June 23, 2017

[Approval by mail]: Bangladesh: Power System Efficiency Improvement Project – Additional Financing- Off Grid Solar PV: Solar Irrigation (ADB)(SREP)- XSREBD064A

Asian development bank Response to comments from Switzerland

I. Answer to follow-up question/comment (Re. answer 1b):

(a) The difference is to cover project implementation costs allocated from the $20million loan to engaging consulting service for project supervisory and implementation.

(b) Unit costs can vary quite dramatically though, depending on the scale, location of the project and what is included in the cost (e.g. power house, water pipe, after sales service etc.). The solar irrigation system cost in Bangladesh comes from two major categories:

1. Equipment costs (Solar panel, Solar pumping system, Module mounting structure, Cable & accessories, Water well related work, Supply, testing, transportation); and
2. Construction Costs (Pump house, Header tank, Distribution pipeline and Fences).

Again, thank you for the information about system cost in India. ADB team will review it. Plus, ADB team is now conducting the due diligence, together with the Implementing Agency (Bangladesh Rural Electrification Board) to finetune the design, and update the estimated cost.

In addition, as you know, the procurement under the subject ADB/SREP funded project will follow International Competitive Bidding(ICB) procedures using ADB's standard bidding documents for plant design, supply and install contract. The bulk purchase of 2,000 sets of system may be a good strategy to lower costs with good quality systems.

II. Answer to follow-up question/comment (Re. answer 2c):

The $6.6 million are contributed by the Government of Bangladesh from the following two parts:

1. Taxes and duties. In the current practice, ADB and other MDBs also treat taxes and duties financed from the government resources as counterpart cash contribution to the project.
2. Land acquisition and rights-of-way for irrigation pipes and/or trenches. Both are essential to the project, which will be procured or leased by the government. Bangladesh has limited amount of land available but its population density is very high. Rate of land area per person is one of the lowest in the world. Therefore, land acquisition and rights-of-way is very expensive since the arable land is valuable in Bangladesh. Without land acquisition/lease, right of way of underground pipe/trench, the project cannot be implemented.

ADB team is planning the fact-finding mission for this project preparation from 17-20 July. There is a familiar saying, "seeing is believing". Therefore, field visits will be conducted by ADB mission. ADB team would like to invite SREP committee to join the mission to visit the sites if it is possible.

(III) Answer to follow-up question/comment (Re. answer 3a):

The Bangladesh IP noted an estimated generation capacity target of 43 GWh annually for the off-grid solar projects. This was obtained from initial targets of (i) 25 MWp solar capacity under the mini-grid project, and (ii) 6MWp solar PV irrigation project.

The proposed solar irrigation sub-project used a conservative estimation target of 5GWh/year (see response to 3a). The generation output difference is accounted for in the mini-grids project (which has separate scope of this solar irrigation project).

There is a $5 million SREP funding allocated for the mini-grids project; however, given the SREP grant resource constraints the mini-grid project is listed under reserve pipeline.

(IV) Answer to follow-up question/comment (Re. answer 3b):

It is true that solar irrigation system solutions have a substantially lower environmental footprint compared to traditional diesel run pumping systems. Though, solar irrigation system is not a 100% renewable energy project, it is a cross-sectoral project, i.e. a typical energy-water-food nexus type project. The potential environmental advantages are from solar power component in the solar irrigation system. Per Bangladesh IDCOL project, solar power generation part is about 28% of the whole system cost, the remaining 72% cost covers pumping system, pipes, construction etc. Having said that, the main cost of the project goes to irrigation part, this is the reason why diesel saving is modest from the whole investment of $47.385 million. Hypothetically, if all investment of $47.385 million is for solar power generation only, and the solar system will be grid connected, and operated at full capacity, i.e., 365 days and 8 hours a day, then the equivalent diesel saving will be 9,686 ton per year. It will be more impressive in terms of GHG emission reduction.

Hope this clarifies.

(V) Answer to follow-up question/comment (Re. answer 3c):

(a) Noted.
(b) The ADB ongoing project has 3 other solar energy components. The overall leverage of SREP against the 4 solar energy components (including the proposed solar irrigation component) was presented, i.e., (i) a 7.4 megawatt (MW) solar photovoltaic (PV) power system at Kaptai; (ii) a 4.2 MW hybrid mini-grid on Hatiya Island; (iii) supply, installation and commissioning of solar street lighting systems in eight city corporations; and (iv) solar irrigation.

The initial response provided above (question 3c) presented two ways of looking on project's leverage ratio: (i) specific to the solar PV irrigation sub-project; and (ii) the solar energy component of the entire project.

(VI) Answer to follow-up question/comment (Re. answer 4a):

(a) Revenue expressed are per year and payback periods calculated are correct considering electricity sales from 5 hp and 7.5 hp systems. The payback period of the later two schemes will be 10 years and 8.2 years without sale of electricity.

(b) The tariff Tk. 10.14 per kWh assumed in the DPP for electricity sales from 5 hp and 7.5 hp pumping systems to the grid are too high. In addition, although the DPP assumes electricity sales to the grid, the required regulatory framework does not exist yet. Hence most likely situations are either no sale of electricity or commencement of sale of electricity after

several years at a lower cost. The project is considered pro-poor. As mentioned in the SREP cover page, it will directly benefit small and marginal farmers in rural communities of Bangladesh.

(VII) Answer to follow-up question/comment (Re. answer 4b):

ADB will compute these rates of return going forward during the due diligence process. We would like to note that for energy projects, ADB internal policies and guidance require that FIRR be greater than WACC (which varies with cost of funds) and that EIRR be greater than 9%.

(VIII) Answer to follow-up question/comment (Re. answer 4c):

Unavailability of commercial financing together with the high initial cost is a large barrier for solar PV irrigation in Bangladesh. In addition, solar powered irrigation and the operating model is still at very early stages and not proved to be financially and operationally viable. The SREP fund plays a game changer in scaling up the market of solar irrigation systems in Bangladesh, given government is willing to borrow $20 million loan for this solar irrigation component.

Furthermore, it is believed that solar powered irrigation, when scaled up, will help Bangladesh reduce the expenditure of fuel imports and reduce cost of production for farmers leading to improve living standards of farmers. The impacts of fuel replacement and GHG emissions will be significant once the solar irrigation system is widely adopted under the leadership of this SREP funding support.

Therefore, a grant from SREP will assist to overcome the barriers of meeting high initial capital cost, pilot the technology and the operating model and help improve living standards of farmers of rural Bangladesh. This will help Bangladesh to establish an environmentally, financially and operationally sustainable irrigation system.

(IX) Answer to follow-up question/comment (Re. answer 4d):

To make the solar irrigation system commercially viable without grant contribution or subsidy would be the goal over the long run. Currently, solar irrigation system development is at the infancy stage. Reaching a commercial scale of deployment will require substantial efforts to develop an enabling environment to support market development.

The payback periods of all four systems are close to ten years (without the benefit of electricity sales) even with 50% grant support. Without any grant support, the payback periods will be about twenty years or more. As the lifetime of pumps is ten years and of solar PV systems is twenty years the project becomes financially not viable.

In summary, SREP non-grant contribution will not be a viable option.