

## SOLAR PLANT MONITORING & CONTROL

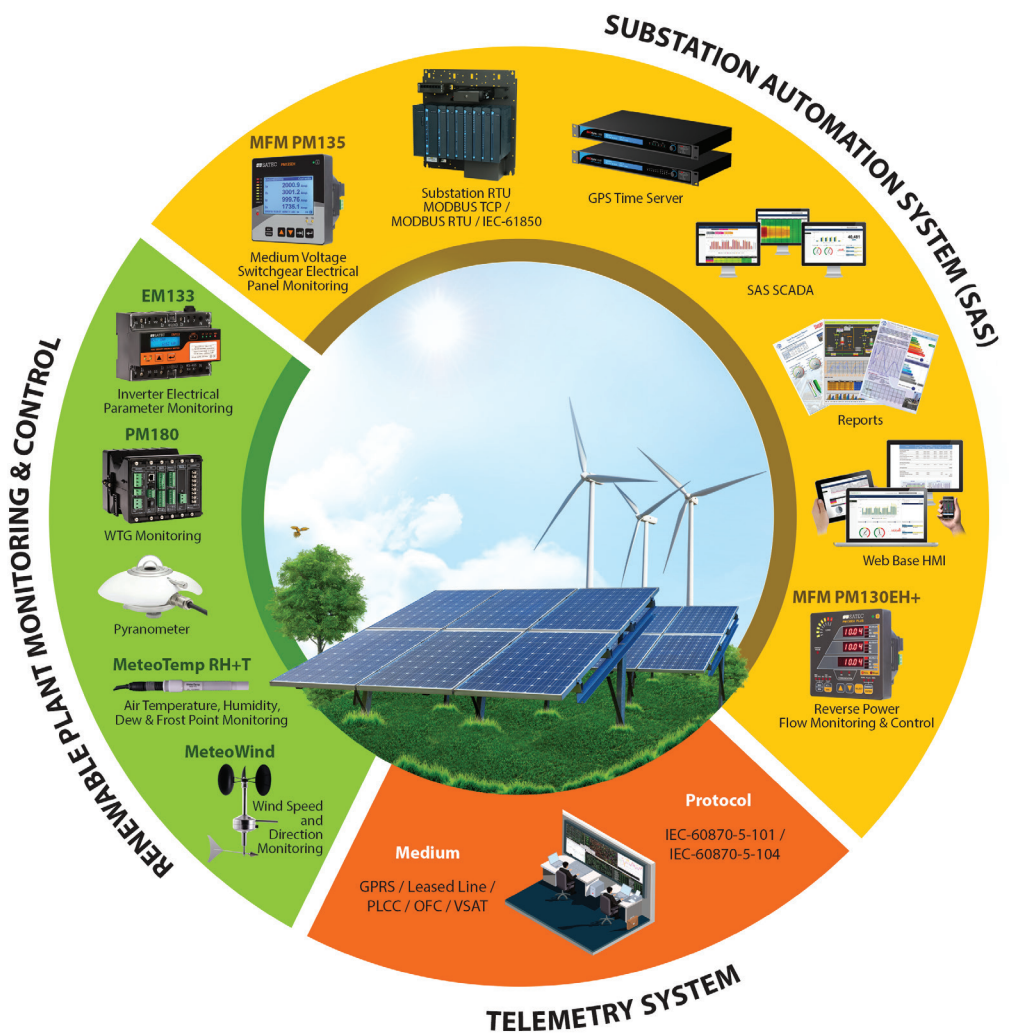
- Monitor and Control of solar plants
- Monitor parameters from solar inverters and strings
- Monitor solar plant generation performance
- Weather Monitoring Sensors
- Data logging
- GPS Time Server
- Reverse power flow monitoring & alarm
- Telemetry System
- SCADA System
- Cloud based solar plant monitoring
- Remote user access and reports

### SOLAR PLANT MONITORING

There is an increasing use of grid connected solar power plants. These solar plants require an economical solution to monitor performance of the solar plant, data logging, weather status, SCADA operation, telemetry system and reports.

Following information is required from the solar plant :

- Local SCADA for the solar plant
- Remote monitoring of the solar plant operation to reduce cost
- Operating hours for the solar plant
- Solar plant grid interface parameters and quality of power being injected in the grid



- Electrical energy generated by the solar plant inverters
- Performance parameters for the solar plant
- Net import/ export of energy to the grid
- Weather monitoring and forecasting of energy generation
- Data logging
- Provide reports on the solar plant operation

All the above information should be provided to the owner via cloud based service. This information can be accessed by the user via any intelligent mobile devices or PC's.

### SOLAR PLANT AUTOMATION– SMART SOLUTION

In solar plants, automation becomes an essential requirement to ensure optimal performance of the solar plant and monitor the same to ensure high returns for the investor.

We offer complete solution for monitoring and control of the solar plant to meet the above stated objectives.

Solar plant monitoring and control is done using RTU system, SATEC intelligent Multi-function meters, Weather Monitoring Sensors, GPS Time Server and SCADA software. Please refer to figure-1 on next page.

The RTU System shall be installed in the Solar Plant to monitor and collect required parameters and status information of Inverters and weather Station, IED's, relays, MFM etc. All these parameters will be displayed via local SCADA HMI pages. All SCADA HMI pages are also available to remote clients via web log-in.

#### Function performed by Solar Plant Monitoring and Control System :

- RTU System will communicate with all protection and control relays used in the plant via IEC-61850 protocol
- Communicate with all MFM and collect required parameters from the same
- Monitor digital status via optically isolated digital inputs
- Provide control commands via relays or digital outputs

- Monitor time stamped ( one msec. resolution) SOE
- Provide required time stamped parameters and SOE to local and remote SCADA
- Monitor weather parameters through sensors

**Function performed by Solar Plant Monitoring and Control System (cont.) :**

- Local SCADA system provides display of all parameters from the solar plant
- Provide required reports and performance analysis
- Provide reports and alarm event alerts via emails
- RTU system shall also provide required telemetry System: Communicate with remote SLDC and provide required real time parameters to SLDC
- Communicate with SLDC can be via any available means of communication - like GPRS, Leased lined, PLCC, V-SAT, and Radio etc.
- Redundant telemetry communication links and communication with multiple SCADA centers can be provided

eXpertpower service can be subscribed for minimum twelve months. Subscription charges are based on number of solar plants and number of users.

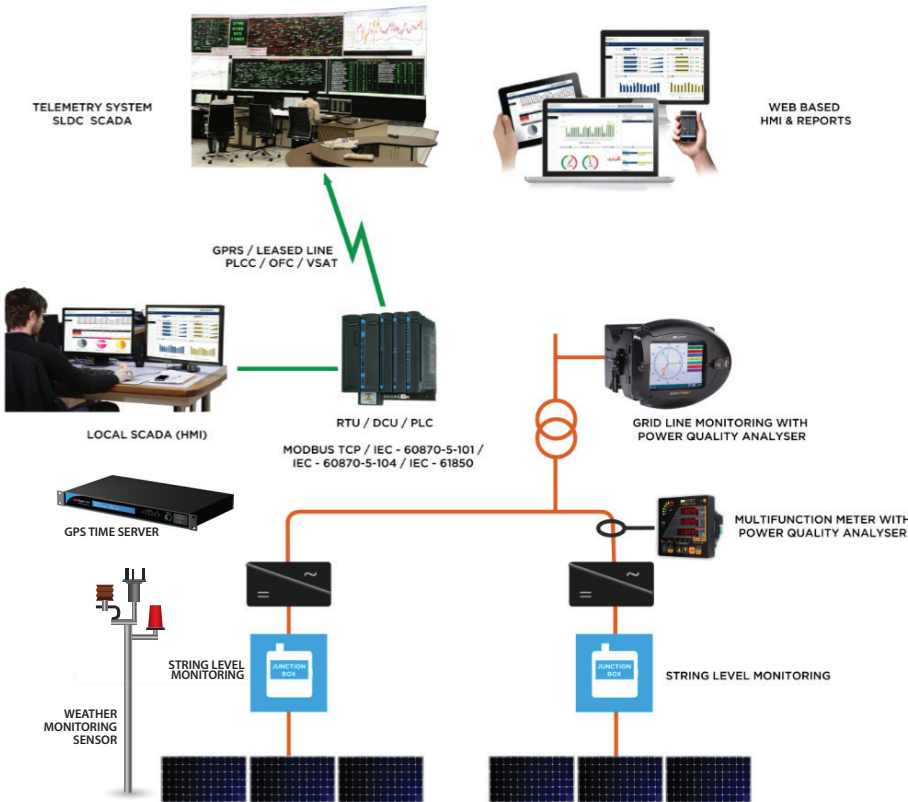


Figure-1 : Solar Plant Monitoring & Control

**WEATHER MONITORING SYSTEM**



As per REMC guidelines— weather data is mandatory to be monitored and provided to State Load Dispatch Centre (SLDC). At the same time weather parameters are an important feature for plant owners to monitor plant production efficiency and forecast production. Pyranometer is essential in the initial stage of plan set-up and further used in plant performance monitoring. We offer the following highly accurate and affordable sensors :

- Solar irradiation (W/m2) as per ISO 9060
- PV Module Temperature
- Wind Speed as per MEASNET
- Wind Direction as per MEASNET
- Relative Humidity per WMO
- Air Temperature as per WMO
- Rain Gauge Sensor



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