

# Solar Telecom Power System

Communications is one of the foundations of modern society. Solar power systems for telecommunications typically supply power to continuous loads ranging from 1 W single terminal to multi-kW BTS & repeater stations located in places with no access to the electricity grid. We have delivered thousands of stand-alone solar power systems to clients in the Asia, Middle East, and Africa. Our reputation as the leading supplier of solar power systems has been Established through proven performance, the supply of highly reliable systems and by integrating skills across the key areas of manufacturing, product engineering and customer support..

Telecommunication provides the lion's share of market opportunities for photovoltaic. Telecom stations are often located in remote, uninhabited areas where no infrastructure exists. However, reliable and economical power is a must wherever such stations are installed. Topsun Telecom Power Systems has a wide range of professional solar power systems that have been designed to serve the needs of particular services.



## Telecom Opportunity Milestone

1) "Of the next billion mobile users, 71% will come from parts of the world where urbanization levels are still well below 50%."

- Pyramid Research

2) "There is a whole set of needs at the rural level which has to be converted into opportunity in which information and communication technologies will have a major role."

- Confederation of Indian Industry

3) "The cost of passive infrastructure is enormous and telecom companies should consider the infrastructural challenges in the rural areas."

- CII National Committee on Telecom and Broadband

"Deployment of the Topsun Solar Telecom Power System has made the BTS shared site uninterrupted with almost Zero break down. Remote monitoring of system performance made the system more suitable for the remote site.

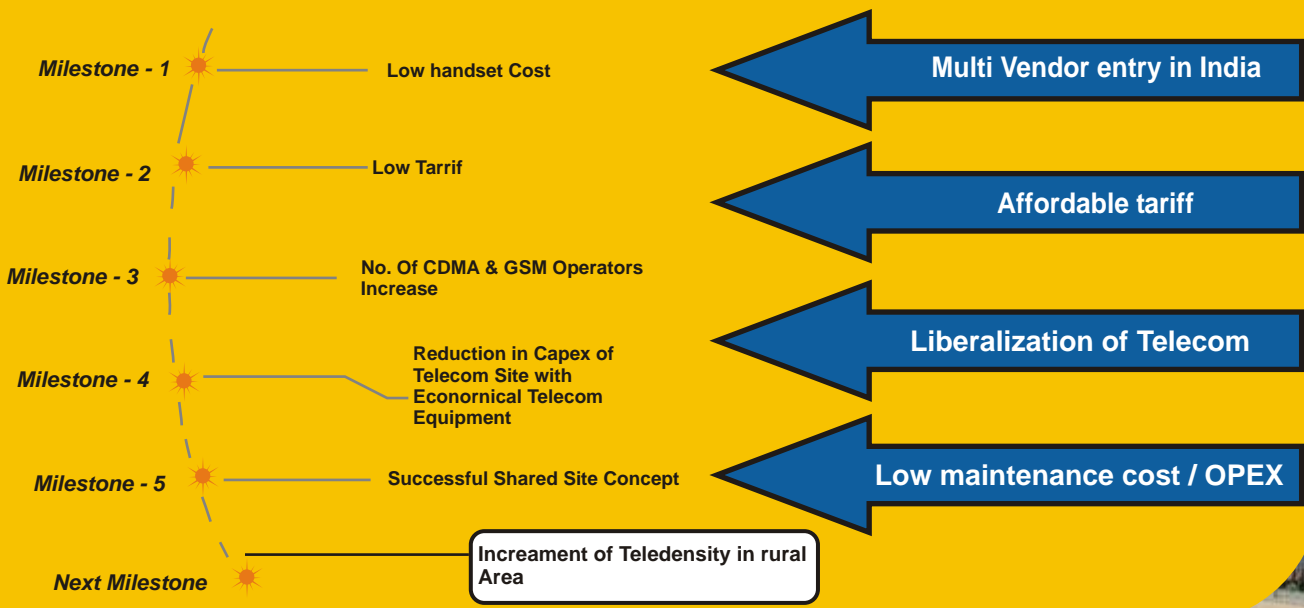
..... From : One of the Leading Telecom Operators

As per the situation the best solution to overcome the problem of connectivity, the telecom system should be taken care by renewable Energy sources. The major hindrance in setting up the system is huge capital expenditure. Topsun Provides Innovative Solution with Economical & environmental sustainability. When Telecom Operator decides to set up a new radio site, we must ensure that it meets quality of service requirements and is financially profitable. They use autonomous energy solutions, such as solar panels, to install new BTS sites in regions that are not connected to public electricity grids or Grid is not stable. Such solutions provide an interesting alternative to traditional diesel generator sets, for which the refueling and maintenance costs are often too high to keep in continuous operation, and which can be inconsistent, thereby altering the network's quality of service. That said, solutions that use solar panels must be sufficiently efficient to keep the overall cost of the site down to a reasonable level



# Telecom : Growth Milestones

## INDIAN TELECOM GROWTH PATH



### Telecom Growth Factors

Conveyance  
Billing

Less Power  
BTS/Server

Outdoor BTS  
telecom Power

## TELECOM OPERATOR'S NEEDS

### ON BUSINESS DEVELOPMENT

- Develop reliable site Unman area
- Zero network breakdown in rural area
- Reduce OPEX and increase Profitability
- Multi Vendor compatibility on site

### ON INFRASTRUCTURE DEV.

- Lack of grid connectivity
- Inadequate power supply by grid at remote, hilly places
- High maintenance at site
- No Remote monitoring & Control

## Rural Telecom Site need

- Unstable / No Grid Connectivity
- Frequent Breakdown
- High Maintenance Cost
- High Diesel cost for DG operation
- No Skilled Manpower at Unmanned Sites
- Difficulty in Storage & Transportation of Fuel

## Urban Telecom Site need

- Installation & Maintenance of DG sets
- Noise Pollution
- Air Pollution
- Huge Vibrations
- Difficult to manage Frequent fuel filing & Maintenance from private site.

**MAJOR PROBLEM IS FOR THE CONSISTENT POWER WITH USE OF EASILY AVAILABLE ELECTRICITY SOURCE**

**Topsun Energy Ltd.**



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# Solar Telecom Power System Solution

## Solar Telecom Power

- Stable & Assured Green Solar For almost 25 - 30 Years
- Easy and quick installation
- Affordable cost
- Saves investment cost on ups gensets
- Reduces dependency on grid
- Generates clean electricity
- On - site' source of power
- Say - Noise Pollution  
Air Pollution  
Huge Vibrations

## TOPSUN INNOVATIVE CONTRIBUTION

- ROI of the Topsun System will be in 7 – 8 Years
- Common Controller
- Hybrid System – Auto Change Over
- Easy Implementation of the system
- Remote monitoring
- Commercially Feasible solution
- Long life of the SPV - > 25 Years of life
- Single Vendor Solution
- Topsun will provide the accurate solution with its experience since 1992

### SOLAR STAND ALONE

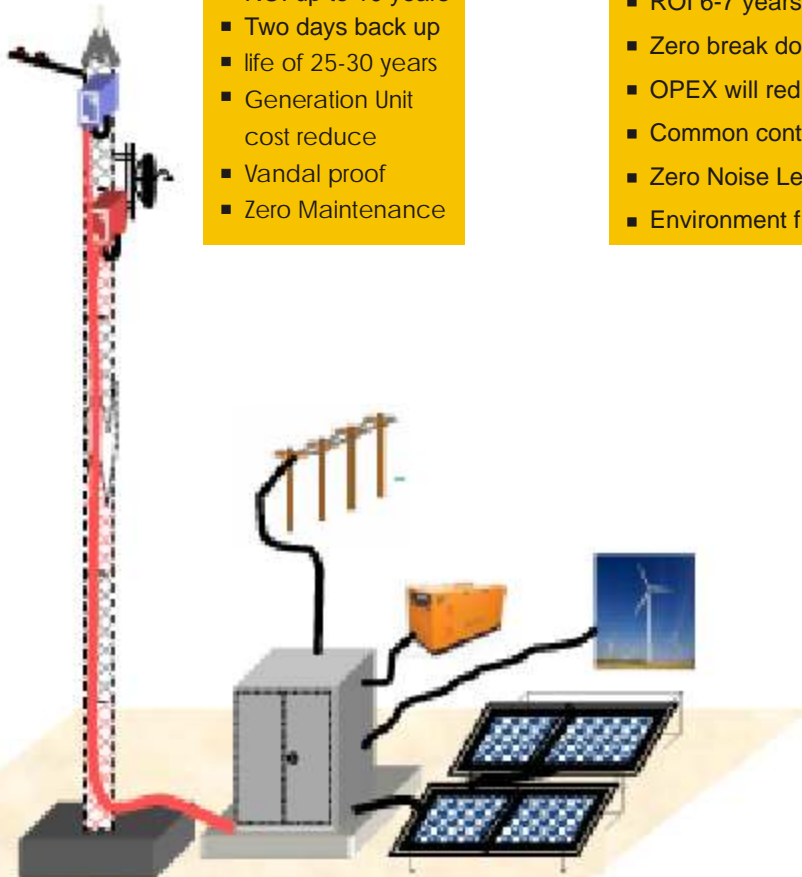
- Zero Break down
- ROI up to 10 years
- Two days back up
- life of 25-30 years
- Generation Unit cost reduce
- Vandal proof
- Zero Maintenance

### SOLAR HYBRID WITH GRID

- Eliminate Generator
- ROI 6-7 years
- Zero break down
- OPEX will reduce
- Common controller
- Zero Noise Level
- Environment friendly

### SOLAR HYBRID WITH WIND

- Common controller
- No power cost increment till 7-25 years
- Remote monitoring
- Remote metering
- Consistent power Supply

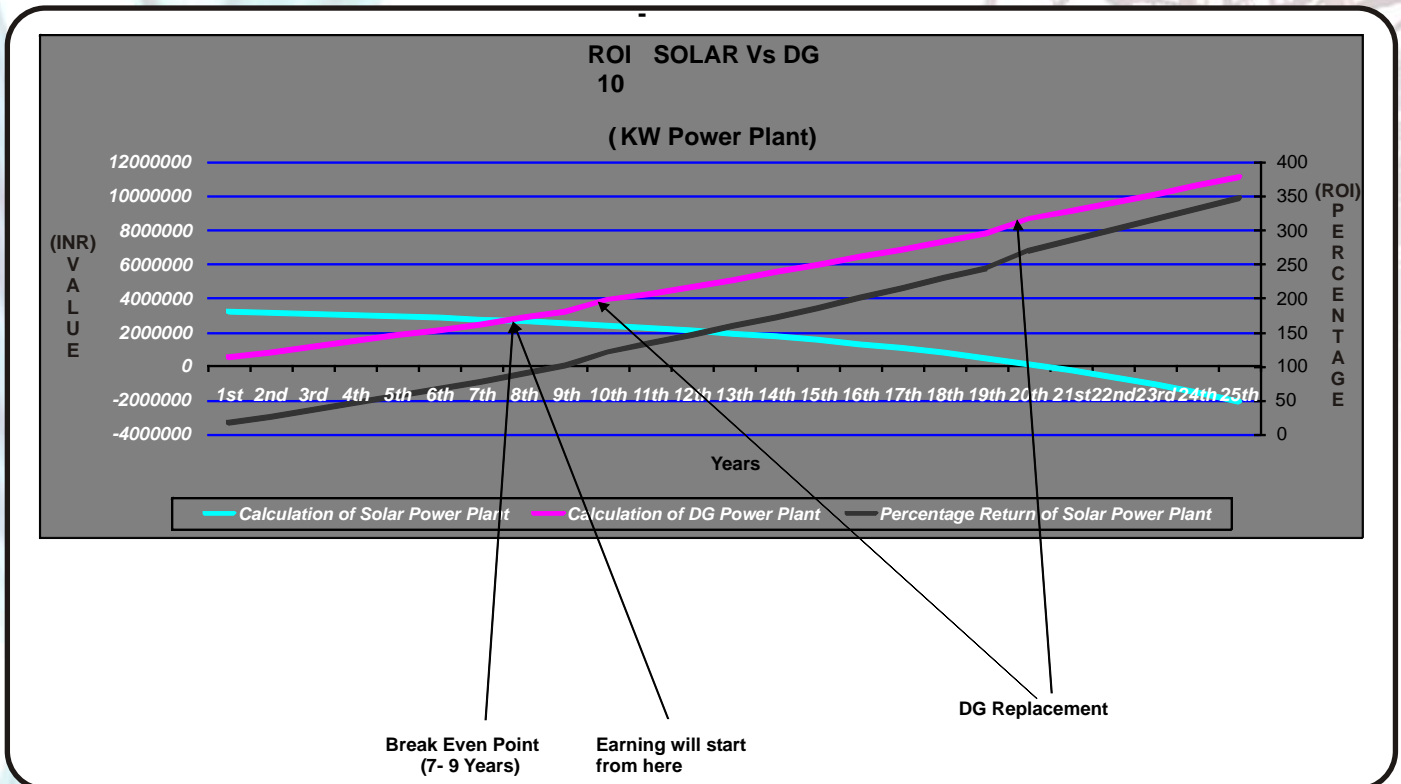


# Commercial analysis and feasibility with Topsun Solution

Topsun offers Solar telecom Power solution with its experience since 1992. With the research & development from this experience Topsun offers commercially feasible solution for Telecom Operators. For Topsun Solar telecom solution, recovery of the Investment will be in 7 - 8 years with predictable conditions & as the life of the system is almost 25 – 30 years, for the rest of the years system will be totally free. The elaboration of the recovery is mentioned as below.



Considered Factors for ROI Calculation	
Diesel Generator	Solar Power Plant
DG Cost	Solar Prices
Diesel Cost	Bank Interest
Unit Cost	Unit Cost
DG Maintenance	Solar Power
Life of DG	Life of the Solar System
Diesel transportation	—
Hours Of Operation	



(Between 7 to 9 Year)

**Elaboration of the Recovery with Topsun Solar Power System for Telecom**

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# Solar Telecom Power System

## Topsun Solution Overview

### Advantages of the Solar Power system over conventional power sources

Life of the system	More Than 12 years
Running Cost	Almost Zero
Maintenance	Almost Zero
Noise Level Pollution	Zero
Carbon Credits	Applicable for the system

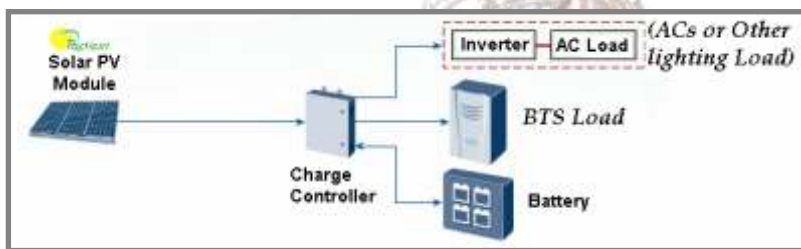
### Topsun Standard Telecom Systems

SYSTEM	APPLICATION
Stand Alone System	BTS
Hybrid Solar Power System	BTS
Hybrid Solar Power System for Shared Site	
Stand Alone Solar Power System	Microwave
Stand Alone Solar Power System	Repeater

## The Way Forward - Topsun Sustainable Solar Telecom Solution

### 1) Stand Alone Solar Telecom Power System (New Sites)

Topsun Offers Stand Alone solar Telecom Power Solution for New Remote Sites where grid or DG sets are unavailable / Unattainable / Unreliable. This Solution is widely appreciated in rural areas also where the ARPU's are needed to be Higher. Topsun Stand Alone solar Power Plant is designed as per the Requirement of the Telecom Site.



#### System Features

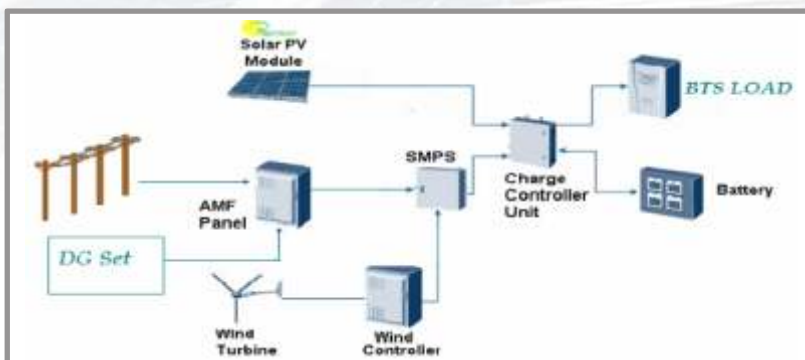
- Solar Power is the only source of energy
- Capacity of Solar array & battery bank is designed as per the loads, daily hours of operation & back up for non-sunny days.
- System Autonomy: 2 to 7 days as per requirement
- All the system components are as per IEC or equivalent international Standards
- Life of the SPV is more than 25 – 30 years

#### Application

Remote Areas / Rural Sites Unmanned Sites / Remote Forest sites

### 2) Hybrid Solar Telecom Power solutions (Existing Sites)

Topsun Offers Hybrid solar Telecom Power Solution for existing Sites. This Solution is widely appreciated in Urban & hilly areas also where the ARPU's are needed to be Higher. Topsun Hybrid solar Power Plant is designed as per the Requirement of the Telecom Site



#### System Features

- Solar, grid & Wind (If available) power are the source Of energy
- All the system components are as per IEC or equivalent international Standards
- Switching over of the load is easily possible

#### Application

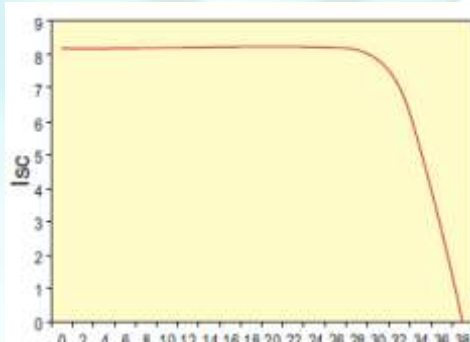
Urban Sites / Rural sites / Hybrid sites



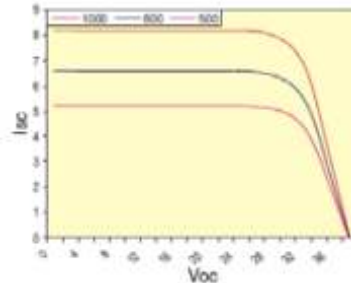
## Solar Modules

- Topsun Offers Mono / Multi Crystalline Solar Modules
- Topsun offers as high as 14 – 15.5% conversion efficiency modules
- Size of the Module – 180 Watt – 260 Watt

### IV Curve



### Various Irradiance Levels



- High Power Density
- Vandal Proof
- AR Coated cell surface – To improve cell conversion efficiency
- Topsun Offers 25 year's performance warranty on the Panels

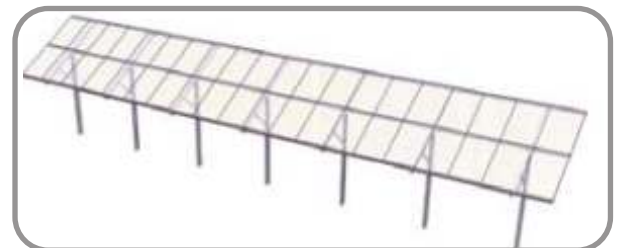


## Charge Controller

- DG – SOLAR – Wind Connection – Hybrid System with Auto Change over
- High Efficiency
- Gensets On-Off control
- All necessary Protections
  - Deep Discharge
  - Lighting & Surge protection
  - Reverse Polarity
  - Over voltage shutdown (level adjustable)
  - Overload and Short circuit proof
  - High temperature protection
  - Temperature Compensation
- Universal single piece of Controller
- Data Storage
- Broad temperature application range, up to -30°C—60°C

## Structure

- ➔ Design To accumulate the System with less space requirement
- ➔ Design with fixed Tilt Angle
- ➔ Tracking System can be provided
- ➔ Anti corrosion Structure.
- ➔ Future Expansion Can be done
- ➔ With stand wind Speed of approx 200 Kmph



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