

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: 5539

PROJECT DURATION : 4

COUNTRIES : Morocco

PROJECT TITLE: Promoting the Development of Photovoltaic Pumping Systems for Irrigation

GEF AGENCIES: UNDP

OTHER EXECUTING PARTNERS: National Agency for the Development of Renewable Energy and Energy Efficiency (ADEREE)

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 revision required

III. Further guidance from STAP

The majority of the funding is to support 5000 small-scale and 7 medium-scale solar PV pumping systems – so this is not really a "demonstration" as claimed. A smaller sum is allocated for developing pump standards and labeling coupled with nutrient application, and end-of-life recycling. The need for financing, subsidies and capacity building is addressed.

1. The use of abundant solar resources to displace heavily subsidised diesel and LPG used to pump water is commendable. Only drip irrigation is supported which is okay for row crops but less so for cereals and pasture. The crops to be irrigated are not fully described (though olives, citrus and strawberries are mentioned on page 16). It is assumed that sprinkler irrigation systems are currently used, in which case the water (and hence energy) savings from drip irrigation could be substantial. Please define more clearly.
2. The argument to reduce payback periods as deployment increases makes sense, particularly with recent price reductions for solar PV panels (though the balance-of-plant has not had the same cost savings).
3. What is not clear is the source of water, how reliable are waterways during the summer season, depth of water table a solar pump will need to handle, etc. Will new wells need to be drilled to source groundwater or will existing wells simply be converted from diesel-power pumps to PV pumps? It is not clear how small-scale concentrating solar systems could replace PV as is advocated (page 12). It is also not clear how many litres per year a 2 kW PV system could typically provide for a range of groundwater or stream systems under Moroccan conditions, and whether irrigation demand is seasonal or all-year-round.
4. It is also not clear how the PV systems will be sized. Studies show that proper sizing depends on, inter alia, detailed information about local climate, soil properties, depth of well, characteristics of the crop (Gajjar et al. (2010) A simple method estimates and economic indicators of photovoltaic systems for drip irrigation. *Economics of Agriculture* (60)2; 223 – 236.) Where will project developers obtain necessary data to optimize individual systems?
5. The GHG emission reductions of the scheme are presented with uncertainties described. The projected performance of a 2kW solar pumping system compared with the existing diesel pumps is not compared, nor the maintenance involved with maintaining a drip irrigation scheme.

6. Even though 5000 small systems are only a small percentage of total irrigation systems, some consideration could be given to learning from installing and monitoring maybe 100 pilot projects initially before the rest are deployed.

7. Overall the project proposal could be improved if the impacts from the practical application of the PV technology displacing diesel pumps are better determined (as outlined above).

8. What analysis will be done to site the PV systems? The project mentions a GIS/GPS platform to optimize the siting and orientation of PV panels – what type of data will be collected to aid in this effort? For example, higher levels of solar radiation can lead to higher ambient air temperatures and if the PV panels are black, they may overheat resulting in a loss of PV cell efficiency. Will the project developers use the GIS/GPS platform or another method to take this and other factors into account? Has a country or region-wide resource assessment been done either by this project or in the past? Where will project developers obtain the necessary data required siting specific systems?

9. Under environmental and social benefits, it could be noted that small holder irrigation is frequently cited as a strategy for poverty reduction, climate adaptation and food security (Burney, J. et al (2010) Solar-powered drip irrigation enhances food security in the Sudano-Sahel. PNAS, 107(5); 1848 – 1853, Polak, P., Yoder, R (2006) Creating wealth from groundwater for dollar-a-day farmers: Where the silent revolution and the four revolutions to end rural poverty meet. Hydrogeol J, 14:424-432). Will this project contribute to reduction in food security and climate adaptation? Does it fit within Morocco national strategies related to these issues?

<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:</p> <ul style="list-style-type: none"> (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	<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:</p> <ul style="list-style-type: none"> (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.