

Renewable Energy in Telecom

2nd India Specific working group: Green Power for Mobile

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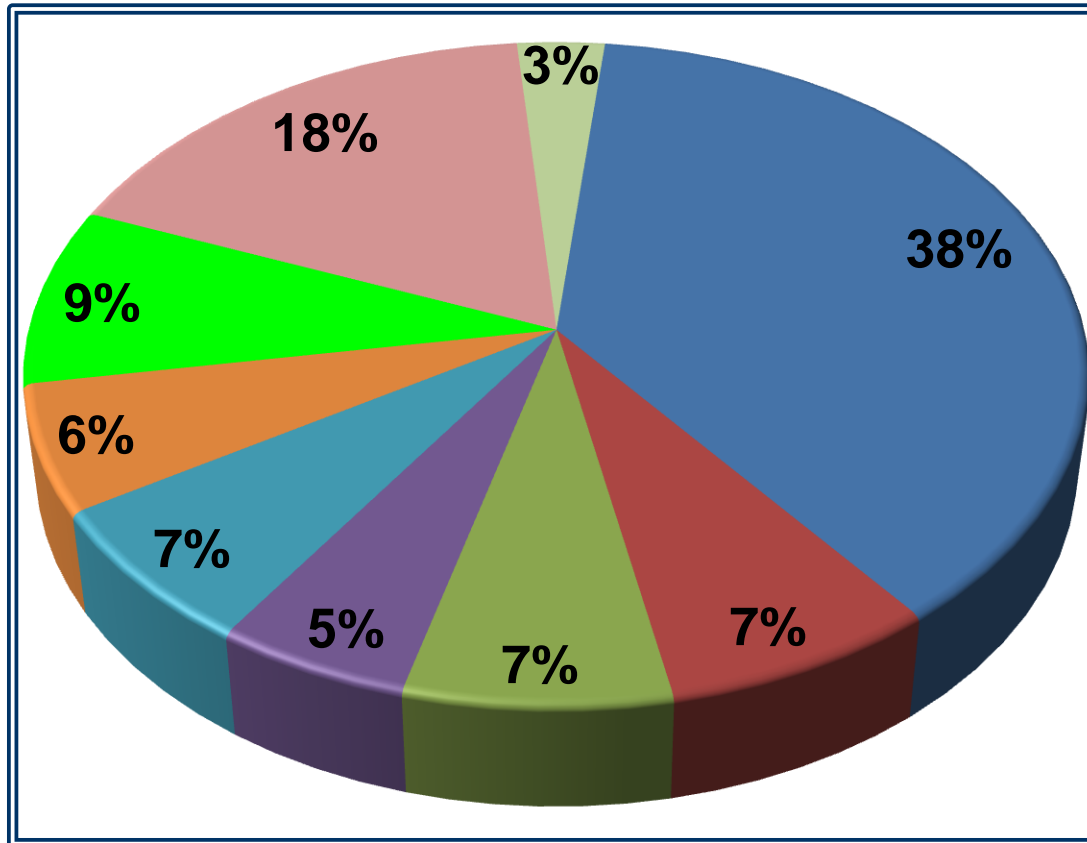


Agenda

- Indian Carbon Footprint Scenario
- Energy Management
- Opportunities in Energy Management
- Solar DG hybrid Solution.
- Opex Model for Solar Solution
- Advantages & Disadvantages
- About Bharti Infratel
- P7 Green Tower Program



CO2 Footprint – Indian Scenario



- Electricity
- Transport
- Residential
- Other Energy
- Cement
- Iron & Steel
- Other Industry
- Agriculture
- Waste

Total GHG emission is 1905 Million MT

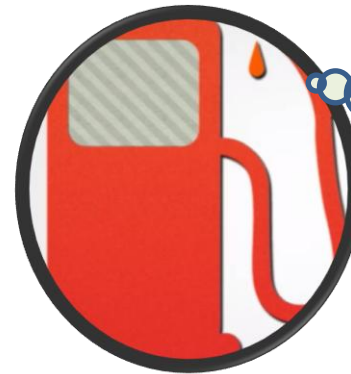
Telecom is part of other industries category like textile, pulp & paper etc with combined GHG emission of only 9%.

“Less is Still More”

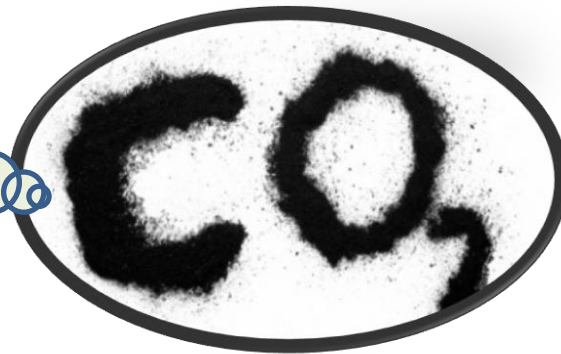
Consumes 8.6 bn units of energy.*



Consumes 2 billion litres of diesel.



20 million metric ton of CO₂**

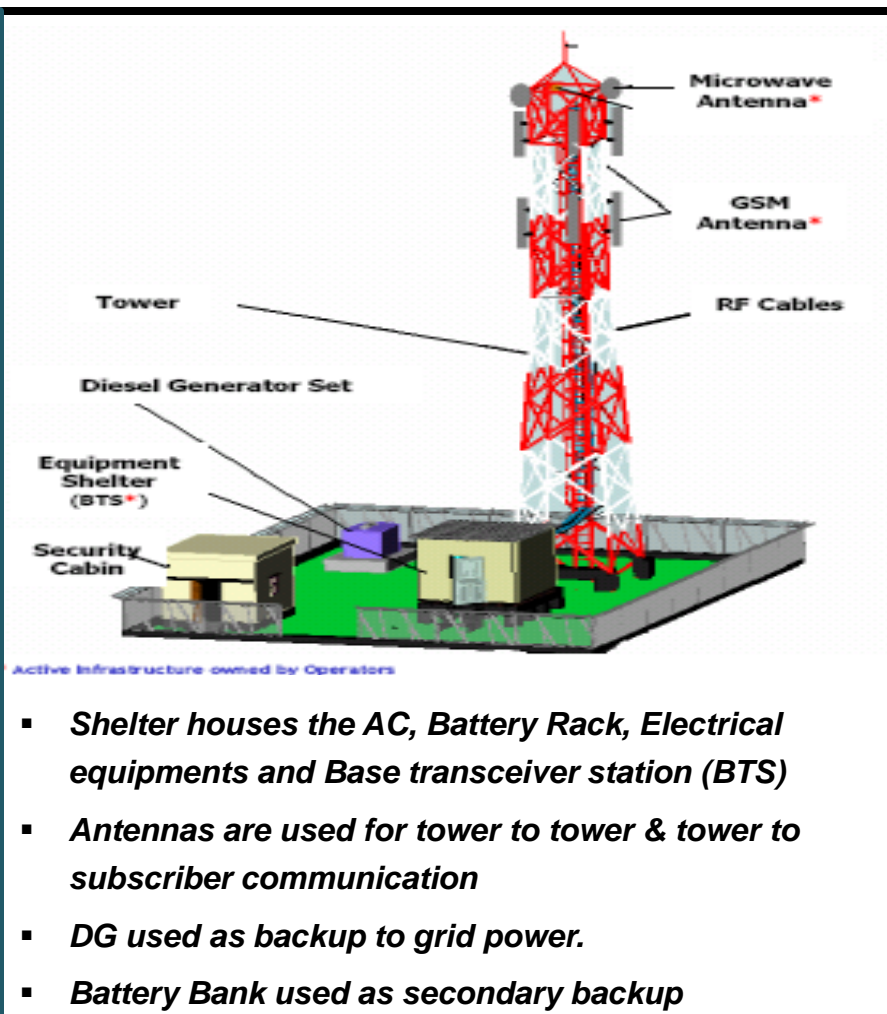
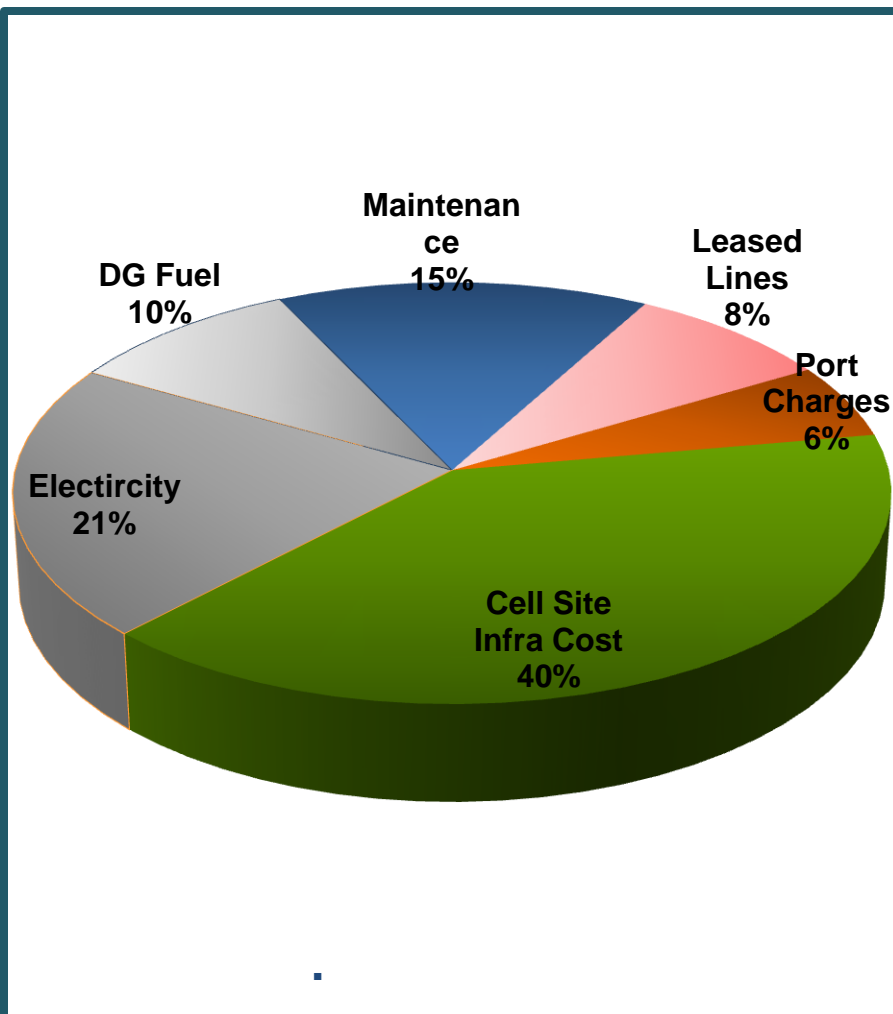


Estimated energy cost >2 bn USD.



It is very important for telecom industry to focus on energy management for competitive sustainable business.

Typical Telecom site



Electricity and Diesel bills are major expenses and must be brought down

What is Energy Management

“Energy management is the process of monitoring, controlling, and conserving energy in an organization.”

“The judicious and effective use of energy to maximize profits (minimize costs) and enhance competitive positions”

The objective of Energy Management is to achieve and maintain optimum energy procurement and utilization, throughout the Network and:

- ❖ To minimize energy costs / waste without affecting production & quality**
- ❖ To minimize environmental effects.**

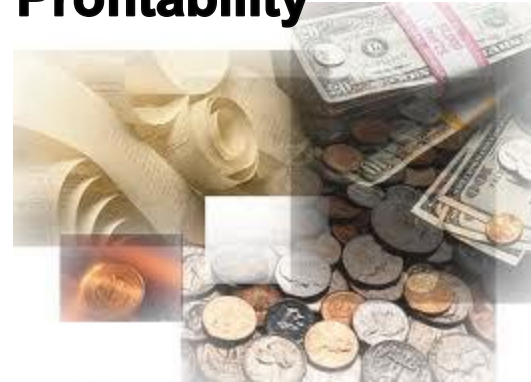


Benefits of Energy Management

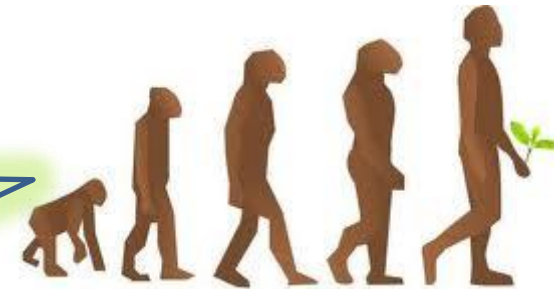
Low Cost



Profitability



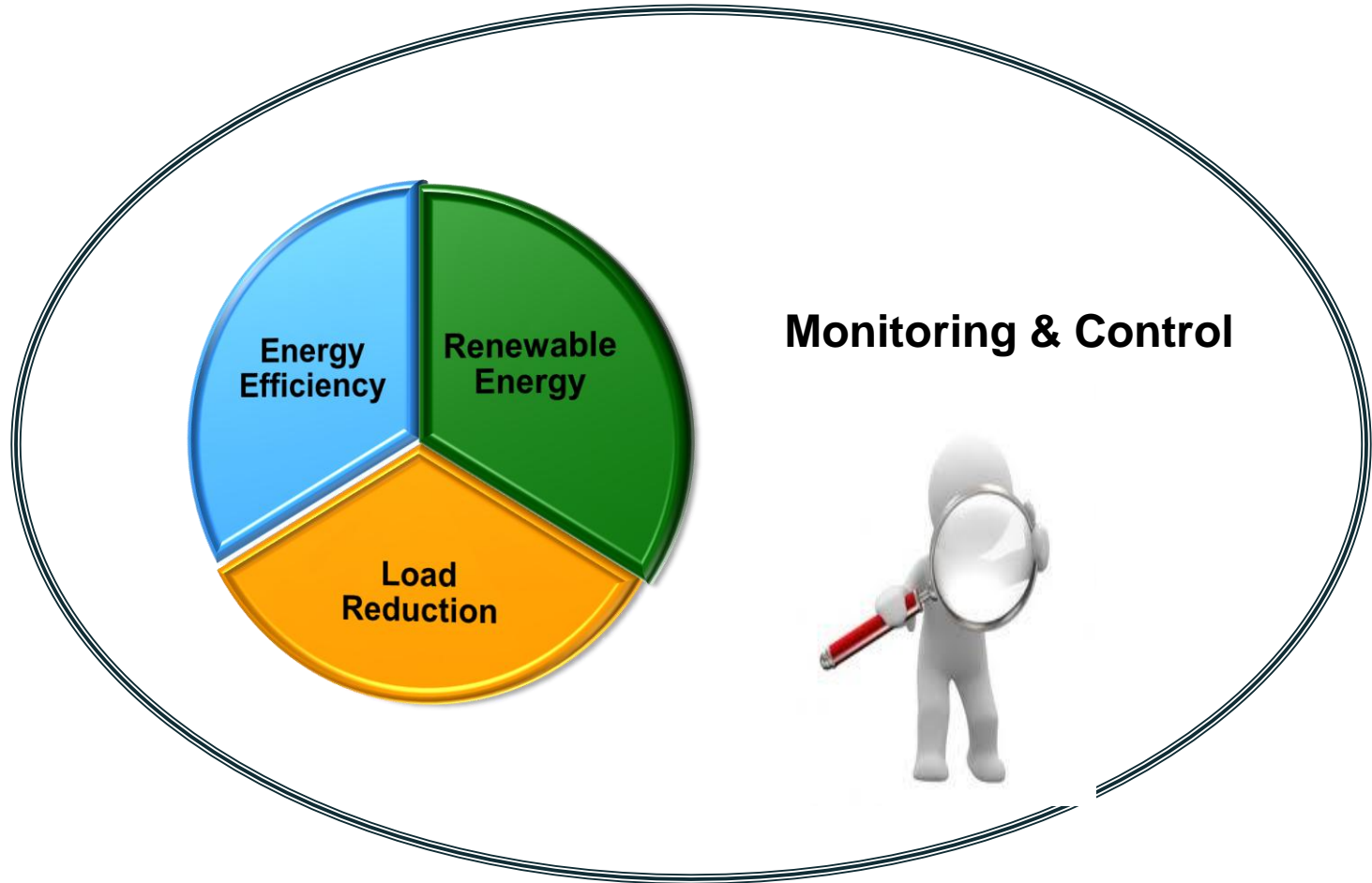
Sustainability



Competitiveness



Opportunities of Energy Management



Energy management in telecom infra needs to combine all three aspects coupled with effective monitoring & control tools to achieve desired results.

Renewable Energy Strategies



Solar

High Capex.
High savings.
5hrs availability.
Space Required.



Fuel Cell

Medium Capex
Medium savings.
Fuel logistics.
Fuel Storage.



Biomass

Medium Capex.
High saving.
Maintenance.
Fuel logistics.



WIND

Medium Capex.
Medium to high
saving.
Unpredictable.
Lesser availability

Towercos to tie up with RESCOs for scaling up these initiatives.

Solar Adaptability to Telecom

The background is a solid green color. On the right side, there are several white, curved, crescent-like shapes of varying sizes and orientations, arranged in a pattern that suggests movement or a signal. These shapes are semi-transparent and overlap each other.

Solar DG Hybrid System Over View

➤ Solar Panels:

- 3-8 KWp
- Mono & Multi-crystalline silicon.

➤ VRLA Batteries (600 Ah-1200 Ah) :

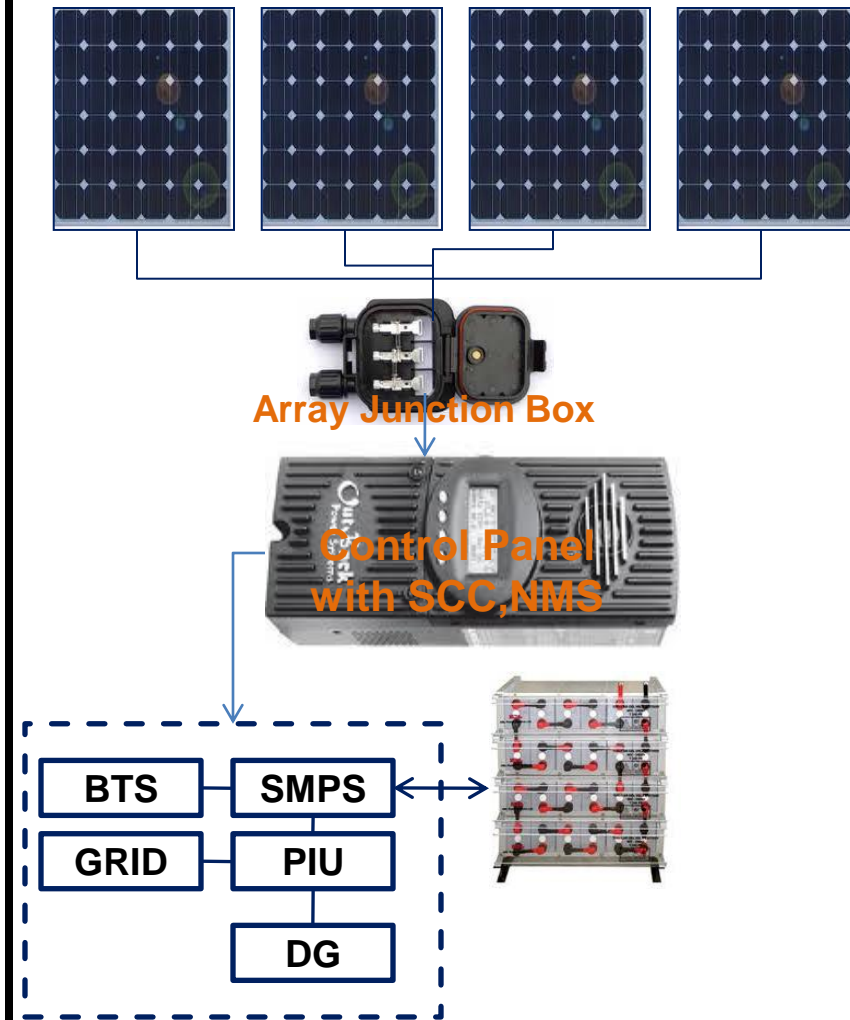
- Prolonging battery backup upto 11 hrs.
- New Battery instead existing one.

➤ Hybrid Solar Controller (HSC) :

- Sophisticated controller for optimization
- Communication with centralized Data Management Center.

➤ Data Management Center (DMC):

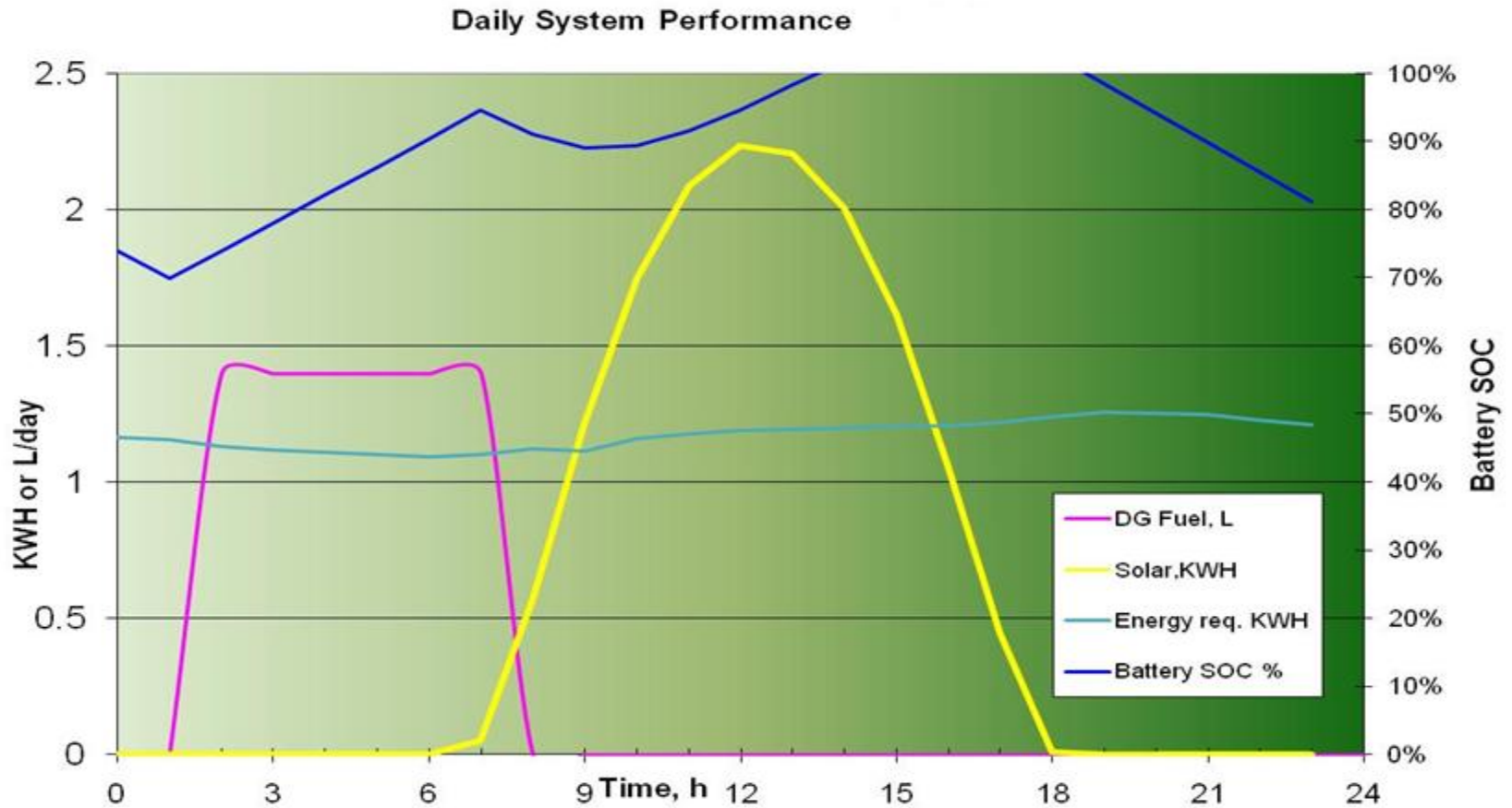
- 2-way communication with sites
- Data reporting.
- Escalation Alarms



Mostly rural site with off grid /poor grid quality for solar deployment



Solar DG hybrid Battery usage profile



DG runs only during 1 am to 8 am, rest of time site is managed using battery & solar.

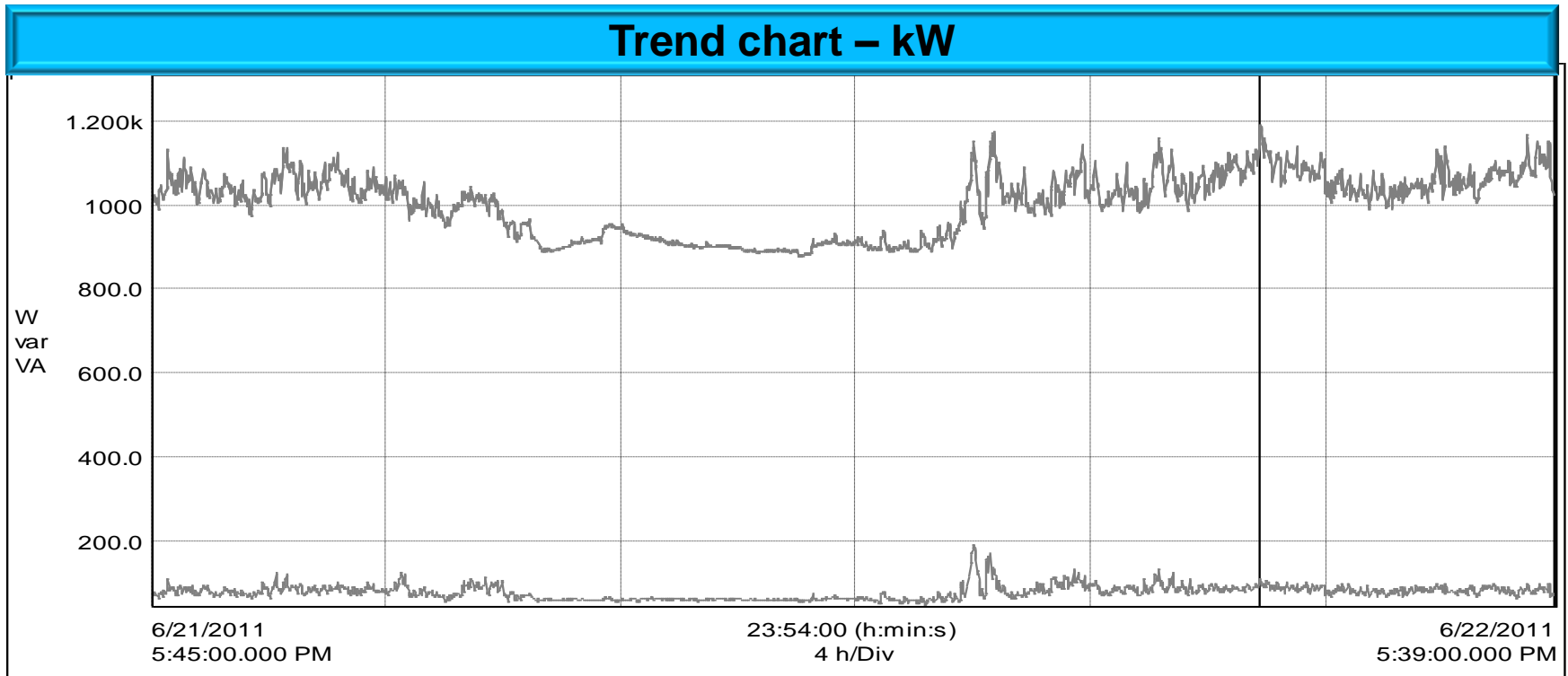
Monitoring & Control

Bharti Infratel Tower Operating Center



Remote Monitoring & Control Increases productivity , reduces site visits, improves uptime and enable effective energy management.

BTS load profiling

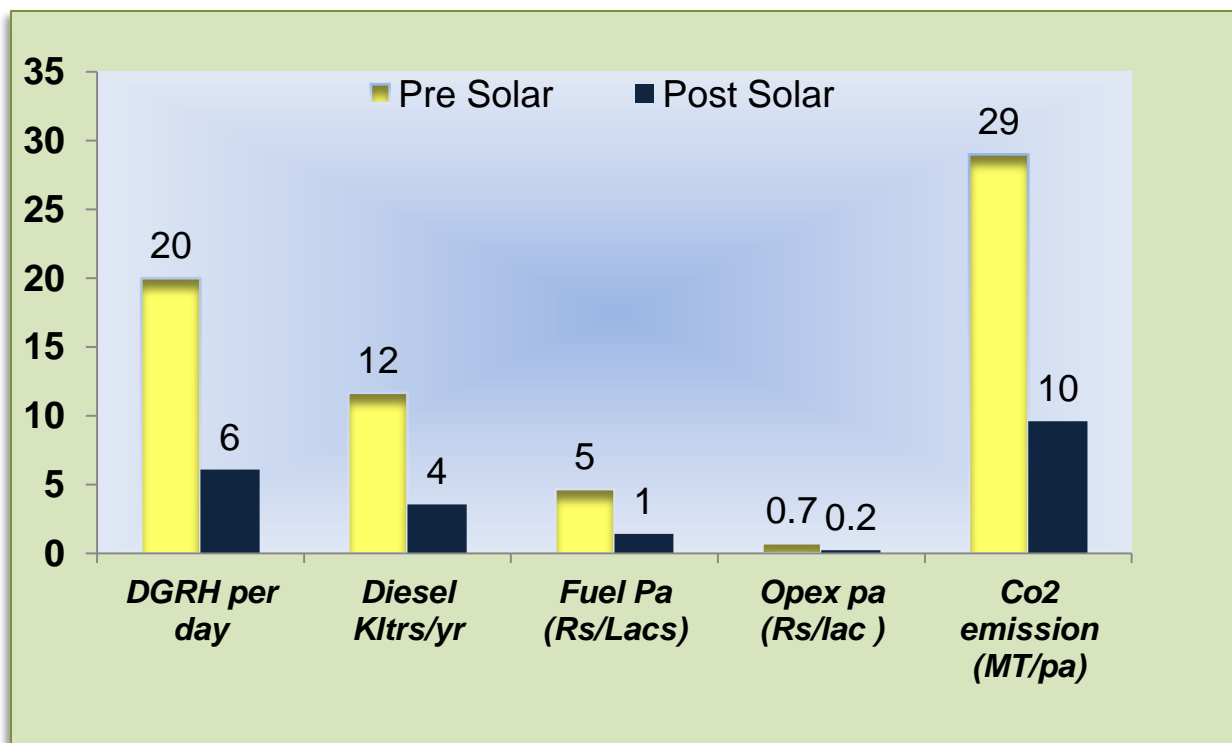


- Type: Outdoor BTS
- Trx : 12
- Logging duration: 24 hours
- Max KW: 1.188
- Max Amp.: 23.3
- Total energy consumed: 24 kWh
- Per Hour consumption: 1 kWh

Max. KW : 1.188 (DC)

Key Parameters for 1BTS site

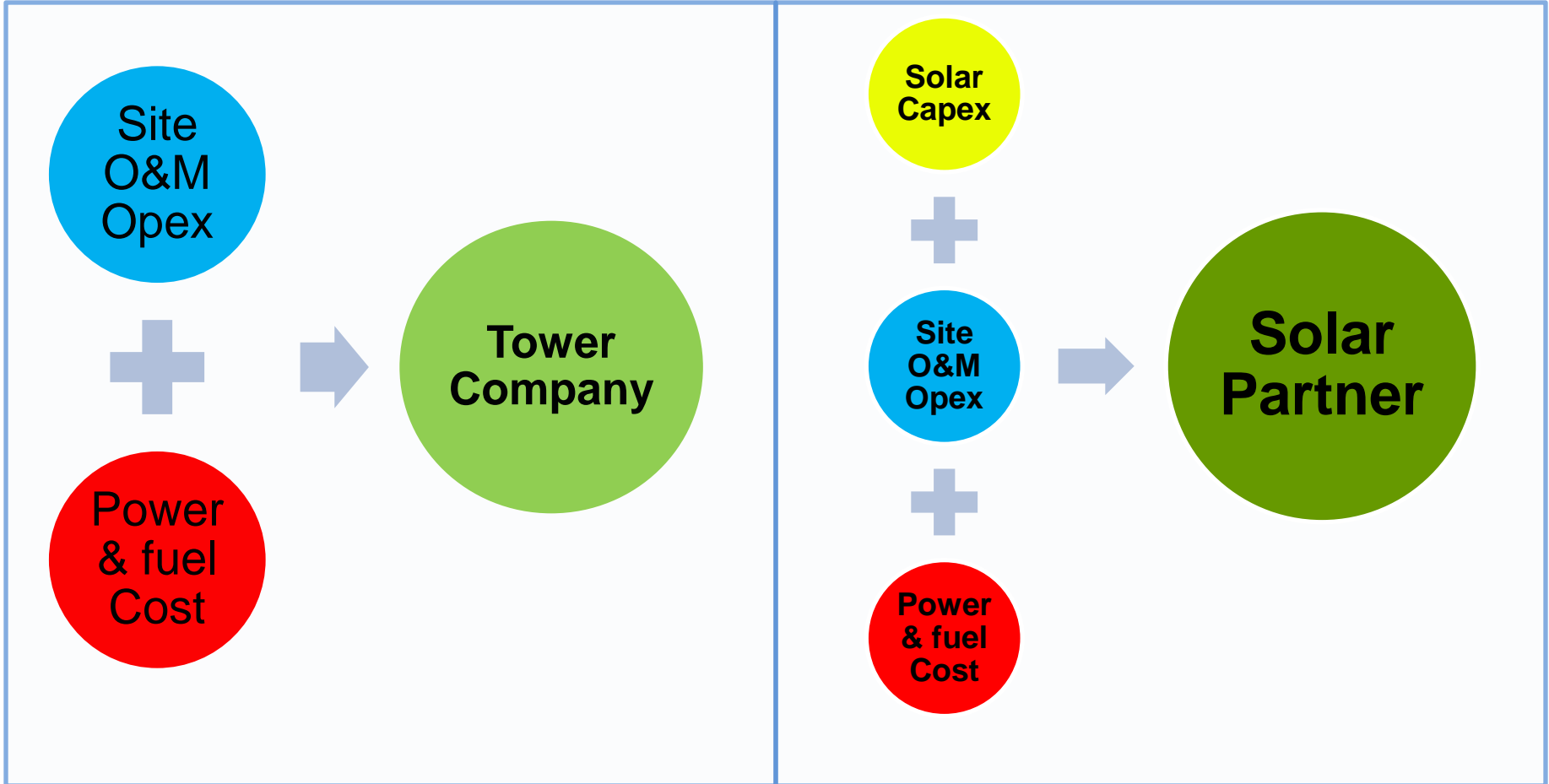
	<u>Max</u>	<u>Min</u>	<u>Avg</u>
DC load(kW)	1.5	0.8	1.2
DGRH/Day			
Pre solar	22	19	20
Post Solar	8	4.5	6.1



- ***DGRH reduced from 20 hrs per day to 6 hrs per day.***
- ***Diesel consumption reduced from 12kl to 4kl per year.***
- ***Co2 emission reduced from 29MT per yr to 10MT per yr.***

Pre Solar Model

OPEX Model



BOOT : Build, Own , Operate & Transfer Model

Opex Model

Scope

- Solar System design.
- Supply ,Install & Commissioning.
- Operation & maintenance
- Third Party equipment Maintenance.
- Site Security, Diesel Filling & Grid Coordination.

Fee

- Capex EMI
- Overheads
- Site O&M expenses.
- Diesel Filling Charges.
- Fixed Diesel Expenses indexed to diesel prices.
- Grid Charges at actuals.
- Site Security where applicable.

Advantages – Opex Model

- No Initial Capex to towerco
- Reduced Solar Panel Performance risk.
- Back to Back Uptime SLA.
- Fixed Opex cost including energy cost
- Single vendor for complete site O&M.
- Asset get transferred at the end of 10 years.



Disadvantages – Opex model

- Limited solar vendor eco system available on Opex basis with O&M & Solar Experience combined.
- Improvements in technology over 10 years needs mutual concurrence.
- Cost of Funds payable
- Depreciation benefit goes to Solar Vendor.



Roadmap for Solar Expansion in Telecom

Following Reasons should help solar to penetrate in Telecom .

- Huge existing Tower base(>330000) in Indian Telecom Network
- Further Network Expansion in Deep Rural.
- Outdoor telecom equipment requiring no Air-Conditioning.
- Increasing Prices & probable Deregulation of Diesel prices.
- Falling prices of solar panels.
- Most rural sites are Ground based & hence no Space limitation.
- Solar energy is more reliable than other Renewable energy sources.
- Network Uptime can be Managed in Difficult Terrain Sites with solar.

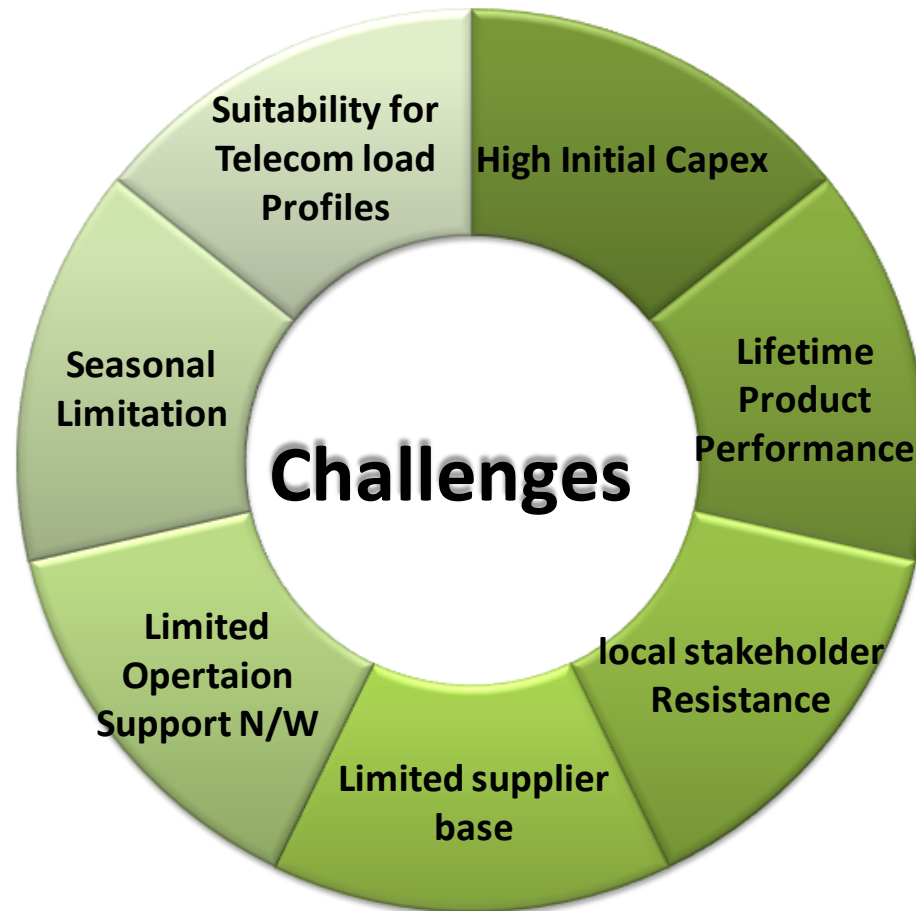


Issues

- **Solar Economic feasibility for higher telecom loads (beyond 4 kW) yet to be established.**
- **Economically feasible for Poor/No Grid sites due to high per unit cost vis-à-vis Grid power.**
- **Solar vendors need to be a site O&M Expert to get performance from Solar solution installed at site.**
- **Roof top sites with Limited space are not ideal choice.**
- **Requirement of shadow free space in southern side.**
- **Panels Cannot be installed on tower top due to high wind Loading.**



Challenges in Solar Deployment



Drivers for RESCO Model

- Non expertise in power generation & maintenance.
- Focus on improved Network footprint.
- Isolated & distributed network with limited scale.
- Can act as a Anchor load for a RESCO who can support other customers in vicinity.
- Coordination with regulatory bodies to utilize available support like subsidy etc.
- RESCO can bring better technology expertise & innovation in alternate energy sources.



Energy Initiatives at Bharti Infratel

The background is a solid green color. On the right side, there are several sets of white, curved, concentric lines that resemble signal waves or ripples, arranged in a vertical column. The lines are of varying lengths and are positioned to create a sense of movement and connectivity.

About Us

- **Bharti Infratel** is one of the world's largest **telecom passive infrastructure service providers**, that deploys, owns and manages telecom towers and communication structures for all wireless operators
- Provides best-in-class telecom infrastructure services with **compelling capital investment saving opportunities to wireless operators**
- As pioneers in India, Infratel has a **strong telecom heritage**, with deep market understanding, and unmatched Operational & Maintenance capabilities



Our Vision

‘To be the best and most innovative passive communications infrastructure provider globally’

Known for

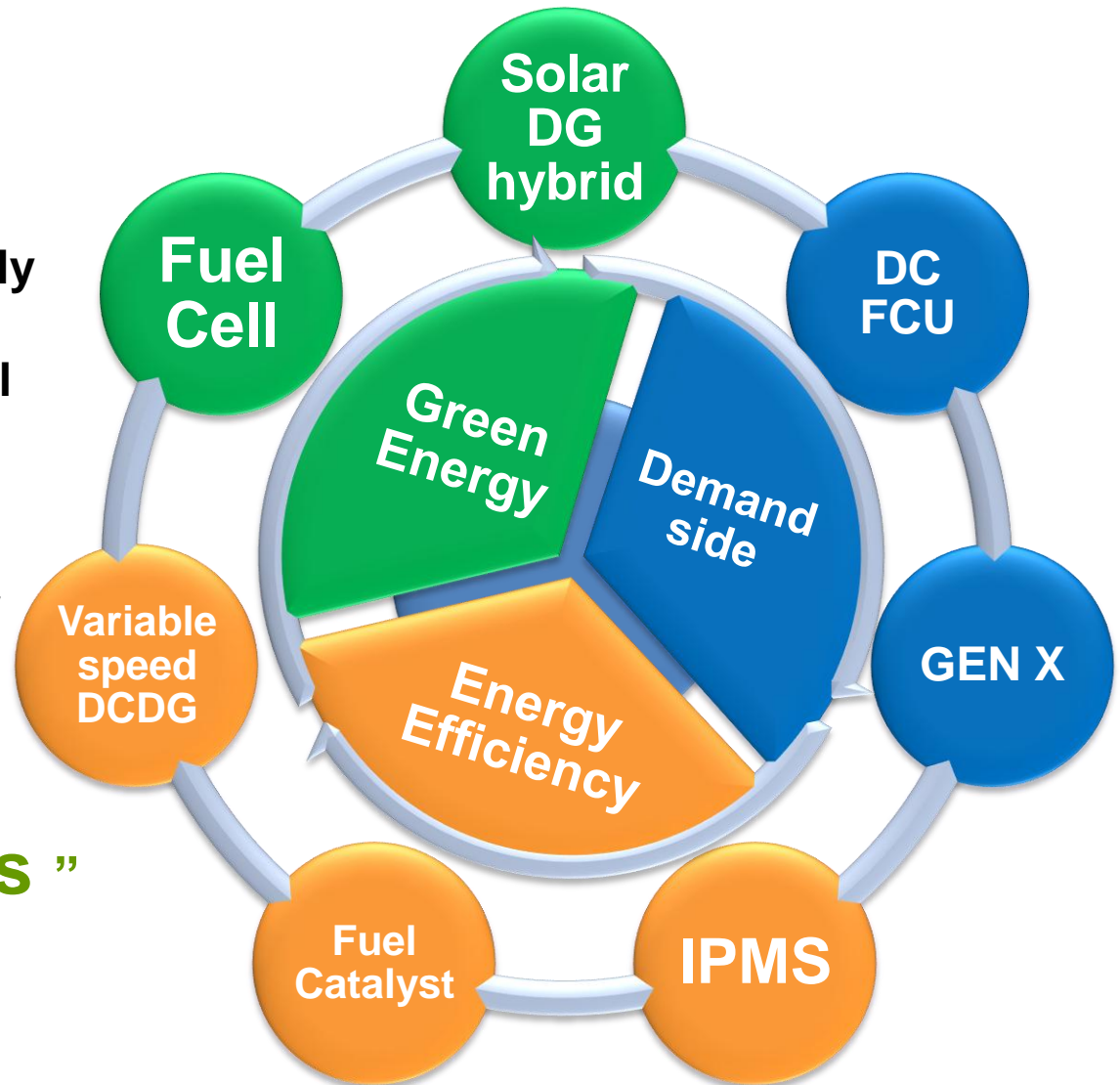
Highest uptime
Speed & quality of deployment
Cost & energy efficiencies
Environment friendliness



New Energy Initiatives Program- P7

Being environmental friendly organization, Bharti Infratel launched combined Green Energy & Energy Efficiency Program .

“ P7 Green Towers ”



Awards for P7 Green Towers Program



Green Mobile Award for “Best Green Product/Service or Performance” at GSMA Mobile World Congress in year 2010-2011 for P7 Green Towers Program.



National Award for Excellence in energy management at 10th energy efficiency summit- “Being most innovative energy saving product” for P7 Green Towers Program.



“Best Innovative Infrastructure Company” of the Year Award, by Essar Steel-CNBC TV 18 for P7 Green Towers Program.



Thank You



Bharti Infratel Limited
www.bharti-infratel.com