Cover Page for Project/Program Approval Request			
1. **Country/Region**:	*Bangladesh*	2. **CIF Project ID#**:	(Trustee will assign ID)
3. **Source of Funding:**	☐ FIP	☐ PPCR	☒ SREP
4. **Project/Program Title:**	*Power System Efficiency Improvement Project – Additional Financing (Off-grid solar PV: solar irrigation)*		
5. **Type of CIF Investment:**	☒ *Public*	☐ Private	☐ Mixed
6. **Funding Request in million USD equivalent:**	*Grant: $22.22 million*[1]	*Non-Grant:*	
7. **Implementing MDB(s):**	*Asian Development Bank*		
8. **National Implementing Agency:**	*Bangladesh Rural Electrification Board*		
9. **MDB Focal Point and Project/Program Task Team Leader (TTL)**:	*Headquarters- Focal Point: Christian Ellermann (cellermann@adb.org)*	*TTL: Mr. Aiming Zhou (azhou@adb.org)*	
10. **Project/Program Description** (including objectives and expected outcomes)**:**			

The Bangladesh SREP Investment Plan (IP) was endorsed in November 2015 with total indicative financing of $75 million to cover investments on grid connected renewable energy, off-grid solar photovoltaic (PV), and development support for waste to energy. The investment components aim to develop a stable and sustainable power supply that will increase electricity access, enhance energy security, and reduce poverty in the country.

Table 1: Bangladesh SREP Investment Plan, 2015

Project	SREP ($ Million)	MDB
A. Grid Connected Renewables	**44.45**	
Investment in utility-scale solar and wind, and rooftop solar	28.00	WB
Investment in utility-scale solar and wind, and rooftop solar	15.00	IFC
Resource assessment	0.95	WB
Technical assistance or transaction advisory	0.50	IFC
B. Off-grid solar PV	**29.95**	
Investment in mini-grid	5.00	ADB
Investment in solar irrigation	24.00	
Project preparation	0.95	
C. Development support for Waste-to-Energy	**0.30**	**WB**
Total	**74.70**	

[1] The total SREP funding allocated to this project in the Bangladesh SREP Investment Plan is $24 million in grants. As part of the SREP pipeline management policy discussion, the $22.22 million in grants requested here represents an adjusted amount to accommodate predicted available grant resources at this stage. The GoB may request funding approval of the remaining $1.78 million if additional grant funding becomes available under SREP.

The $22.22 million SREP grant[2] for investment in solar irrigation under the off-grid solar PV is proposed to support the on-going implementation of ADB Loan 2769: Power System Efficiency Improvement Project as described in the IP. The project was approved by ADB Board in August 2011 and became effective in October 2012. The project aims to increase the provision of better access to electricity in the country by addressing two key areas in the power sector in Bangladesh which suffers from acute power shortages through (a) improved energy efficiency by upgrading an existing power generation facility, a 450 MW power plant at Ashuganj; and (b) increased renewable energy use by:

(i) Installing a 7.4 MWp solar PV grid connected power plant at Kaptai;
(ii) Installing a 4.2 MW off-grid hybrid power system, including a mini power distribution grid on Hatiya Island; and
(iii) Supply, installation, and commissioning of solar PV LED street lighting systems (SSLS) and LED based street lighting systems (LSLS) in 8 city corporations.

In July 2015, a minor change in scope was approved for the reallocation of $20 million loan proceeds to expand the country's renewable energy through financing a new output on solar PV pumping systems, upon the request from the Economic Relations Division of the Ministry of Finance on behalf of the Power Division of the Ministry of Power, Energy and Mineral Resources. This change in scope was introduced to mobilize the SREP funding. A Development Project Proposal (DPP)[3] for this new output was also prepared by the Bangladesh Rural Electrification Board (BREB) to support and complement project readiness. The DPP provides the details of the project design including implementation arrangement and cost summary.

The ***Proposed Power System Efficiency Improvement Project – Additional Financing*** ("Project") will support the new output of deploying solar irrigation technology in rural areas and reducing the additional demand for power during irrigation season.

(iv) Installing at least 2,000 (1.5 horsepower [HP] = 250 units, 3 HP = 250 units, 5 HP = 1000 units, and 7.5 HP = 500 units) solar PV irrigation pumping systems.

The project will also generate 5,054 megawatt-hour per year (MWh/y) by connecting through a permanent evacuation line the 1,000 pumping systems with 5 HP and 500 pumping systems with 7.5 HP to mini-grids. A power purchase agreement between the buyers/consumers and the BREB will be finalized during project implementation period. To ensure effective returns of investments, a long-term operation and management strategies will be introduced.

[2] The total SREP funding allocated to this project in the Bangladesh SREP Investment Plan is $24 million in grants. As part of the SREP pipeline management policy discussion, the $22.22 million in grants requested here represents an adjusted amount to accommodate predicted available grant resources at this stage. The GoB may request funding approval of the remaining $1.78 million if additional grant funding becomes available under SREP.

[3] In Bangladesh, processing of development projects (both GOB financed and Aided) for approval involves several steps. At the formation stage, a project may be an idea with preliminary studies of its desirability in terms of national needs, and likely cost and benefits. At the formulation stages, it has to be spelled out in greater detail and specific terms in order to enable the decision-making bodies to evaluate it and to approve (or postpone or reject) it. The readiness of the solar irrigation project is very high.

The BREB will be the implementing agency of the proposed project. Under BREB, a Project Management Unit will be set up to manage procurement, site selection, operation and maintenance (O&M), monitoring, and ownership transfer.

Table 2 shows the proposed financing plan and Table 3 shows the breakdown by project component.

Table 2: Proposed Financing Plan

Source	On-going	Additional Financing	Total
Asian Development Bank	280.00	20.00 [a]	300.00
Islamic Development Bank	200.00	0.00	200.00
Government of Bangladesh	81.18	0.075	81.26
SCF-SREP	-	22.22	22.22
Other [b]	-	1.78	1.78
Equity [c]	-	3.31	3.31
Total	**561.18**	**47.385**	**608.57**

[a] Reallocated ADB loan proceeds from the on-going/current project.
[b] SREP (in case additional grant funding becomes available) or other funding source(s) administered by the Asian Development Bank.
[c] Equity contributions from solar irrigation system buyer/consumer(s). Not administered by the Asian Development Bank.

Table 3: Proposed Financing Plan by EE/RE Component

Source	Energy Efficiency	Renewable Energy	Total
Asian Development Bank	205.00	95.00	300.00
Islamic Development Bank	200.00	0.00	200.00
Government of Bangladesh	67.50	13.75	81.26
SCF-SREP	-	22.22	22.22
Other [i]	-	1.78	1.78
Equity [ii]	-	3.31	3.31
Total	**472.50**	**136.06**	**608.57**

[i] SREP (in case additional grant funding becomes available) or other funding source(s) administered by the Asian Development Bank.
[ii] Equity contributions from solar irrigation system buyer/consumer(s). Not administered by the Asian Development Bank.

Output b (iv) is consistent with the objectives and scope of the original loan for increasing renewable energy. The impact and outcome of the proposed project will be the same, that is, increased provision of better access to electricity and increased electricity generating capacity from renewable energy in the country.

The project is fully aligned with Bangladesh Country Partnership Strategy (CPS), 2016-2020; and the Bangladesh Country Operations Business Plan (COBP), 2017–2019. To achieve higher, inclusive, and sustainable economic growth in the country, the CPS identified easing infrastructure constraint on energy sector as one of the country's strategic priorities. This can be addressed by

expanding power generation capacity, improving the efficiency of transmission and distribution networks, and expanding regional interconnections

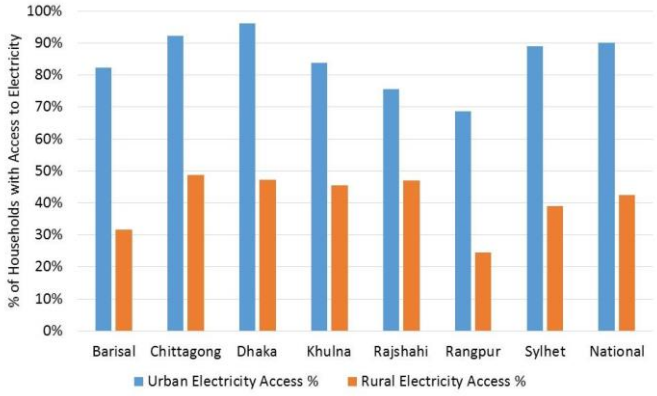
Country Background

Bangladesh is largely a rural economy with more than 70% of the population and 77% of workforce living in rural areas. Agriculture plays an important role for the country's economic growth. Through improved agricultural income, the sector has helped reduced poverty in the country accounting to 90% of poverty reduction between 2005 and 2010. The sector employs about 45% of the country's workforce and is a major source of rural jobs.[4]

Agricultural productivity, however, is undermined by other development challenges the country is facing such as vulnerability to extreme weather events, limited access to finance, and poor infrastructure including roads, power, and irrigation.

At the national level, access to electricity has improved from 47% in 2009 to 76% in 2016 but supply is mostly limited to urban areas which 90% access rate, while rural areas have 40% access rate. Figure 1 presents percentage of urban-rural households with access to electricity by division. The Barisal and Rangpur divisions have very low rural access rates with 32% and 24%, respectively. The country's per-capita electricity supply and consumption is among the lowest in the world: in 2014, Bangladesh's electricity consumption per-capita was only 160 kWh, compared with the world average of 3,030 kWh.

Figure 1: Percentage of Urban and Rural Households with Electricity by Division, 2010



Proper irrigation is critical to increase farm yields. However, poor performance of irrigation schemes has been recognized as a major problem in the agricultural sector of Bangladesh. Most farmers usually rely on expensive diesel- or electricity-powered irrigation pumps. Farmers with electricity-run pumps continuously struggle with persistent power outages. This forces them to operate their pumps at night when electricity consumption decreases and power outages are less likely.[5] Irrigation consumes about 4.58% of the total electricity generation in the country.

[4] http://www.worldbank.org/en/news/feature/2016/05/17/bangladeshs-agriculture-a-poverty-reducer-in-need-of-modernization

[5] http://www.worldbank.org/en/results/2015/09/08/solar-powered-pumps-reduce-irrigation-costs-bangladesh

In off-grid rural areas, the lack of electricity makes it difficult and costly to operate pumps. An estimated 11.06 million farmers are using diesel for water pumping needs. This is about 1.34 million diesel-run pumps (i.e., 1.2 million pumps as Shallow Tube Well; and 0.14 million pumps as Low Lift Pump), which consume one million tons of diesel to irrigate 3.4 million hectares of agricultural land. Table 3 compares irrigation pumps by energy source.

Table 4: Comparison of irrigation pumps by energy source

	Irrigation pumps run by diesel	**Irrigation pumps run by electricity**
Total number of pumps	1.34 million	0.27 million
Area coverage	3.4 million hectares of land	1.7 million hectares of land
Electricity / Fuel consumption	1 million tons diesel / year ($900 million / year)	1,500 MW
No. of farmers	11.06 million	6.65 million

Source: Rahman, F. (2015) IDCOL Solar Irrigation Projects

To address the problems of power shortages and soaring diesel prices, the government has initiated efforts to develop solar energy and to provide electricity for irrigation. Solar PV pumping technology has recently gained popularity as capital costs have declined and awareness of potential benefits has increased. Following Bangladesh's success in expanding solar home systems (SHS) to provide electricity in rural areas, solar PV pumping technology is well suited for the country's flat terrain and abundant sunshine. The BREB has piloted a number of these solar projects. As of April 2016, the total installed capacity of solar PV system in the country is about 4.50 MWp.

Table 5: Total Installed Capacity of Solar Photovoltaic System, April 2016

System	**Quantity**	**Installed Capacity (kWp)**
Solar home system	36,561	3,677.99
Rooftop solar plant	17	543.41
Solar powered irrigation pump	40	239.00
Solar charging station	1	21.00
Total		**4,481.40**

Source: ADB (2016) Ministry of Power, Energy and Mineral Resources Business Plan for Solar Photovoltaic Pumping System for Agricultural Irrigation & Aquaculture

Solar Irrigation Pumps Initiatives

The Infrastructure Development Company Limited (IDCOL), a government owned financial institution, is implementing the Off-grid Solar Irrigation Pumps Program which pilots solar PV powered irrigation facility to off-grid areas to reduce dependency on fossil fuel. The program has installation targets of 1,550 pumps by 2017 and 50,000 pumps by 2025 to be funded by the government and multiple development partners, including World Bank, KfW, GPOBA, JICA, USAID, ADB and Bangladesh Climate Change Resilience Fund (BCCRF).

The Ministry of Power, Energy and Mineral Resources through its Power Division, based on its latest plan, has also announced an initiative to install 500,000 solar irrigation pumps by 2020 to reduce the use of conventional diesel and electricity pumps. The initiative is part of the 500

megawatt (MW) solar power development in Bangladesh under the Asia Solar Energy Initiative (ASEI) launched by ADB.

11. **Consistency with Investment Criteria:**

Increased RE capacity and increased access to energy via RE: SREP will be instrumental in scaling up implementation of solar PV pump irrigation systems in Bangladesh by bringing down the capital cost and accelerating technology deployment.

The proposed project will install at least 2,000 solar PV irrigation pumps comprised of 250 units of 1.5 HP, 250 units of 3 HP, 1000 units of 5 HP, and 500 units of 7.5 HP which is equivalent to about 13.2 MWp solar capacity.

Table 4: Estimated solar PV capacity and generation output

Solar PV pump capacity	No. of systems to be installed	Equivalent solar capacity (kWp)	Total solar capacity (kWp)	Est. Generation Output (60% min. grid export) MWh/year
1.5 HP System	250	2 kWp	500 kWp	-
3 HP System	250	4 kWp	1,000 kWp	-
5 HP System	1000	6.7 kWp	67,000 kWp	2,894
7.5 HP System	500	10 kWp	5,000 kWp	2,160
Total	**2,000**		**13,200** kWp	**5,054**

The project will directly benefit approximately 10,000 households by providing affordable irrigation service. Using Bangladesh's average household size of 4.5 members, the project will benefit about 45,000 individuals (at least 22,227 women and 22,773 men).

During non-irrigation season, mini-grid-connected solar PV pump systems (1,000 units with 5 HP, and 500 units with 7.5 HP) will generate about 5,054 megawatt-hour per year (MWh/y) to supply electricity to selected rural communities[6]. This will benefit an estimated 7,016 households or about 31,587 individuals[7] (at least 15,794 women and 15,793 men).

The proposed project will support the country's Rural Electrification Program through enhancing the capacity of the distribution network to meet the increasing demand of electricity in the remote rural areas. Bangladesh's policy on the power sector is "to provide access to affordable and reliable electricity to all by the year 2021". As electricity plays a vital role in the agriculture sector of any country, this project will introduce a new and viable solution for the current energy crisis in the agriculture sector.

Low-emissions development: The project directly supports the government's "Renewable Energy Policy 2010" by reducing dependence on fossil fuel and expanding the use of renewable energy. It

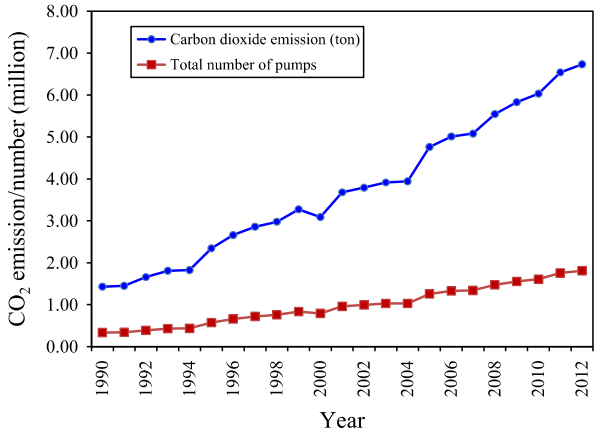
[6] Revenue generated from electricity generation has been estimated for 180 days and each day only four hours of insulation. As there is some uncertainty of having the grid feed from the system, only 60% of the generation is considered to feed in the grid system.

[7] National average per capita electricity consumption is 160kWh per year.

will help achieve the 150 MW solar PV pump systems target by 2021 under the government's 500 MWp Solar Development Program.

The widely-used diesel pumps are significantly contributing to carbon emissions in the agriculture sector. Currently, 1.3 million diesel pumps use 900 million tons of diesel annually, emitting 31 million tons of carbon dioxide (tCO_2). Installing 50,000 solar PV pumping systems in Bangladesh could save 450 million liters of diesel and reduce emissions by 1 million tons of CO_2 per annum (IDCOL, 2015). Figure 2 illustrates historical carbon emissions from irrigation pumps (deep tube well, shallow tube well, and low lift pump).[8]

Figure 2: Carbon Dioxide emissions from Irrigation Pumps, 1990-2012



The deployment of 2,000 solar PV pump systems could save 678 tons diesel/year. This will result to greenhouse gas (GHG) emission reduction of about 2,160 tons of carbon dioxide equivalent per year (tCO2e/year) or 43,206 tCO2e/year over 20-year project lifetime[9].

GHG emission avoided from the installation of 2,000 solar pumps: 29,154 GJ/year (total heat from saved diesel) x 0.0741 ton CO2 / GJ (emission factor of diesel) = 2,160 tCO2/year

Using the principal of proportionality considering financing, the $22.22 million additional financing from SREP will achieve GHG emission reduction under its renewable energy component from 25,000 tCO_2/year to 27,160 tCO_2/year.

Affordability and competitiveness of RE: The project will directly contribute to the government's vision "to provide access to affordable and reliable electricity to all by the year 2021". GOB's 7th five-year plan emphasizes the importance of electricity for generating economic opportunities. The installation of solar PV irrigation pumps can provide reliable, predictable, and affordable energy inputs for irrigation. The connection to the grid will also allow supply of electricity in rural areas

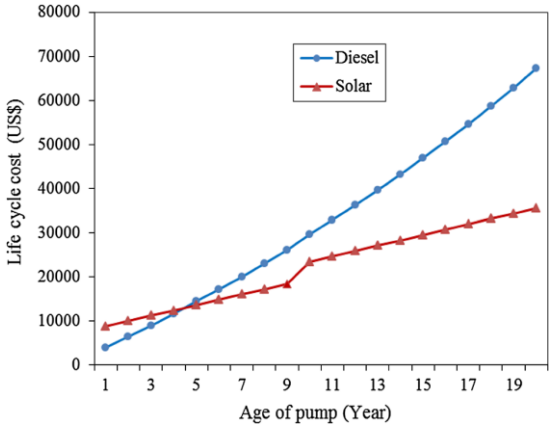
[8] Source: Hossain, M.A., Hassan, M.S., Mottalib, M.A. et al. (2015) "Feasibility of solar pump for sustainable irrigation in Bangladesh" *International Journal of Energy and Environmental Engineering* June 2015, Volume 6, Issue 2, pp 147–155

[9] Diesel savings: 678 tons diesel / year; Heat content = 43 GJ/ton diesel
Total heat from diesel = 678 tons diesel/year x 43 GJ/tons diesel = 29,154 GJ/year

especially during off-peak season. It can almost eliminate the cost to purchase fuel. With the rapid reduction of solar PV costs in the market, solar irrigation system prices have declined (but up-front cost remains a barrier for most farmers). Solar PV is the only practical option in non-electrified areas where logistics make it too expensive or impractical to supply diesel fuel on a regular basis.

Although solar-based irrigation systems are capital intensive, a comparison of life cycles shows that operation cost of solar pump is significantly lower than diesel pump. Diesel pumps require regular purchase of diesel and lubricating oil; have high repair and maintenance costs; and frequent technical problems for farmers. On average, diesel engines and pumps last for ten years and with engine overhauling required every five years. In comparison, solar pumps are cost-effective and require minimal maintenance. Solar PV panels usually last for 20 years, and operation is independent of diesel availability and price fluctuations.[10] Based on farmers' experiences on IDCOL's solar irrigation pilot project, the switch from diesel to solar has resulted in a reduction of operating costs by almost half.

Figure 3: Life cycle coşts of diesel and solar PV-operated pumps



Deployment of solar PV pumping systems reduces fuel expenditures for the agriculture sector and improves energy security by reducing diesel imports. Each year, one million tons of diesel is consumed for irrigation which is worth $900 million. Transporting diesel to rural areas is also costly and supply can be inconsistent due to difficult access leaving farmers often forced to pay diesel on a higher price than the government approved rate. The average cost of one liter of diesel is about $0.88 as of April 2017.

Based on current practice, a farmer has to pay $37 - $49 for each bigha of land as irrigation charge during a crop season for diesel or electricity run pump, whereas for solar irrigation pumps it is $31 - $34.

Productive use of energy: Increasing productivity in the agriculture sector is widely recognized as one of the most effective ways to fight poverty and stimulate socio-economic development. According to UNEP (2012), every 10% increase in farm yield reduces poverty by more than 5% in

[10] Source: Hossain, M.A., Hassan, M.S., Mottalib, M.A. et al. (2015) "Feasibility of solar pump for sustainable irrigation in Bangladesh" *International Journal of Energy and Environmental Engineering* June 2015, Volume 6, Issue 2, pp 147–155

Asia and 7% in Africa. The solar-based pumps will provide sustainable, affordable, and reliable power supply to irrigate larger farmlands in rural areas directly benefiting small and marginalized farmers. Availability of water year-round will enable farmers to shift from two to three seasons of cropping increasing their production and income as well as savings from the avoided use of expensive diesel.

The solar powered pumps will upgrade agricultural facilities through irrigation for vegetables, aquaculture farming and mixed crops rather than being used only for paddy cultivation. Access to electricity will improve farmers' technical efficiency promoting greater inclination to use agricultural machinery that could enhance their productivity.

Table 7 shows the direct benefit of the proposed project.

Table 7: Direct benefit earning from irrigation and power generation

Solar pump size	**1.5 HP**	**3 HP**	**5 HP**	**7.5 HP**	**Total**
No. of pump systems	250	250	1,000	500	2,000
Cultivation in bigha per pump / year	11	17	31	52	111
Revenue earning/pump/year ($) ($37.71/bigha)	414.81	641.07	1,169.01	1,960.92	4,185.81
Electricity generation/year ($)	0	0	368.91	550.63	919.54
Revenue per pump / month ($) (irrigation + electricity generation)	414.81	641.07	1,537.92	2,511.55	5,105.35

Note: 1 acre = 3.025 Bigha (approx.)

Economic, social, and environmental development impact:

Economic impact: Solar-based irrigation offers substantial economic benefits and will mainly accrue from the displacement of diesel use. The reduction of diesel will help improve the country's foreign exchange earnings by minimizing import of petroleum products.

Social impact: The project will directly benefit small and marginal farmers in rural communities of Bangladesh. About 87% of rural households rely on agriculture for at least part of their income. The availability of reliable and affordable irrigation systems will reduce hardships of the farmers and family members by reducing pump maintenance and need to procure diesel fuel on a regular basis. The connections to electricity will give women and children opportunities to engage in other productive activities.

Environmental impact: The proposed project will promote environment friendly technology. Solar powered irrigation projects have no adverse effect on environment. The project will reduce air pollution by replacing diesel fuel for irrigation system. It will avoid contamination of soil and groundwater from motor oil and fuel spills. It will eliminate noise disturbance from operating diesel engine.

The existing project's Environmental Management Plan (EMP) will be updated to reflect the proposed new output on solar PV irrigation pumping systems. The updated EMP will include measures for proper disposal of decommissioned / recycling of diesel gensets, including solar

panels and other electrical equipment. Farmers will trade-in used diesel gensets to access the project. These used diesel gensets will be collected and processed in a licensed facility for recycling of parts and disposal of hazardous wastes. While, arrangements will be made with suppliers/manufacturers to take back solar panels either at the end of the lifetime of solar panels or if they need to be replaced.

Economic and financial viability: The $22.22 million grant from SREP and $1.78 million from other source(s)[11], will help bring down the capital cost of solar PV pump systems making it financially and economically viable. It will increase solar PV contribution in the country's energy supply mix, eliminate use of fuel, and avoid negative ecological and public health impacts. The financial and economic analyses of the proposed project has been calculated at 15% discount rate. The project is financially and economically viable, with estimated economic internal rate of return (EIRR) of 48.75% and financial internal rate of return (FIRR) of 21%.

Although the FIRR appears high, the repayment period is longer that that desired by private investors. Further, there is limited long-term commercial financing available in the Bangladesh RE market. The high EIRR reflects the various benefits of reducing diesel fuel consumption; however, there is no policy or financial instrument to monetize these benefits as upfront cofinancing. The detailed financing structure will be finalized in consultation with GOB and relevant stakeholders before ADB's management approval in Q3 2017.

Leveraging of other financing: The $22.22 million SREP grant and $1.78 million from other source(s)[12], will be delivered as cofinancing with $20 million ADB loan, and $0.075 million government counterpart contribution. Private sector equity of at least $3.31 million will be mobilized.

Gender: please see item # 13

Co-benefits:

Energy security: The project will enhance energy security through diversifying energy sources, increasing solar capacity to meet energy demand in the agriculture sector.

Employment opportunities: The project will create job opportunities during the installation and operation and maintenance of the solar pumps. Manpower will be hired by the operating buyers/consumers (sponsors). It will offer long-term employment by building technical skills of local staff. Livelihood and microenterprise development will create more jobs available at the community level.

[11] The total SREP funding allocated to this project in the Bangladesh SREP Investment Plan is $24 million in grants. As part of the SREP pipeline management policy discussion, the $22.22 million in grants requested here represents an adjusted amount to accommodate predicted available grant resources at this stage. The GoB may request funding approval of the remaining $1.78 million if additional grant funding becomes available under SREP, and otherwise the Asian Development Bank will support the remaining $1.78 million from another source or sources.

[12] See previous footnote.

Improved health: Access to clean energy will improve health of the local community by eliminating air, noise, and soil pollution through avoided fuel and lubricating oil spills. It will reduce farmers and local communities' exposure to conventional pollutants present during combustion of diesel, especially particulate matter with diameter of 2.5 microns or less (PM2.5), which is one of the most harmful of conventional pollutant emissions with respect to human health. Household connection to electricity will avoid use of kerosene as lighting source thereby minimizing indoor air pollution.

12. **Stakeholder engagement:**

The proposed project design, including the business model and project impacts were identified through series of consultations and discussions with Ministry of Power, Energy and Mineral Resources, Sustainable and Renewable Energy Development Authority (SREDA), Infrastructure Development Company Limited (IDCOL), Bangladesh Agriculture Development Corporation (BADC), Palli Bidyut Samity (PBS), non-government organizations and other local government authorities.

The farmers' community is the main beneficiary of the project and they need to be convinced on the benefit of the program. Other project stakeholders include teachers, private sector, women's group, local residents, etc. Consultations will continue during project implementation. The project will organize and implement various public awareness activities to promote the solar PV pump system technology which will focus on benefits and opportunities (economic, financial and environmental), project design workflow, and responsibilities of each stakeholder. Activities will include: public consultations; one-on-one discussion with farmers and community leaders; and use of local and national media such as print, radio, television and internet.

Considering the profile of people engaged in farming who majority have minimum education and low income people, information materials should be easy to understand, in local language and supported by pictures and graphics. A local and central communication flow will also be designed to allow farmers to communicate technical concerns and suggestions through cellphone, email and central communication software.

13. **Gender considerations[13]:**

The benefits of solar pumping solutions, especially in rural off-grid and non-access areas, has a strong gender dimension, since many women are engaged in rainfed agriculture. Watering can take up to six hours, leaving little time for other essential work, such as hoeing, weeding and tending to the plants, in addition to household chores.

The proposed additional financing will be linked to the project's Gender Action Plan (GAP). It will enable poor women and men's participation in the renewable energy sector, increase women participation in skills training and employment in the power sector especially in the operation and maintenance of solar PV pump systems, and provide opportunities for women to engage in home-based livelihood activities as electricity becomes available. A gender-mainstreamed monitoring system to monitor implementation and ensure that women including the vulnerable groups of the communities are benefiting from the project.

[13] Ibid.

14. **Indicators and Targets (consistent with results framework):**		
Core Indicator	**On-going**	**Additional financing**
(a) Installed capacity from renewable energy, as a result of SREP interventions	7.4 MW	13.2 MWp solar capacity
(b) Annual electricity output from renewable energy as a result of SREP interventions (GWh/yr)	-	5.054GWh/year
(c) Number of women and men, businesses and community services benefitting from improved access to electricity and fuels, as a result of SREP interventions	-	***Improved irrigation:*** 10,000 farming households 45,000 individuals (women: 22,227 and men: 22,773) ***Electricity during non-irrigation season:*** 7,019 households 31,587 individuals (women: 15,794 and men: 15,793)
(d) GHG emissions avoided i. Annual ii. Lifetime (20 years)	 25,000 tCO_2e/year 500,000 tCO_2e lifetime	 2,160 tCO_2e/year 43,206 tCO_2e lifetime
Development indicator(s): - Job opportunities during pump installations and during operation and maintenance		

15. **Co-Financing:**		
	Amount (in USD million):	*Type of contribution:*
• Government	0.075	Counterpart
• ADB	20.00	Loan (reallocation from existing $300 million loan)
• Others *	1.78	Grant (tbc.)
• Communities	3.31	Equity
Co-Financing Total:	25.165	

* The total SREP funding allocated to this project in the Bangladesh SREP Investment Plan is $24 million in grants. As part of the SREP pipeline management policy discussion, the $22.22 million in grants requested here represents an adjusted amount to accommodate predicted available grant resources at this stage. The GoB may request funding approval of the remaining $1.78 million if additional grant funding becomes available under SREP, and otherwise the Asian Development Bank will support the remaining $1.78 million from another source or sources.

16. Expected Board/MDB Management[14] approval date:
Expected ADB board approval: October 2017

FINAL Version
February 26, 2013

[14] In some cases activities will not require MDB Board approval.