> |
| <p>3. Major issues to be considered during project design</p> | <p>STAP proposes significant improvements or has concerns on the grounds of specified major scientific/technical methodological issues, barriers, or omissions in the project concept. If STAP provides this advisory response, a full explanation would also be provided. The proponent is strongly encouraged to:</p> <p>(i) Open a dialogue with STAP regarding the technical and/or scientific issues raised; (ii) Set a review point at an early stage during project development including an independent expert as required.</p> <p>The GEF Secretariat may, based on this screening outcome, delay the proposal and refer the proposal back to the proponents with STAP's concerns.</p> <p>The proponent should provide a report of the action agreed and taken, at the time of submission of the full project brief for CEO endorsement.</p> |