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

Total GHG emission is 1905 Million MT

Source: INCCA-India GHG Emission, 2007 – MOEF

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.

*No. estimated for 330 k towers @ 3kw/tower
**Source TRAI Recommendation for green telecom
Typical Telecom site

- Shelter houses the AC, Battery Rack, Electrical equipments and Base transceiver station (BTS)
- Antennas are used for tower to tower & tower to subscriber communication
- DG used as backup to grid power.
- Battery Bank used as secondary backup

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

Energy Management

Bharti Infratel Limited
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
- Medium to 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
Solar DG Hybrid System Overview

- **Solar Panels:**
  - 3-8 KWp
  - Mono & Multi-crystalline silicon.

- **VRLA Batteries (600 Ah-1200 Ah):**
  - Prolonging battery backup up to 11 hrs.
  - New Battery instead of 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 qualify for solar deployment*
DG runs only during 1 am to 8 am, rest of time site is managed using battery & solar.
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

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<td><strong>DGRH/Day</strong></td>
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<td>19</td>
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<td>Post Solar</td>
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- **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

Site O&M Opex

Power & fuel Cost

Tower Company

OPEX Model

Solar Capex

Site O&M Opex

Power & fuel Cost

Solar Partner

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

- High Initial Capex
- Lifetime Product Performance
- Local stakeholder Resistance
- Limited supplier base
- Limited Operation Support N/W
- Seasonal Limitation
- Suitability for Telecom load Profiles
- Local stakeholder Resistance

Challenges for 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
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
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