

# 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: February 24, 2014

Screener: Virginia Gorsevski

Panel member validation by: Ralph E. Sims  
Consultant(s):

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

**FULL SIZE PROJECT GEF TRUST FUND**

**GEF PROJECT ID:** 5628

**PROJECT DURATION :** 4

**COUNTRIES :** Botswana

**PROJECT TITLE:** Promoting Production and Utilization of Biomethane from Agro-Waste in South-Eastern Botswana

**GEF AGENCIES:** UNDP

**OTHER EXECUTING PARTNERS:** Ministry of Local Government and Rural Development (MLG), Department of Waste Management and Pollution Control (DWMPC), Selected District Councils (Gaborone City Council, South East District Council, Lobatse Town Council, Kweneng District Council, Kgatleng District Council), Biosys Botswana Pty Ltd, Botswana Development Corporation, Botswana Meat Corporation  
**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):  
**Consent**

### III. Further guidance from STAP

The project aims to strengthen investments and capacity building in biogas production from organic wastes, particularly from farm animals and sewage treatment plants. Several industrial "scale biogas plants are to be built and demonstrated. The project is not truly innovative as many medium-scale anaerobic digesters (ADs) are operating worldwide. Much can be learned from these existing projects. This project aims for the wide deployment of AD plants throughout Botswana with the added advantage of addressing treatment of wastes to avoid local pollution of waterways.

1. Biogas is corrosive. Please identify the materials that will be used in construction to prevent corrosion of the plant.
2. Waste-to-energy through the biogas route can add value, depending on whether the biogas is scrubbed to produce biomethane for use as a transport fuel, for electricity generation, or simply combusted unscrubbed to provide heat. Power generation linked with solar PV is one case study under evaluation.
3. The comparative costs of displacing LPG with some biogas are not clear. Cost analyses should include the value available for soil nutrients and conditioners from applying the co-product solid residues to the soils after AD.
4. It is not clear why Weltec was selected to provide the AD technology when a very wide range of AD manufacturers exist worldwide. Was this the result of an open tender process?

5. The GHG emission reduction analysis is logical but there are concerns over leakage of biomethane (with a GWP ~ 23) which can negate the benefits observed to date. The GHG missions avoided depend on the estimates used for using biomethane as alternative fuel in small LDVs, diesel rail, power plants, and the time of generation and dispatch.

5. The project proposes to conduct feasibility studies at three potential sites, one of which has already been selected (BMC Lobatse abattoir). Has there been any spatial analysis (e.g. using a GIS) (or will there be as part of the feasibility study) to ensure that the fuel supply and demand are optimized? There are many studies that use a GIS-based approach for exactly this purpose (see Sliz-Szkliniarz, B. and J. Vogt. 2012. A GIS-based approach for evaluating the potential of biogas production from livestock manure and crops at a regional scale: A case study for the Kujawsko-Pomorskie Voivodeship. *Renewable and Sustainable Energy Reviews* 16(1): 752-763.

6. The proposal outlines the potential economic benefits of the project. It might be helpful to cite sources stating that biofuels from anaerobic digestion are relatively labour-intensive and can play a positive role in maintaining and developing the rural economy (see Singh et al. 2010. A biofuel strategy for Ireland with an emphasis on production of biomethane and minimization of land-take. *Renewable and Sustainable Energy Reviews* 14: 277 – 288.).

7. Has the project taken maintenance costs into consideration? An estimate for maintenance costs for a digester in Tanzania is \$50,000/year (see <http://scottmoskowitz.yolasite.com/resources/UC%20Davis%20D-Lab%20Biogas%20in%20Tanzania%20-%20Report.pdf>). Is it similar for this type of plant in Botswana?

8. The proposal lists two moderate/high risks that are of significant concern – scarce water supplies and potential reductions in rainfall that will result in major losses to livestock, upon which the biomethane project is dependent. Has the project considered the longer term risks associated with changes in ecosystem productivity and structure due to both biotic (human) and abiotic factors? What about prolonged dry periods due to ENSO – potentially exacerbated by climate change (Cui et al., 2013 "Using Remote Sensing to Quantify Vegetation Change and Ecological Resilience in a Semi-Arid System. *Land* (2): 108 – 130).

<i>STAP advisory response</i>	<i>Brief explanation of advisory response and action proposed</i>
<b>1. Consent</b>	<p>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.</p> <p>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.</p>
<b>2. Minor revision required.</b>	<p>STAP has identified specific scientific or technical challenges, omissions or opportunities that should be addressed by the project proponents during project development.</p> <p>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.</p>
<b>3. Major revision required</b>	<p>STAP has identified significant scientific or technical challenges or omissions in the PIF and recommends significant improvements to project design.</p> <p>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.</p>