



Solar Irrigation in Bangladesh: Current Situation and Future Prospect



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Background: Solar Irrigation

- Agricultural sector is a vital contributor to Bangladesh's economy for employment, food security and economic growth;
- Efficient water management is an important factor for agricultural productivity;
- Alternative energy is required for food and energy security, to address climate change impact and to mitigate risk of price hick of petroleum products;
- It has huge scaling up potential provided a business model is in place;
- Reduction of greenhouse gas emission is possible.



GoB's outlook: SIP Implementation

- **NDC**

Goals are achievable by maximizing the use of renewable energy;

- **7th FYP**

Emphasizes expansion of irrigation and farm mechanization with appropriate technology including better using renewable energy along with the private sector investment;

- **Minor Irrigation Policy, 2017**

Encourages the use of renewable energy for irrigation;

- **Bangladesh Delta Plan**

Emphasizes on developing long term RE and harnessing the potential of RE;

- **National Agricultural Policy, 2018**

Encourages the use of solar irrigation pump;

- **National Agricultural Mechanization Policy, 2019**

Encourages the use of solar irrigation for crop cultivation.



Draft SIP Roadmap 2021-2030

➤ **Component A**

- Standalone SIP systems 45,000nos;
- Install Solar Capacity(ISC) 1,000MWp;
- Replace 320000nos. diesel pumps;
- Irrigate 690,000 hectares land;
- Serving 2,500,000 farmers;
- Reduce 300,000 tonnes diesel use annually.

➤ **Component B**

- Hybridization/solarization piloting 1,250nos. GC-SIP
- ISC 25 MWp by 2023

➤ **Component C**

- Small decentralized ground mounted GC SPV piloting 25 MWp by 2023



Irrigation Equipment Used in 2018-19

Type of Equipment	Operated by Electricity (Unit)	Operated by Diesel (Unit)	Total	Area Irrigated (ha)
DTW	BREB 32,565 + BPDB 2,865 = 35,430	2,204	37,634	1,076,141
STW	BREB 2,53,864 + BPDB 35,570 = 2,89,434	10,68,098	13,57,532	2,994,466
LLP	BREB 12,965 + BPDB 1,018 = 13,983	1,73,205	1,87,188	1,248,616
Total	3,38,847	12,43,507	15,82,354	5,319,223

Source: Bangladesh Agricultural Development Corporation, Minor Irrigation Survey Report 2018-19, Sech Bhaban , Sher-e-Bangla Nagar , Project Director , Digitalization of Survey and Monitoring for Development of Minor Irrigation Project, January 2020.



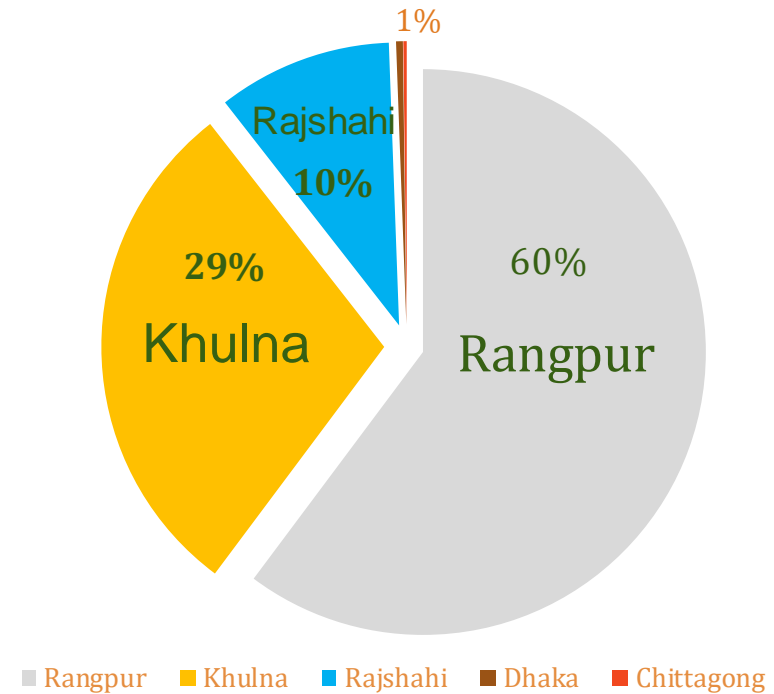
Diesel Consumption in Irrigation

Total Number of Diesel Pumps		12.43 lac pumps
Fuel consumption per pump per year		1200 liters
Total Fuel Consumption in a Year	12.43 lac pumps X 1200 liters	14,916 lac liters
		= 14.916 lac kilo-liters
		=12.5 lac tons
Import cost of Per Ton Diesel (BPC Website)		BDT 36,622
Total Import Cost of Diesel in a Year	BDT 36,622 X 12.5 lac tons	BDT 4,578 Crore



Present Status of SIP

Organization	Quantity	Capacity
IDCOL	1523	41.05 MW
BREB	40	0.24 MW
BADC	243	2.61 MW
BMDA	327	1.79 MW
RDA	18	0.24 MW
Total	2151	45.93 MW



Existing Financing Structure

Sponsor's Equity: 15%

Concessionary Loan (for 10 years): 35%

Grant: 50%



SIP Projects

- BREB has taken 2000 SIP projects
 - Target to complete: 355 nos. by March, 350nos. By July, 2021 and rest 1295 projects are currently under approval process for 32 PBS
- BARD will soon start 11 SIP projects
- BARI has taken 8 SIP research projects at costal areas:

District	Upazila	No. of projects
Patuakhali	Kuakata	3
Borguna	Amtoli	1
Vhola	Charfeshion	3
Noakhali	sadar	1

These SIP systems are being used portably for watermelon irrigation and for other season, utilization of them are lights and fans with a battery.

**Pump capacity: 280/375W, Panel capacity: 350-375/1300W.

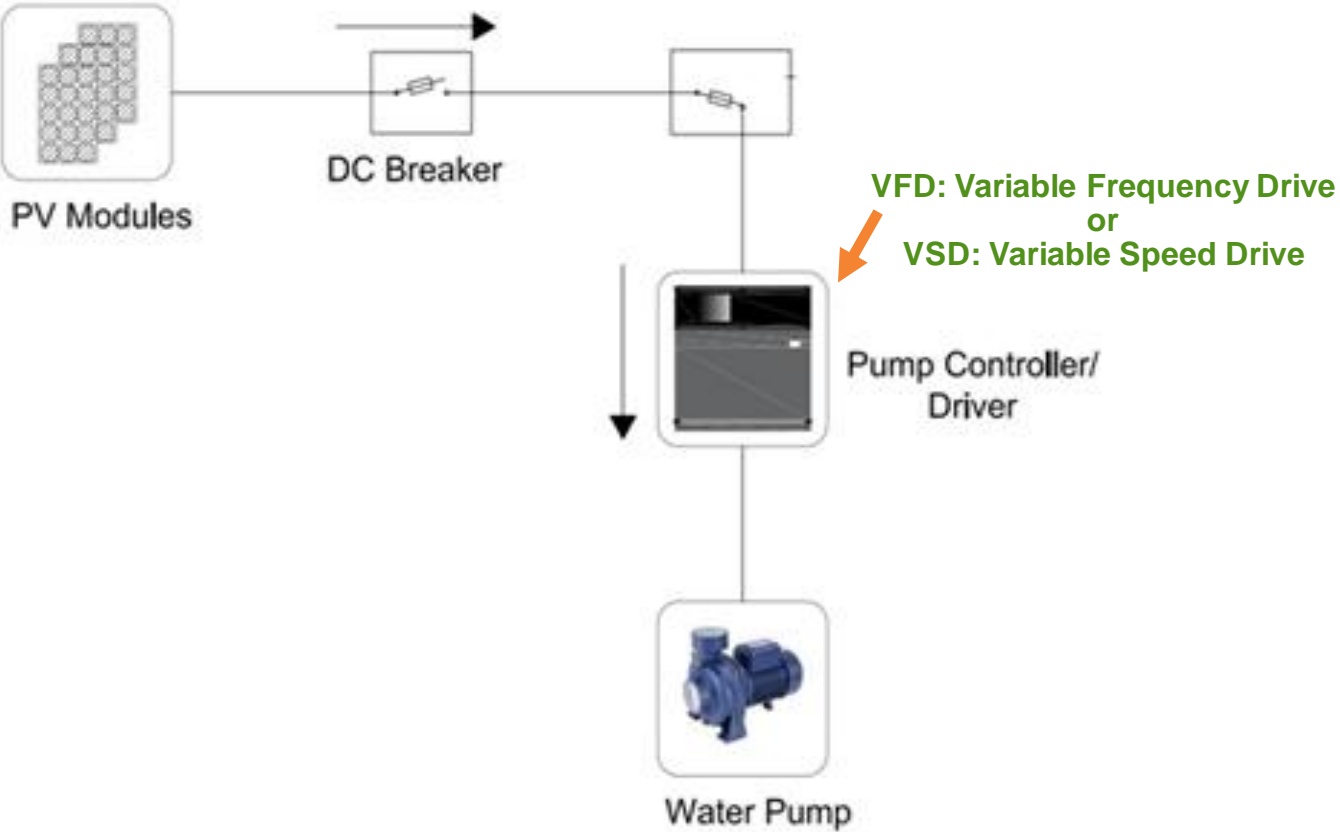


Challenges

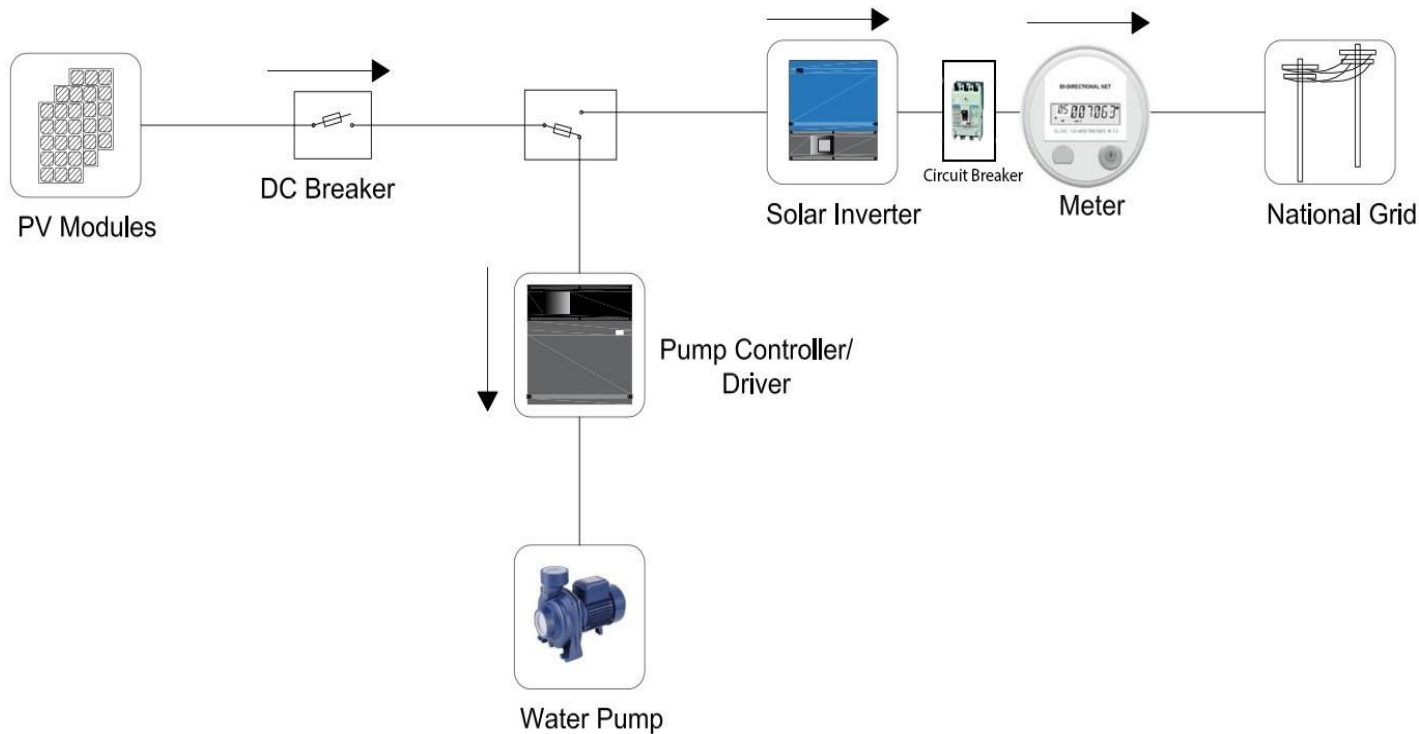
- **Excess Energy Utilization**
- **Rapid grid expansion**
- **Policy level interventions**
- **Subsidized tariff**
- **Business model**



Stand Alone SIP



SIP Grid Integration



- SIP operator will be like a small **IPP**
- They will submit bill every month to distribution utility @ **Bulk tariff**
- They can not get electricity to operate load, only **kW AC ins.Cap** equivalent **kWh/month** import is allowed for system operation only
- Utility meter will be a **bi-directional meter** to calculate energy export and import for self consumption



Net Metering Guideline

- **Monthly Billing Unit (BU) = I – E – C**

Where,

I: Electricity Import

E: Electricity Export

C: Credit Amount

- **Settlement Period:** Fiscal Year (July – June)

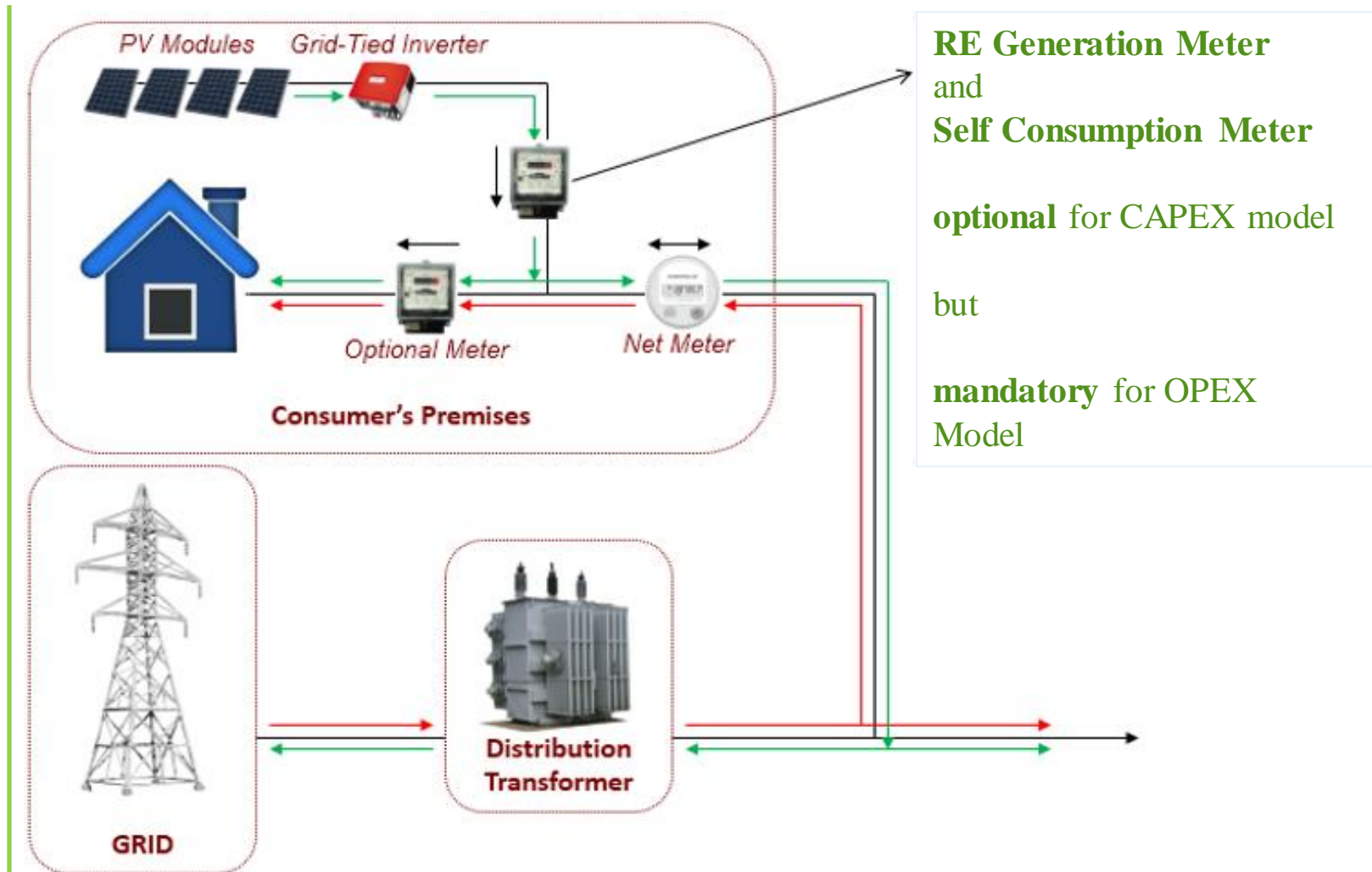
- Utility will pay to consumer @ 33 kV Bulk rate, if $C > 0$

- All 3 phase consumer classes of LT, MT and HT except temporary and construction

- Applicable only for RE sources

- After self consumption, surplus electricity can be exported to the grid

- Up to 70% of sanctioned load; but not exceeding 10 MW



A photograph of a solar panel array in a field. The panels are tilted and mounted on a brick base. The background shows a grassy field and some trees under a clear sky. The text "Thank you" is overlaid in a green, serif font.

Thank you