

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)

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Consultant(s):

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

FULL SIZE PROJECT **GEF TRUST FUND**

GEF PROJECT ID: 5345

PROJECT DURATION : 5

COUNTRIES : Nigeria

PROJECT TITLE: Promoting Low Carbon Energy Solutions in Nigeria Energy/Power Supply

GEF AGENCIES: UNDP

OTHER EXECUTING PARTNERS: Federal Ministry of Power, Federal Ministry of Environment, Energy Commission of Nigeria, Nigerian Electricity Regulatory Commission, Transmission Company of Nigeria

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 at increasing the share of renewable power generation in Nigeria up to 10% by 2020, excluding large hydro. The proposal appears ambitious, given wind and solar systems are used only in Nigeria. The project has several interesting features such as financial de-risking of private investment, integration of renewable energy systems into the national grid and pilot investment projects.

STAP has a number of suggestions which could be addressed during the next phase of the project development.

1. What is the rationale for considering only on-grid renewable energy systems? Why not off-grid renewable energy applications, particularly for rural areas. Feeding power grids from small scale renewable energy systems could lead to additional costs and technological requirements.
2. The PIF mentions only solar and wind energy based renewable energy systems. Why not small hydro and biomass heat and power systems (assuming there is no geothermal resource and ocean energy is still immature)? The STAP recommends the consideration of different renewable energy technologies for each given region based on techno-economic assessments.
3. Selection of pilot investments to finance projects should be based on techno-economic analysis of different renewable energy options.
4. Setting up of targets for renewable energy should also be based on techno-economic assessment of different renewable energy options and the available resources.
5. For any on-grid renewable energy systems, there is a need for assuring a stable, year-round supply of power if expensive back-up systems are to be avoided. The proposed project should also consider the variability and seasonality of certain renewable energy systems and make provisions for addressing these.
6. What is the scale of renewable energy systems proposed in the project? Will it be kilowatt scale or megawatt scale or large multi-megawatt scale plants?

7. The PIF states that the tariff for electricity is very low. In such a scenario how can the government best make investment in renewable energy systems attractive for private investors, unless exceptional resources (solar radiation levels, mean annual wind speeds) are available. Feed-in-tariffs are an option being pursued, and it is good that an analytical approach is being pursued. Lessons can be learned from several European countries (Spain, Italy, UK, Germany) where FIT policies have been revised recently for various reasons.
8. Renewable energy systems usually need higher up-front investments and O&M costs can also be relatively high, although fuel costs are zero (except for bioenergy plants). How will this incremental capital cost and the implications for the price of electricity be addressed in the project to make it attractive for private investors?
9. The project should also address rationalization of power tariffs and possible removal of any subsidies for fossil fuels.
10. Technology transfer issues have to be addressed if a large-scale shift to renewable energy systems is envisaged.
11. The project should develop a good baseline scenario and make projections for the next 10 years at least on the share of fossil fuels, large hydro and renewable systems under the baseline scenario.
12. Two baseline projects are already in place. This GEF project will build on them, but exactly how, will need careful management and difficulties for MRV. The main problem with integrating variable renewable energy generation into an existing power supply system is to make the system more flexible. It is not clear how this will be achieved using demand-side management, better forecasting, energy storage, inter-boundary connections etc. This is complex and will require more than the training of grid system operators, though this is an important component. It depends on the anticipated share of variables to total generation. (Chapter 8 of the IPCC Special Report on Renewable Energy, 2011, and various IEA reports on flexible grids could be useful.)
13. It seems that upgrading of the network to accommodate higher shares of renewable energy is underway, and that GEF funding will build on that. However, the MRV will be difficult. Therefore, STAP recommends for the project developers to elaborate further on this aspect.
14. It appears that a major gap in the project is the details of the assessments of wind and solar resources. Without these, it is difficult to undertake economic analyses or locate optimum sites (with best wind speeds. Producing a renewable energy resource assessment for the whole country should be a high priority. It takes time to obtain detailed assessments of useful accuracy with seasonal and diurnal variations. It is not clear who will do that, or even the assessments for the specific pilot projects as proposed, including the methodology and models used. (and at what resolution).

<i>STAP advisory response</i>	<i>Brief explanation of advisory response and action proposed</i>
1. Consent	<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>
2. Minor revision required.	<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>
3. Major revision required	<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>