

# CASE STUDY

## Unlocking solar rooftop opportunities in cold storage MSMEs in West Bengal

### BACKGROUND

West Bengal has a large number of cold storage units. With an average insolation of 4.5–5 kWh/m<sup>2</sup>/day, West Bengal presents a favorable solar resource, translating to 1400–1500 kWh annual energy output per kWp. Current policies in West Bengal restrict ‘net metering’ (where, consumers are billed on net electricity units, i.e., consumption at facility minus generation from solar) for system sizes above 5 kW, but allow ‘gross metering’ (where, all solar generation units are purchased by the utility at a predetermined tariff). The gross metering policy is less lucrative and discourages MSMEs from installing rooftop solar panels, because the feed-in tariff is INR 3.20/kWh, while current utility electricity tariff is in the range of INR 6–7/kWh. Hence, the design of solar PV rooftop system should focus on captive consumption of electricity generated from solar power. The solar PV system must be sized at 60–80% of contract load to utilize the units generated for captive consumption, as most of the monthly energy consumption in a typical cold storage lies in this range. In case the regulations in West Bengal enable the provision for solar net metering in future, the design capacity for the solar PV system can be increased up to 90–100% of contract load (as energy units are settled in monthly/annual billing cycle).

### Baseline

A cold storage unit in Hooghly, West Bengal installed rooftop solar PV system with gross metering system. The benefits are as follows:

Capacity of solar PV system (kW <sub>p</sub> )	100
Annual generation (kWh)	1,27,000
Feed-in Tariff of WBSEDCL (INR/kWh)	3.20
Annual monetary benefit (Lakh INR)	4.0



Figure 1: Rooftop solar PV system

Based on an energy audit in 2023, it was recommended to switch the solar power for captive use. It was further recommended to install a zero export device to prevent power export to grid, and a DG synchronization device for the solar system to optimize solar power generation when the DG set is in operation during grid power failure.

### MONETARY SAVINGS

With the gross metering, the cold storage unit can generate 127,000 kWh from solar; but with captive use of solar power this generation would be reduced to 98,100 kWh. The reason is that during the off-season, the consumption will be very low compared to the generation. However, the monetary benefits on captive use will be significantly higher than that with gross metering system, as shown in the table:

Particulars	With gross metering	With captive use	Monetary benefit with captive use over gross metering system
Annual generation (kWh)	127,000	98,100	-
Annual effective energy charges (lakh INR) (A)	68.9	62.3	6.6
Annual net rebate amount for PF (lakh INR) (B)	3.6	4.9	1.3
Annual electricity duty (Lakh INR) (C)	11.8	10.0	1.8
Total (lakh INR) (A+B+C)	84.2	77.2	9.7

The total monetary benefit by switching from gross metering to captive use would be INR 9.7 lakhs per year. With an investment of INR 1 lakh for zero export and DG synchronization device, the payback period will be 1.2 months.

For more details, please contact

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