



CASE STUDY

CUSTOMER Pune, Maharashtra (Application – Manufacturing (Precision Temperature sensors))

Introduction / Overview about precision sensors:

This case study highlights the design, implementation, and performance of a Hybrid PV Solar Plant integrating solar photovoltaic (PV) panels with energy storage and backup sources. The project aims to ensure reliable and sustainable energy supply while reducing dependency on conventional power source.

Project Overview:

- ◆ **Location:** Pune, Maharashtra, India.
- ◆ **Installed Capacity:** 34.5KW
- ◆ **Commissioning Date:** Mar,24
- ◆ **Hybrid System Components:** PV Panels, Battery, Hybrid Solar Inverter PCU, Grid Supply

System Design & Component:

- ◆ **PV Modules:** 540Wp Mono PERC PV panels
- ◆ **Total Installed PV Capacity:** 34.5KW
- ◆ **Inverter Type:** Hybrid Solar Inverter 30KW with MPPT
- ◆ **Battery:** TGEL 400AH
- ◆ **Grid:** 25KVA Contract Demand
- ◆ **DG:** 30KVA

Energy Storage & Backup

- ◆ **Battery Type:** TGEL 240V/400AH, 120Cells of 2V, MS stackable Modules
- ◆ **Backup System:** DG of 30KVA and 25KVA Grid Supply
- ◆ **Control System:** IoT based Monitoring

Financial & Environmental Impact

- ◆ **ROI**
- ◆ **Payback period**
- ◆ **CO₂ Emissions Reduced**
- ◆ Fossil Fuel Savings
- ◆ Sustainability Impact

Challenges & Solutions

- ◆ **Grid Synchronization Issues:** Addressed by use of advanced controllers
- ◆ **Battery Degradation Over Time:** Factored in sizing the battery AH rating
- ◆ **Weather Variability Impact:** Hybrid system ensures energy reliability

BEFORE INSTALLATION:

January, 2024 MSEDCL Bill:

| CURRENT CONSUMPTION DETAILS | | | | | | |
|-----------------------------|-----------|-----------|-------------|--------------|---------|----------|
| Reading Date | KWH | KVAH | RKVAH (LAG) | RKVAH (LEAD) | KW (MD) | KVA (MD) |
| Current 29-02-2024 | 61109.680 | 65980.720 | 16914.950 | 141217.980 | 14.460 | 14.980 |
| Previous 31-01-2024 | 59379.150 | 64121.090 | 16456.400 | 141217.100 | | |
| Difference | 1730.530 | 1859.630 | 458.550 | 0.880 | | |
| Multiplying Factor | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| Consumption | 1731.000 | 1860.000 | 459.000 | 1.000 | 14.000 | 15.000 |
| L.T. Metering | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Adustment Solar | 0.000 | 0.000 | 0.000 | 0.000 | | |
| Assessed Consumption | 0.000 | 0.000 | 0.000 | | 0.000 | 0.000 |
| Total Consumption | 1731.000 | 1860.000 | 459.000 | 1.000 | 14.000 | 15.000 |

| BILLING DETAILS | Amount in Rs. |
|-----------------------------|---------------|
| Demand Charges | 2,89,323.00 |
| Wheeling Charge @0.60 Rs./U | 6,190.80 |
| Energy Charges | 86,258.48 |
| TOD Tariff EC | 9,465.50 |
| FAC @65.00 | 6,706.70 |

AFTER INSTALLATION is implemented:

June, 2024 MSEDCL Bill:

| CURRENT CONSUMPTION DETAILS | | | | | | |
|-----------------------------|-----------|-----------|-------------|--------------|---------|----------|
| Reading Date | KWH | KVAH | RKVAH (LAG) | RKVAH (LEAD) | KW (MD) | KVA (MD) |
| Current 31-05-2024 | 64217.280 | 69346.400 | 117831.800 | 141917.800 | 14.460 | 14.520 |
| Previous 30-04-2024 | 64169.080 | 69298.150 | 17831.100 | 141481.550 | | |
| Difference | 48.200 | 48.250 | 0.700 | 436.250 | | |
| Multiplying Factor | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| Consumption | 48.000 | 48.000 | 1.000 | 436.000 | 14.000 | 15.000 |
| L.T. Metering | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Adustment Solar | 0.000 | 0.000 | 0.000 | 0.000 | | |
| Assessed Consumption | 0.000 | 0.000 | 0.000 | | 0.000 | 0.000 |
| Total Consumption | 48.000 | 48.000 | 1.000 | 436.000 | 14.000 | 15.000 |

| BILLING DETAILS | Amount in Rs. |
|------------------------|---------------|
| Demand Charges | 4,656.00 |
| Wheeling Charge @01.17 | 56.16 |
| Energy Charges | 350.40 |
| TOD Tariff EC | -04.50 |
| FAC @60.00 | 28.80 |

RESULT AND CONCLUSION:

The Hybrid PV Solar Plant has successfully reduced energy costs, minimized environmental impact, and provided reliable power supply.

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