Energy Efficiency, Clean Power as Engine for Sustainable Growth

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Agenda

- Telecom Growth in India
- Power Challenges
- Energy Efficiency – Telecom System
- Clean Telecom Strategies
- Need for Clean Telecom
- Key benefits of Clean Telecom
- Regulatory Framework on Clean Telecom – India
- Summary

Growing Tele-Density

- Unprecedented growth in the Telecommunication sector in recent years, Particularly in Mobile Telecom
- Manifold increase in mobile voice & data traffic =>
  - Exponential increase in a number of cellular towers in India and more & more towers erected each year.

Telecom subscribers in India:	**892 Million (Wireless segment is the Growth Key Driver with 861.7 Million subscribers)**
Tele-density:	**75.5% (Wireless 73%, wired line 2.5%)** **40% Rural India**

February 2013 data

Indian Telecom Initiatives - Challenges

- Power availability on 24X7 Basis – Major Challenge
- Rural India (Major Part of Country) face power problems:
  - Dismal State of Rural Electrification
  - Non-availability of Grid Power in rural areas
  - Grid far away
  - Poor power quality
  - Unreliable & Erratic Power behavior
- Normally Power availability 6-12 hours a day.

Powering - Cellular Towers

- Mobile BTS : 7,42,000
- Mobile Towers : 5,85,000
- Power Requirement : 1 - 3 KW (24X7)

- 15-20 KVA Diesel Generator as a power backup.
- Diesel Consumption : 4 Litres / hour.
- Diesel Running Hours : 8 - 16 Hours / day (Normally)

Powering -Cellular Towers

- **Major hurdles in operating Diesel Generator sets:**
  - Transportation,
  - Storage,
  - Pilferage,
  - High cost of Diesel
- **Energy is a dominant cost component for Telecom operation:**
  - Energy Cost - Urban : 30% of OPEX
  - Energy Cost - Rural : 50% of OPEX
- **Carbon emission** : 0.84 Kg/ unit of Grid supply
  : 2.68 Kg/litre diesel consumption

Average fuel consumption of 8760 litres diesel every year per tower assuming 8 hours of operation by Diesel Generator sets.

[Source Telecom Regulatory Authority of India (TRAI)]

To Curb the Power Issues and Sustainable Growth & Development - An Imperative need for:

Integration of Energy Efficient
&
Clean power considerations
for
Telecom operations
to
provide best possible Quality of Service
in Telecom sector.

Energy Efficiency Techniques

Energy Efficient Telecom Networks

- Minimization of Energy Consumption in Telecom Networks -
  - Energy Efficient Technologies
  - Energy Conservation Technologies & Protocols
- Optimize Network Efficiency & Reduce Energy Usage
- Transitioning to Renewable Energy Technology
- Evolving a Carbon Credit Policy
- Adoption of Energy Efficiency Analysis
- Infrastructure Sharing – Active & Passive

Infrastructure Sharing - Passive

- Sharing of:
  - Land,
  - Cellular Tower,
  - Power Supply (Grid & Diesel Generator),
  - SMPS &
  - Battery.

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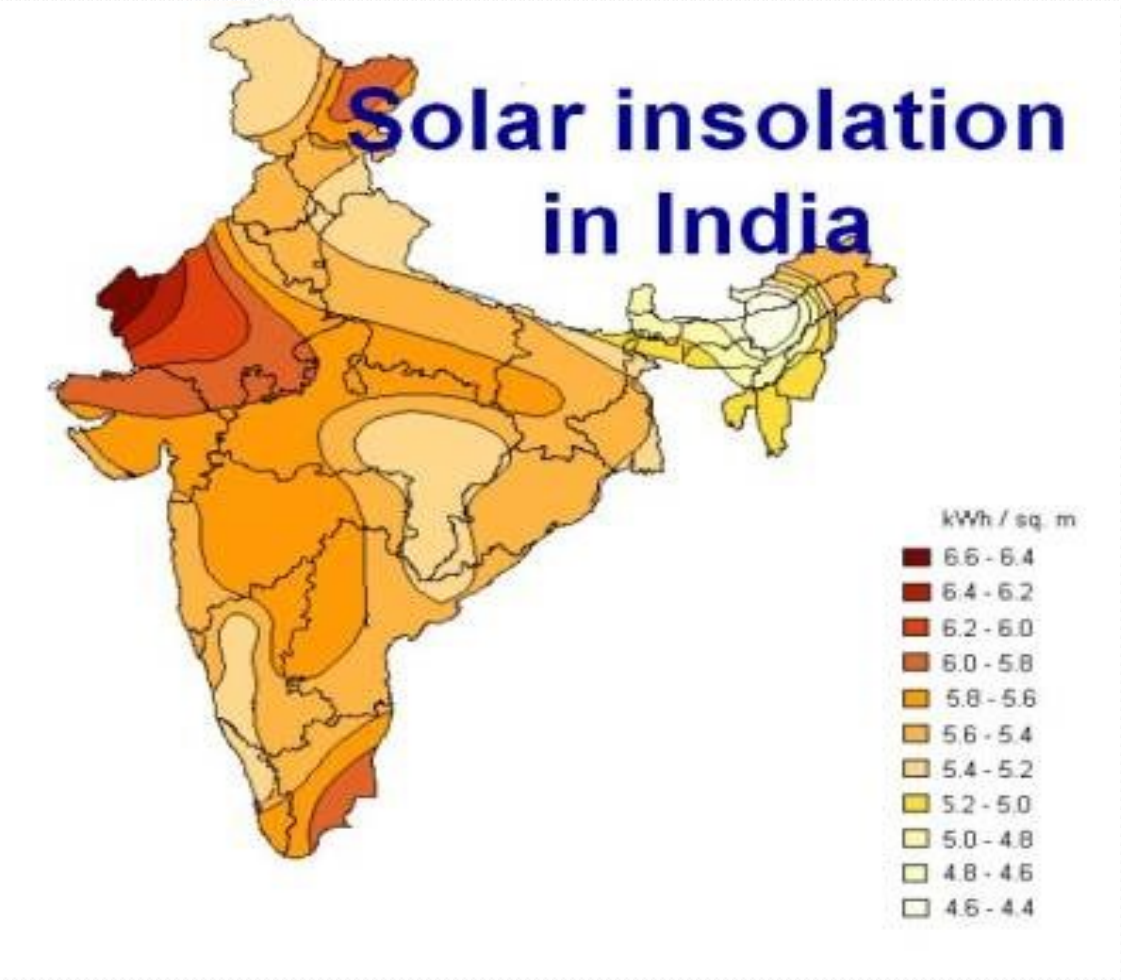
Need for Clean Telecom

- Helps to Penetrate in Rural / off grid areas
- Reduction in Telecom Network Power Consumption
- Reduction in Carbon Foot Prints
- Protect Environment & Save Natural resources
- Sustainable Growth
- Meet Regulatory Requirements
- Social Responsibility

Rural GSM Solution

- Low Power Solution
- Telecom Standards (Generic Requirements) from TEC
- Indigenous Manufacturing
- Low Power solution supports Solar Power Solution
- Rural Areas : Absence of Roads/ Diesel delivery problems
- Conventional Solution more expensive
- Differences in Technical Requirements
- Cost reduction to one third level
- Will Ensure Mobile coverage to uncovered villages

Solar Energy – A Natural Gift to India



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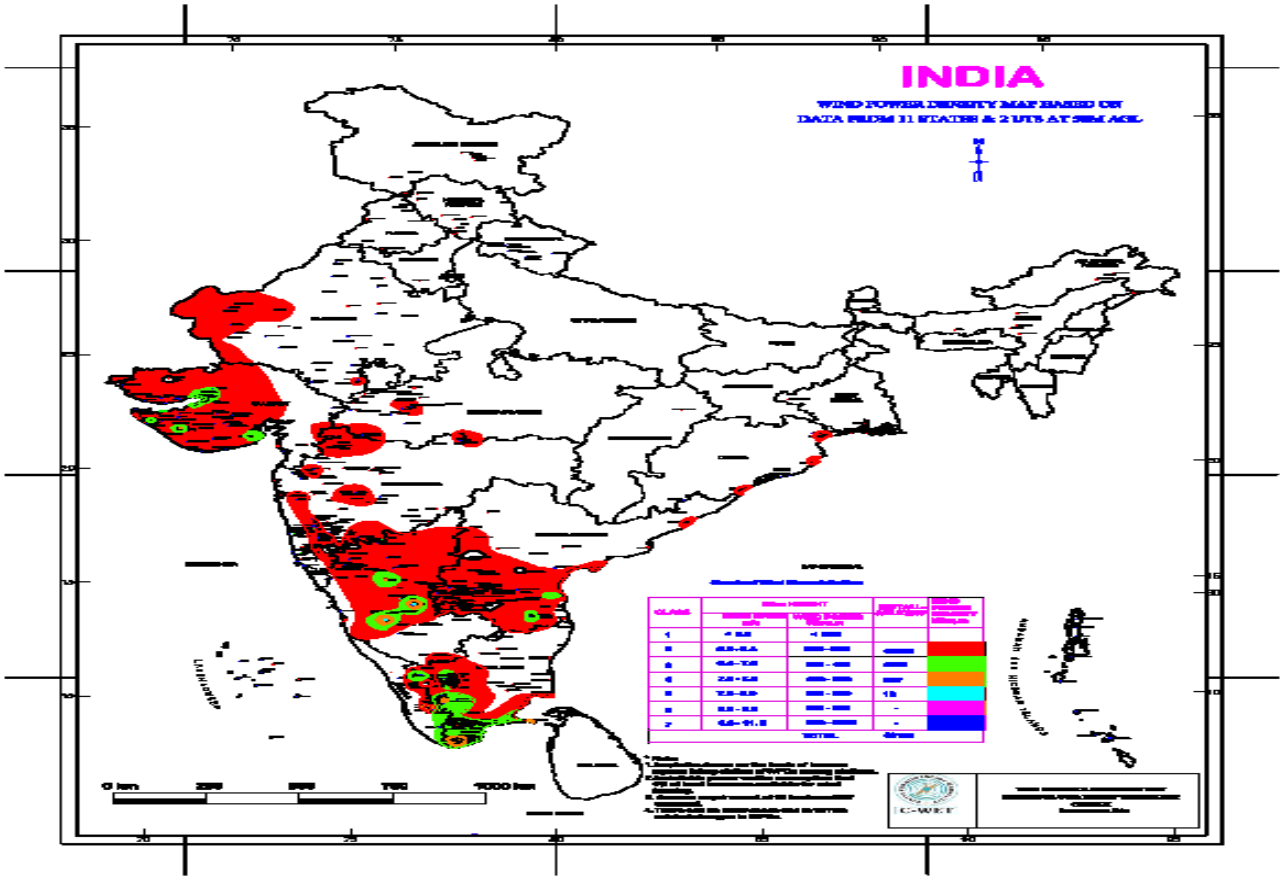
Wind Power Density - India



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Pilot Project - I

- **Solar Photovoltaic Project**

OFF Grid site:

Service Providers : Reliance / BSNL / Vodafone.

Average Energy : 1530 Units / Month
: 51 Units/day.

20 KVA D.G. set running : 16 hours / day.

Solar array capacity : 10 KWP

Average unit generated daily: 40.69 units/day.

Units Generated during a month: 1220.60 Units.

Pilot Project I – Results

S. No.	Items	DG Set	SPV With DG Set	Savings
1.	20 KVA DG Set running	16 Hours/day	2 Hours/day	14 Hours/day
2.	Fuel Consumption (2.75 litres/hour)	1320 litres / month Rs. 52800 / month	165 litres / month Rs. 6600 / month	1065 litres / month (Rs. 46,200 / month) **Rs 5,54,400 / annum**
3.	Carbon Emission	3537 Kg/ month	442 Kg/month	3095 Kg/month **37140 Kg/annum**

Pilot Project - II

Grid site:

Service Providers	:Airtel/BSNL/Vodafone.
Average Energy Required	: 2200 Units/Month.
	:72(36+36) Units/day
Grid Supply	: 6 hours / day
20 KVA D.G. set running	: 10 hours / day.
Solar array capacity	: 10 KWP
WTG Capacity	: 5 KW
Average unit generated	: 49 (37+12) Units/day
Unit Generated	:1470(1110+360)/month

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Pilot Project II – Results

S.NO.	Items	Before	Solar-Wind Hybrid with DG Set	Savings
1.	20 KVA DG Set running	1022 units/month	448 units / month	574 units/month
2.	Fuel Consumption (2.75 litres/hour)	865 litres/ month Rs. 34626 / month	231 Litres Rs. 9260 / month.	634 Litres / month. **Rs. 25366 / month.**
3	Carbon Emission	2318 Kg/month	619 Kg/month	**20387 Kg/annum**
4.	Grid Supply	1209 Units / Month Rs. 8003 / month	547 Units / Month Rs. 3607 / month	662 Units /Month **Rs. 4396 / month.**
5.	Total Savings			Rs. 29762/- per month **Rs. 3,57,144 / annum**

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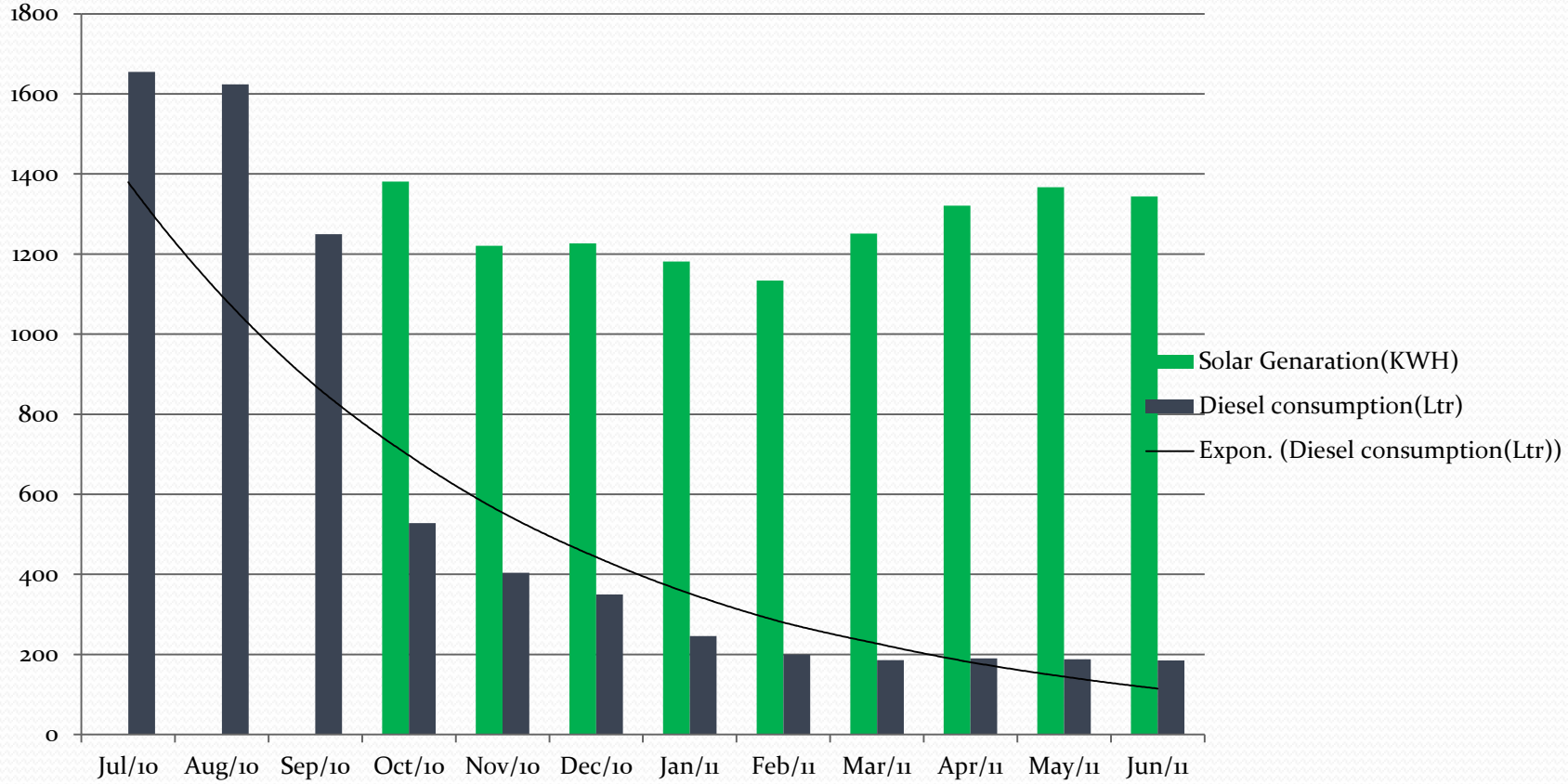
Trend of Monthly reduction of Diesel Consumption and increase in Solar generation



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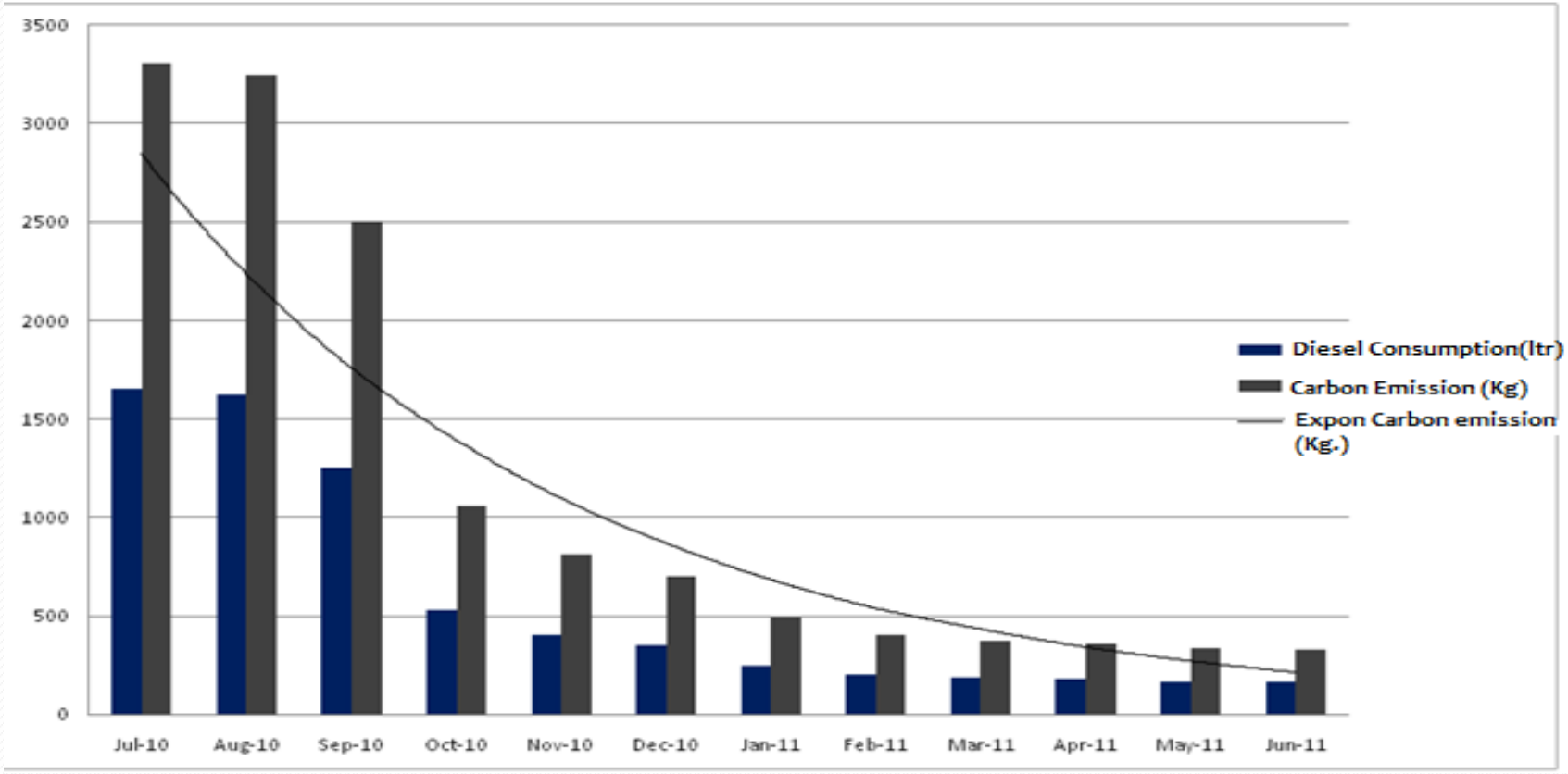
Monthly Trend in reduction of Diesel Consumption and Carbon Emission



Key Benefits of Clean Telecom

- Continual Quality Power availability
- Networking the Globe:
  - Off Grid Connectivity
  - Grid Connected Solar Power
- Reducing Total Cost of Ownership; TCO (CAPEX + OPEX)
- Conserving & Protecting the Environment
  - A one KW SPV system every month prevents 136 kg CO_2 from entering the environment.
- No noise pollution
- Independent of power tariff variation
- Quality of Service (QOS)

Regulatory Framework on Clean Telecom – India

Government Directives

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(To adopt measures to clean the Telecom Sector in India)

Government Directives:

- At least 50% of rural towers and 20% of urban towers to be powered by hybrid power by 2015 (RET + Grid Power) &
- Minimum 75% of rural towers and 33% of urban towers are to be powered by hybrid power by 2020 (RET + Grid Power).
- All Telecom Products, Equipments and Services in Telecom Network energy and performance assessed.
- Certified green passport utilizing ECR rating by 2015.
- All service providers to declare the carbon footprint of their network operation twice in a year.

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Government Directives:

- Service providers to adopt voluntary code of practice encompassing energy efficient network planning, infrastructure sharing, deployment of energy efficient technology and adoption of renewable energy technology.

- Network operator to induct carefully design and optimized energy efficient radio networks that reduce overall power and energy consumption.

- Service provider to endeavour to ensure that total power consumption of each BTS of 2+2+2 configuration will not exceed 500 watt by 2020.

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Government Directives:

- Telecom service providers to have their cell sites particularly in rural areas powered by hybrid renewable sources:
  - wind energy, solar energy, fuel cells or combination thereof

[To ensure that around 50% of all towers in rural areas are powered by hybrid renewable sources by 2015.]

- Service providers to evolve a carbon credit policy in line with carbon credit norms to the ultimate objective of achieving:
  - a maximum of 50% over the carbon footprint levels of the base year 2011 in rural areas and maximum of 66% in urban areas by the year 2020.

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Government Directives:

- The service providers should aim at carbon emission reduction target for the mobile networks:
  - 5% by the year 2012-2013
  - 8% by the year 2014-2015
  - 12% by the year 2016-2017
  - 17% by the year 2018-2019

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Monitoring Mobile network

Parameters:

(a) Units / mobile connection / month
(b) Units / mobile traffic / month
(c) Units / revenue generation / month
(d) Units / Cell site / month
(e) Carbon (Kg) / Cell site / month

Comparability of performance results shall improve the quality / energy efficiency of different operators - turns into **Cleaning /Greening the Telecom.**

Monitoring Mechanism
for
Clean Energy Implementation & Carbon Reduction Targets

- **Web Based Cloud application to :**
  - **Facilitate for uploading the Data by Telecom Operators**
  - **Monitor the progress for Implementation Renewable Energy Technology**
  - **Keep Track of Carbon Emission Reduction Targets**
  - **Analyse & examine various scenario & generate reports.**

Summary

- Energy efficient & clean Energy solutions are imperative need of the time for sustainability.
- The renewable energy for powering Cellular BTS towers - Technically feasible and Financially viable.
- Payback period from the cost analysis of DG operated system vs. SPV system is approximately 3 - 4 years.
- Sharing of the passive infrastructure in a BTS site having more than one operator has resulted in low CAPEX and 30% energy savings. For new operators this will result in faster roll out of network.

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Summary

- Substantial Reduction of Green House Gas (GHG) emissions.
- Quality of Service maintained.
- A one kilowatt PV system each month:
  - Saves 68 kg coal
  - prevents 136 kg CO_2 entering into the atmosphere
  - keeps around 568 litres water from being consumed
  - keeps NO and SO_2 from being released into the environment

THANK YOU

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