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: @@@@ @@, @@@@ Screener: Thomas Hammond

Panel member validation by: Michael Anthony Stocking; Ralph E. Sims
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I. PIF Information *(Copied from the PIF)*
FULL SIZE PROJECT GEF TRUST FUND
GEF PROJECT ID: 5293
PROJECT DURATION : 5
COUNTRIES : Russian Federation
PROJECT TITLE: Save the Source: Catalyzing Market Transformation of Breweries from a Major Natural Resource Consuming Industry to a Pro-active Steward for Resource Efficient Cleaner Production
GEF AGENCIES: UNIDO
OTHER EXECUTING PARTNERS: Centre for International Industrial Cooperation in the Russian Federation, Volga International Cleaner Production Centre, St. Petersburg National Cleaner Production Centre

GEF FOCAL AREA: Multi Focal Area

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): **Major revision required**

III. Further guidance from STAP

STAP welcomes this ambitious project proposal that has a goal to demonstrate how a corporate socially responsible Russian brewing company Baltika can reduce environmental footprint and become a proactive steward in resource-efficient production throughout the entire supply chain. The proposal is innovative for the region and complies with a range of national and international environmental commitments.

To help make the proposal both acceptable and successful, especially in the delivery of global environmental benefits, STAP wishes to raise important technical and scientific concerns that could be addressed during the PPG stage:

1. The proposal has a goal of reducing the environmental footprint of the brewing company, while focusing only on energy and water footprint reductions. STAP refers the Agency to World Bank Group Environmental, Health, and Safety Guidelines with general and industry-specific examples of Good International Industry Practice [5]. While the Guidelines are currently under review for update, they contain the performance levels and measures that are generally considered to be achievable in new facilities at reasonable costs by existing technology. Among the environmental performance measures and issues associated with the operation phase of breweries, the Guidelines cover: 1) Energy conservation; 2) Water conservation; 3) Wastewater and Ambient Water Quality; 4) Hazardous Materials Management; 5) Waste Management; 6) Air Emissions and Ambient Air Quality; 7) Noise; 8) Contaminated Land. Therefore, STAP recommends the Agency and project proponents to consider the Guidelines and mainstream full set of environmental performance indicators in addition to energy and water indicators into project interventions.

2. Effluent discharged by breweries poses a substantial stress on the environment because of the high concentration of organic load created by the process. Discharge of organic matter from a single brewery could reach organic load from a population center of 100,000 inhabitants [1]. It has been estimated that for every one liter of beer that is brewed, three to ten liters of water is used; mostly for brewing, rinsing, and cooling processes. This water later on goes into waste effluent. Therefore, the underlying assumption of the project for breweries to be transformed to be â€˜stewards' of the environment requires a "reality check".

3. Specific details of energy efficiency measures to be undertaken are not identified in the proposal. In a brewery these can be wide ranging â€“ including pumps, heating, refrigeration, conveying, lighting, as well as road transport. Energy

audits of a typical brewery could take a team of energy efficient expert consultants a short period of time to identify solutions as a standard practice. Water use can be similarly audited. Project proposal does not appear to include auditing provisions and it is not clear who will do such necessary audits.

4. The proposal clusters five project components around the objectives of three focal areas (international waters, climate change mitigation, and land degradation) in order to build a multi-focal approach. STAP commends this ambitious framework but raises the issue that the baseline will be difficult to construct. The development of scientifically and technically sound baseline is a key element to the measurement and delivery of sound global benefits. The baseline description and estimates for these focal areas are unclear and appear to vary throughout the document. The proponents of this project are recommended to track and report on the GEBs and impact indicators above baseline.

5. Component 2 of the project "Proactive investment in infrastructure for waste water treatment, ground water replenishment and water body restoration" intends to a) develop a proper wastewater treatment process to use 75% of the treated effluent from the plant for irrigation purposes and b) build a vertical flow constructed wetland for organic particles removal. The first step in determining the proper wastewater treatment process should be to characterize the chemical and biological content and volume of the effluent. For example, bottle-washing results in a large wastewater volume, but contains only a minor part of the total organics discharged from the brewery processes. On the other hand, effluents from fermentation and filtering are high in organics/biochemical (biological) oxygen demand (BOD), but generally low in volume, accounting for about 3% of the total wastewater volume but 97% of the BOD [2]. Project proponents are advised to provide an explicit description and specifications for the proposed wastewater treatment technologies and processes to be used under Component 2.

6. The project proponent should identify the maximum sewage concentration that can be used for irrigation purposes. Various concentrations of the effluent will have differential effects on the growth of the plants. For example, a study conducted in India showed that the properties of the effluent directly affect soil fertility and indirectly wheat and pea crops. The effluent rich in ammonia-nitrogen, nitrate-nitrogen, phosphorus and potassium, increased the values of available nutrients in the soil when applied. The germination of pea and wheat seeds was restricted to 80% and 90%, respectively, when 100% effluent was used for irrigation, whereas germination was quick with 50% and 25% effluent. The growth of the plants was slow with 100% effluent while it was enhanced by using 50% effluent for irrigation [3]. STAP recommends that the present project takes into account lessons learned elsewhere available in the literature in order to inform and apply best available technology and processes for using and monitoring use of plant effluent for irrigation purposes.

7. Biological/biochemical Oxygen Demand (BOD) is a test that is used as a measure of a degree of organic matter pollution of water. The BOD value is usually expressed in milligrams of oxygen consumed per litre of sample during 5 days of incubation at 20Â°C. The values for untreated effluents from polluted sewage usually not exceed 1000 mg/l and for untreated brewery effluent 1000-2000 mg/l. Therefore, STAP is unclear what is meant by "average BOD5 load of 60 g per person per day". This needs checking and explanation, and should preferably be supported by references.

8. Restoration of the degraded wetland is very much welcomed by the STAP. STAP wishes to highlight that the use of wetland as a treatment method has a number of advantages, which include: 1) Removes up to 70% of solids and bacteria; 2) Minimal capital cost; 3) Low operation and maintenance requirements and costs. Among the disadvantages are: 1) the method remains largely experimental; 2) Requires periodic removal of excess plant material; 3) Best used in areas where suitable native plants are available. This information has been taken from [4] source, where the project proponent can get acquainted with other conventional and non-conventional treatment methods used by breweries. STAP recommends that proponents utilize the best available techniques described in the scientific evidence-based literature and describe how they will be applied and their effectiveness monitored during project implementation.

9. Component 3 targets the reduction of the environmental footprint of Baltika agro-industrial suppliers through reducing applications of nitrogen and phosphorus fertilizers. According to the proposal (p.10), the benchmarking system aims to reduce the amount of nitrogen and phosphorus fertilizer by 5 percent. The logic for selecting 5% reduction is elusive. Is it based on the local and national consultations and feasibility studies? How were the N2O emissions assessed while the proposal states that the emissions reductions depend on a number of factors that will be determined during the PPG stage? Thus, STAP questions the estimates for the emission reductions values and the evidence on which they were based and recommends providing evidence-based information in the full project document.

10. Furthermore, to apply effluent to 96,000ha as claimed requires these fields to be adjacent to the brewery â€“ or located relatively close nearby. STAP assumes the crops grown are mainly barley (but not stated) but what about hops?

If barley land is to be irrigated, drip irrigation does not match (usually for row crops) and barley is grown in a rotation so not all land in the area is used each year. This issue needs clarifying.

11. Component 4 intends to use innovative approaches for using brewery waste to generate energy. What type of waste is meant here as opposed to Component 2? CO2 emissions reduction calculations in this Component are unclear and the data for specific energy consumption and CO2 emissions do not give the sources of energy consumed. This is probably for heat as well as electricity. Is it gas or coal based? Answers to these questions could be critical both to environmental impact and the delivery of GEBs and should be provided in the full project document.

References:

[1] Rodrigues A., Brito A., Melo L. (N.A.). Post-treatment of Brewery Wastewater Using a Sequencing Batch reactor. Available at http://repositorium.sdum.uminho.pt/bitstream/1822/1658/1/2001-26%5B1%5D.pdf
[2] Institute of Brewing and Distilling, Examiners reports 2005 to 2009, Diploma in Brewing Module One, 2005 -2009.
[3] Ajmal M., Khan A. (2009). Effects of brewery effluent on agricultural soil and crop plants. Environmental Research Laboratory, Chemistry Section, Z.H. College of Engineering and Technology, Aligarh Muslim University.
[4] Simate G., Cluett J.,, Iyuke S., Musapatika T., Ndlovu S., Walubita L., Alvarez A. (2011)The treatment of brewery wastewater for reuse: State of the art. Desalination 273, 235â€“247
[5] Environmental, Health, and Safety Guidelines. Available at http://www1.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/IFC+Sustainability/Sustainability+Framework/Environmental,+Health,+and+Safety+Guidelines/

STAP advisory response	*Brief explanation of advisory response and action proposed*
1. Consent	STAP acknowledges that on scientific or technical grounds the concept has merit. However, STAP may state its views on the concept emphasizing any issues where the project could be improved. Follow up: The GEF Agency is invited to approach STAP for advice during the development of the project prior to submission of the final document for CEO endorsement.
2. Minor revision required.	STAP has identified specific scientific or technical challenges, omissions or opportunities that should be addressed by the project proponents during project development. Follow up: One or more options are open to STAP and the GEF Agency: (i) GEF Agency should discuss the issues with STAP to clarify them and possible solutions. (ii) In its request for CEO endorsement, the GEF Agency will report on actions taken in response to STAP's recommended actions.
3. Major revision required	STAP has identified significant scientific or technical challenges or omissions in the PIF and recommends significant improvements to project design. Follow-up: (i) The Agency should request that the project undergo a STAP review prior to CEO endorsement, at a point in time when the particular scientific or technical issue is sufficiently developed to be reviewed, or as agreed between the Agency and STAP. (ii) In its request for CEO endorsement, the Agency will report on actions taken in response to STAP concerns.