APPLICATION:

BTS and micro-wave communications for remote telecommunications provider, hybrid systems are particularly well-suited for applications in remote areas, where electric utility service does not exist or unstable power supply. In comparison with the costs of grid extension or the high costs of fuel delivery to remote locations and high site maintenance costs, hybrids can offer several benefits to telecommunication operators:

- Decreased fuel consumption by 30–100%
- Save massive BTS outages (around 65%) due to Genset failures
- Environment friendly: as Genset burn fossil fuel and emit high volumes of CO₂ as well as noise and odors
- Extended maintenance and replacement intervals
- Reduce burden of expensive operating cost: A Diesel Genset typically accounts for 35% of the total OPC of a BTS station
- Payback periods of 3 - 5 years or less in many instances
THE SOLUTION:

The Renewable Hybrid Telecom system consist of Solar Photovoltaic Panels which converts the Sun light into electrical energy and charge the 48V Battery bank during the day time and the BTS load is supported up to its designed power rating. Solar panels are made up of high efficient Crystalline silicon cells. To utilize smaller area of Telecom site and get better output energy generation, Panels are connected in series / parallel combinations to have a designed power output from the system.

An efficient MPPT solar charge controller is used to maximize the power output from the PV Modules to charge the battery bank. The Charge controller will track the power to get the maximum output power. It has a built in intelligence to manage the battery charge and discharge ratings to keep the battery healthy. The Charge controller will prioritize its charging sequence to keep the battery fully charged by providing first preference to solar power when it is available.

Control logic developed to utilize the different resources in efficient techniques and keep the battery fully charged by providing priority to solar charging and using Utility power / Diesel Generator power in the absence of solar power. Control logic to control power systems with multiple power sources. It handles solar energy, Battery Bank and generators in combination with unstable grid. It is also prepared for wind power as an optional. It can be configured to automatically choose / prioritize the smartest energy source at all times, and it can record the amount of energy produced / utilized by the various sources.

It has many offsite benefits if it is connected to the internet. View the system status and receive alarms at a management center. Use features such as battery charging and generator runtime, to plan for site service. Use the energy logs to document the amount of renewable energy used, and to plan for site upgrades.
THE SYSTEM:

For continuous telecom loads of 500 to 3000 watts,

48 volts DC or 110V-240V 50Hz/60Hz AC,

24 - 72 hours Battery backup

- Solar system is designed to provide un-interrupted power to charge the battery bank with complete power reliability. PV Panels used shall be IEC / UL approved
(Solar power generation depends on weather and insolation data, specific to the design site)

- Battery is designed for 3 days (72hrs) of autonomy based on average low temperature for that site. Suitable for solar applications in deep-cycle operation and it’s maintenance free require no watering or equalizing charge.
• Control logic is designed to work with Genset or unstable Utility power to compensate PV contribution. System is designed to provide un-interrupted power to the load with a power reliability of 100%.

• The system is designed for an approximate 50/50 split in energy contribution. The estimated fuel savings compared to a standalone Genset makes the returns much faster.

Product Features:

• Logic Control
  - Supervisory control
  - PV control
  - Battery management
  - Prioritizing the resources
  - Wind turbine control (Optional)
  - Utility / Generator set rectifiers
  - Communications
  - Enclosed compartment
  - Dynamic air-cooling

• Solar Photovoltaic (PV) Array and Mounting Structure
  - 5 - 25 kW solar PV in modular block (Typical 5 kW)
  - Typical 9x3m PV array length fits within telecom site area
  - It can be Elevated 2m above ground to avoid shading from cell site walls, and to provide shading for equipment mounted beneath
  - Seismic rated structure
  - Simplified concrete footings to do it at remote site
  - Theft resistant frame (Optional)

• Wind Turbines and Towers (Optional)

• Battery Banks
  - Cost-effective lead-acid batteries (Valve Regulated Lead Acid)
  - Deep-cycle rating (Appropriate for Solar Telecom site)
  - 1 - 3 days of backup power
  - Forced air cooling / ventilation (using efficient DC fans)

• Outdoor Enclosure for Extreme Environments (Optional)
<table>
<thead>
<tr>
<th>Description</th>
<th>Telecom DC Load</th>
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<tbody>
<tr>
<td></td>
<td>1000 W Cont.</td>
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<tr>
<td>Location considered</td>
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<tr>
<td>Lowest average Irradiation in a month</td>
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<tr>
<td>Average Temperature in a year</td>
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<tr>
<td>Battery autonomy Days</td>
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<td>Battery Depth of Discharge allowed</td>
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