MOBILE OPERATORS' EFFORTS ON GREEN TELECOM IN INDIA

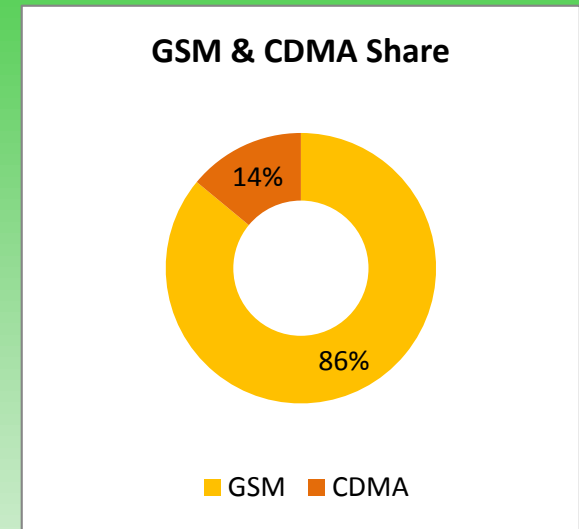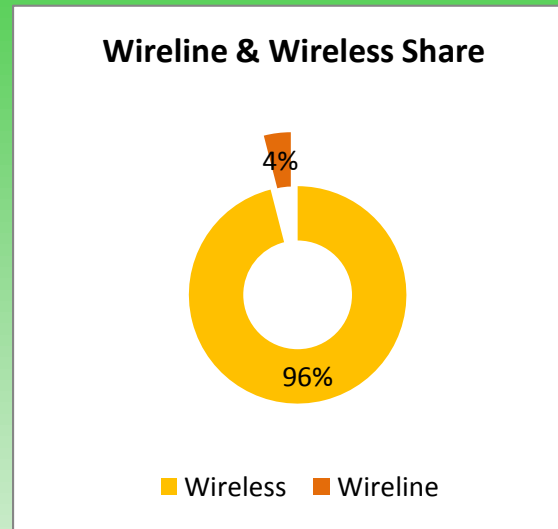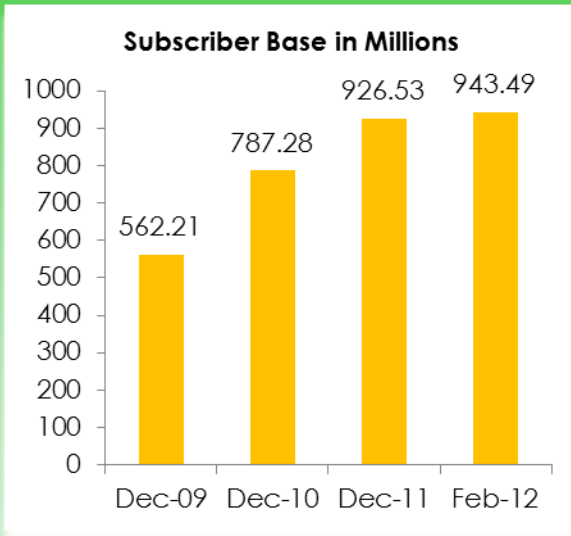**Presented by:**

Rajan S Mathews
Director General, COAI

Making Telecom Green

Subscriber Base in Millions
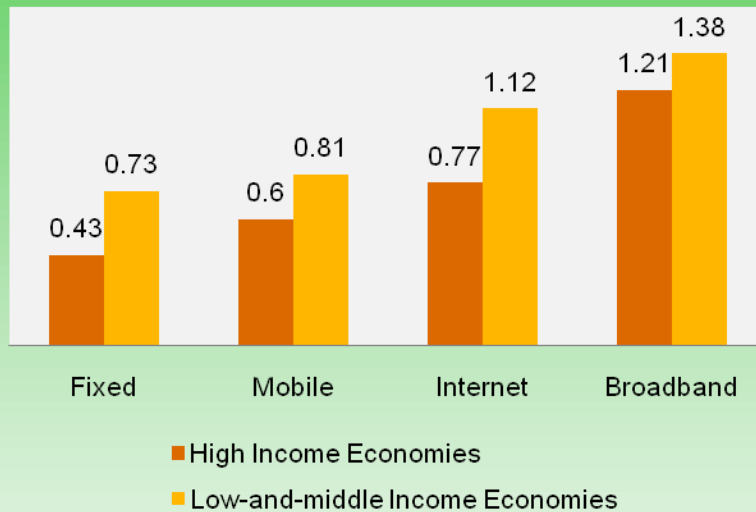

Wireline & Wireless Share

GSM & CDMA Share

❖ The telecom market in India is dominated by mobile connections at 96% of total connections.

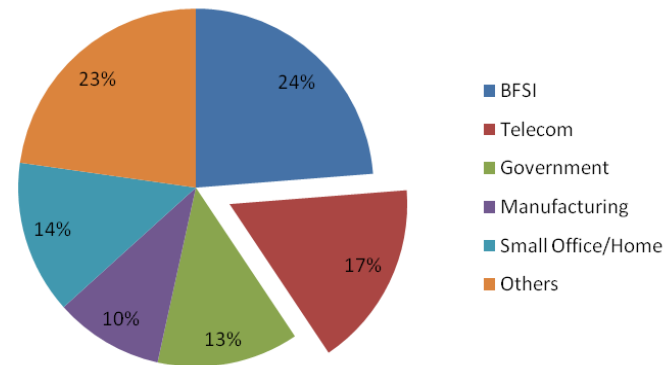❖ Of the wireless connections, 86% are GSM subscribers.

CONTRIBUTION TO THE ECONOMY

Effect of 10% increase in ICT Penetration on GDP Growth (Incremental Percentage Points) as per a World Bank Study

	Fixed	Mobile	Internet	Broadband
High Income Economies	0.43	0.6	0.77	1.21
Low-and-middle Income Economies	0.73	0.81	1.12	1.38

- High Income Economies
- Low-and-middle Income Economies

Further, an ICRIER study suggests higher mobile teledensity leads to faster growth of states, with the growth rate being 1.2 percentage points greater for every 10% increase in the mobile teledensity.

- Direct employment to ~2.8 million people
- Indirect employment to ~7 million people
- Telecom industry revenue is ~2% of GDP (~ USD 30.8 billion)

Telecom Sector Market Share of Domestic IT Revenues

- BFSI — 24%
- Telecom — 17%
- Government — 13%
- Manufacturing — 10%
- Small Office/Home — 14%
- Others — 23%

Source: NASSCOM

Source: World Bank. ICRIER – The Policy Paper Series, January 2009
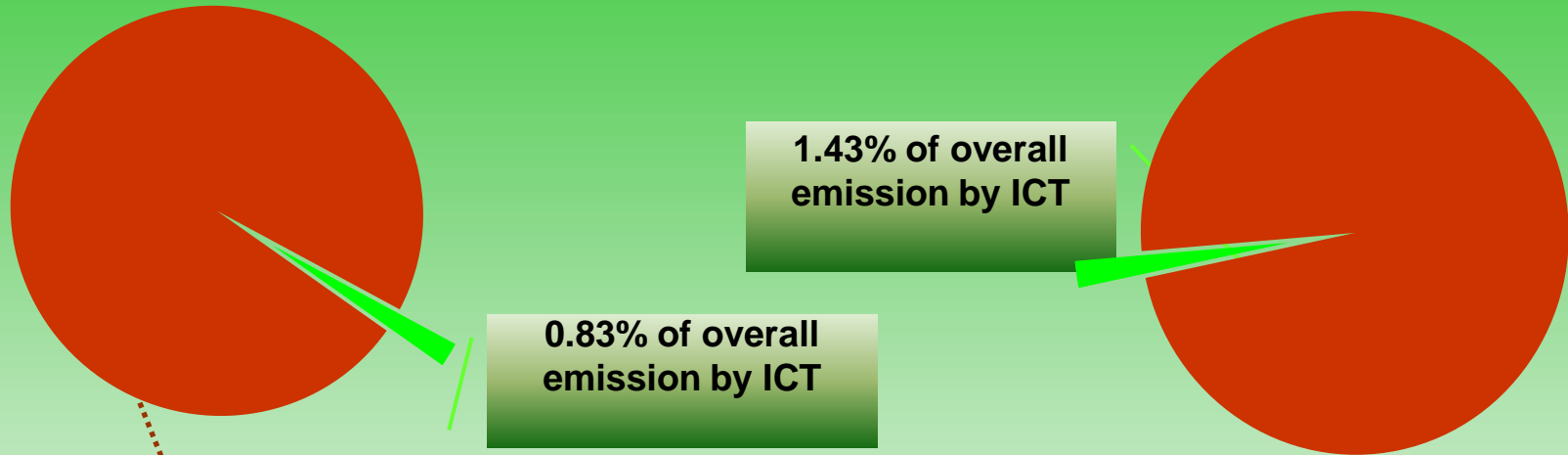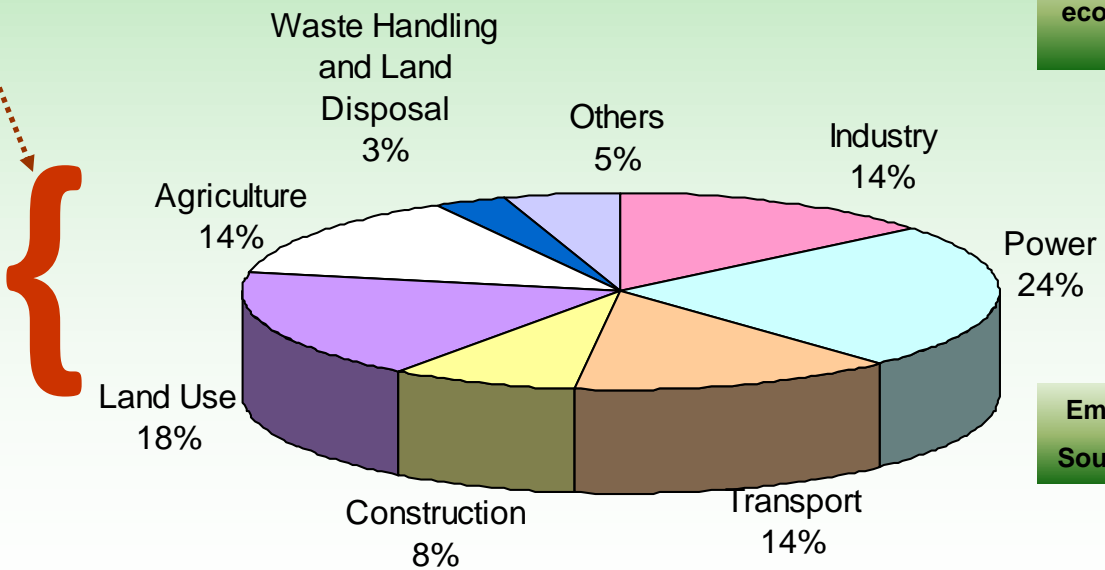
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GREEN TELECOM –

THE CARBON EMISSIONS BY THE TELECOM SECTOR

THE GLOBAL ICT CARBON FOOTPRINT (INCLUDES TELECOM) IS RELATIVELY SMALL AT 1.43%

0.83% of overall emission by ICT

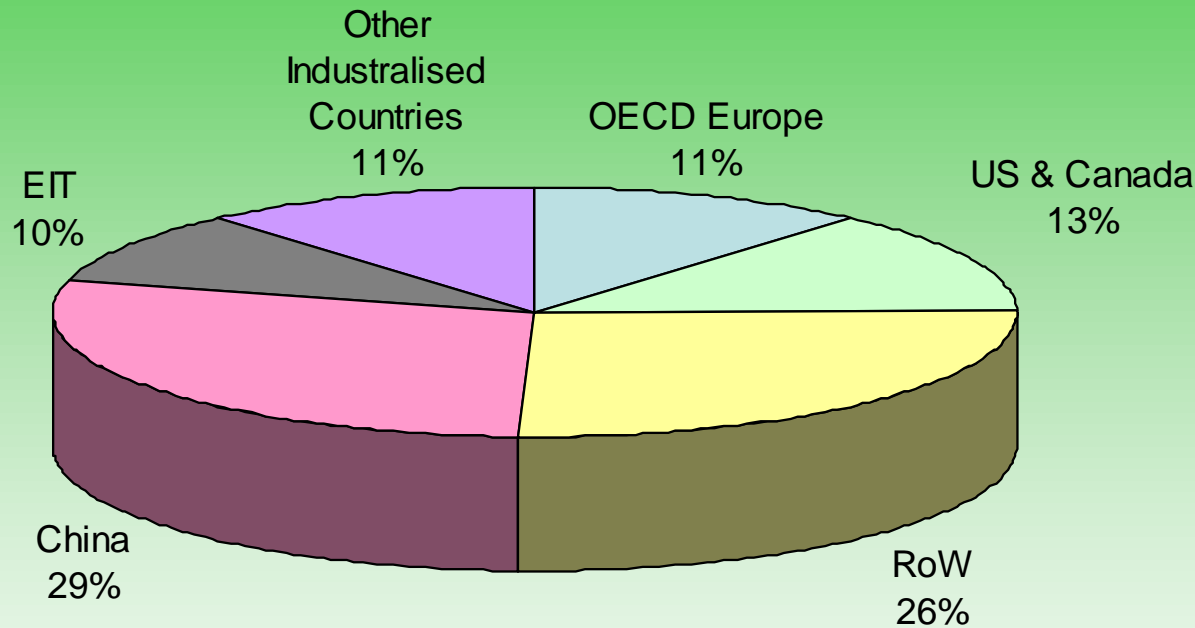**1.43% of overall emission by ICT**

Smart 2020; enabling the low carbon economy in the information age. Report by the climate group

Emission Break-up Sector wise : World

Source: World Resources Institute- 2006

Pie chart labels:
- Waste Handling and Land Disposal 3%
- Others 5%
- Industry 14%
- Power 24%
- Agriculture 14%
- Land Use 18%
- Construction 8%
- Transport 14%

INDIA'S SHARE IN THE GLOBAL ICT FOOTPRINT IS MUCH LOWER IN THE GLOBAL 1.43% SLICE

Other
Industralised
Countries
11%

OECD Europe
11%

US & Canada
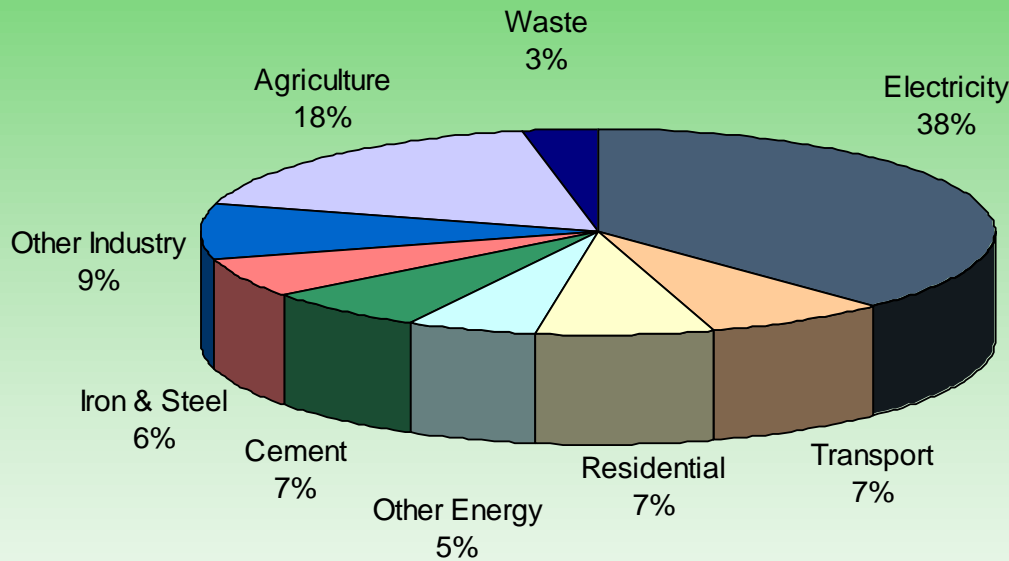13%

EIT
10%

China
29%

RoW
26%

India is included in RoW with other countries, with the share being only **27%** of **1.43%**. **This amounts to only 0.38%.**

RoW = Rest of World (includes, India Brazil, South Africa, Indonesia and Egypt

EiT = Economies in transition. (includes Russia and non-OECD Eastern Europe countries

Sector-Wise CO2 (eq) emissions in India – almost similar to Global pattern

Pie chart: Sector-Wise CO2 (eq) emissions in India

- Electricity 38%
- Waste 3%
- Agriculture 18%
- Other Industry 9%
- Iron & Steel 6%
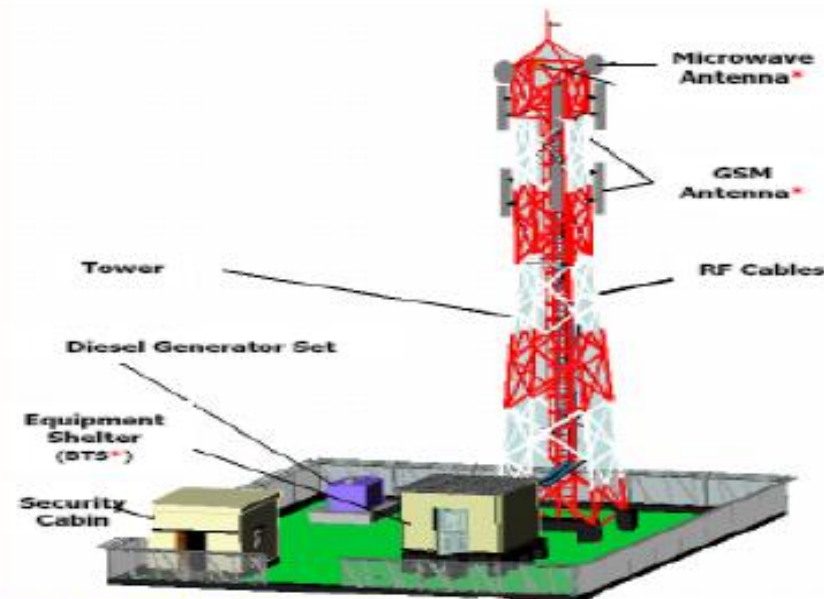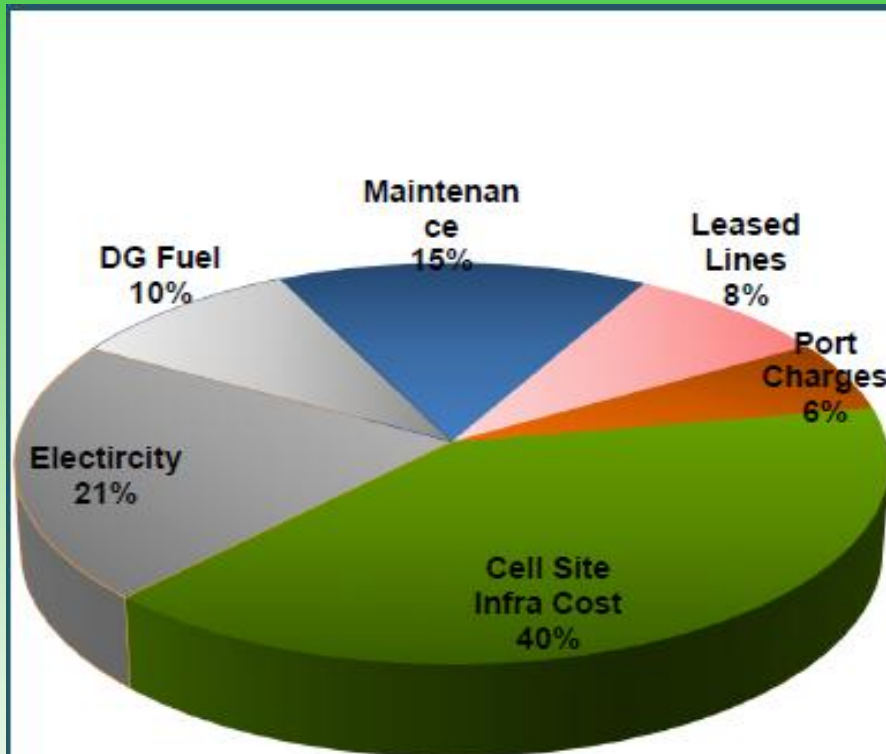- Cement 7%
- Other Energy 5%
- Residential 7%
- Transport 7%

Agriculture, Electricity, Transport and Cement account for **70% of CO2** emissions in India.

Share of Telecom sector in the overall CO2 emissions is negligible.

Telecom included in "Other Industry" with a share **of just 9%.**

Pie chart:
- Maintenance 15%
- Leased Lines 8%
- Port Charges 6%
- Cell Site Infra Cost 40%
- Electricity 21%
- DG Fuel 10%

Tower diagram labels:
- Microwave Antenna*
- GSM Antenna*
- Tower
- RF Cables
- Diesel Generator Set
- Equipment Shelter (BTS*)
- Security Cabin

Active Infrastructure owned by Operators

- 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

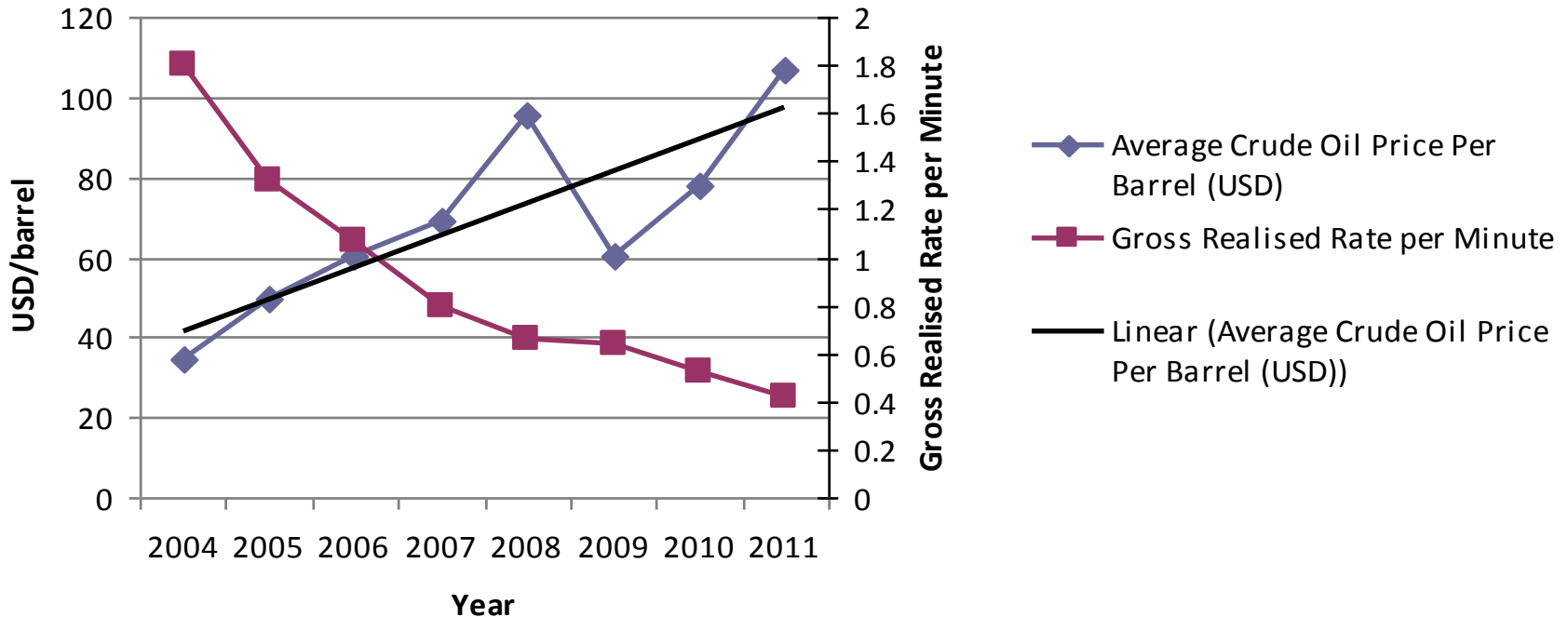**Electricity and Diesel bills are major expenses for the operators and must be brought down**

Oil Prices vs Gross Realised Rate per Minute

The revenue realised is steadily falling even as the oil prices are increasing steadily

THE ENABLING EFFECT OF ICT

THE ENABLING EFFECT OF ICT

❖ The ICT sector has a powerful role to play in tackling climate change by enabling other sectors, such as transport, buildings, power and industry, to become more efficient.

❖ ICT could reduce global carbon emissions by 7.8 GtCO2e by 2020 (from an assumed total of 51.9 GtCO2e).

❖ The five major opportunities for reducing emissions are

         – dematerialisation,

         – smart motor systems,

         – smart logistics,

         – smart buildings and

         – smart grids

Source: Smart 2020; enabling the low carbon economy in the information age. Report by the climate group

THE ENABLING EFFECT OF ICT

❖ **Dematerialization –** the substitution of high carbon products and activities with low carbon alternatives e.g. replacing face-to-face meetings with videoconferencing, or paper with e-billing, could play a substantial role in reducing emissions.

  ➢ dematerialization could be responsible for reducing emissions by 500MtCO2e, just less than Australia's total emissions in 2005.

❖ **Smart Motor systems** –ICT could play a significant role in mitigating global carbon emissions from motor systems and industrial process optimization; reduction of up to 970 MtCO2e in 2020. .

  ➢ A motor is "smart" when it can be controlled to minimize its power usage through a intelligent motor controller (IMC), ICT's main role, therefore, will be to monitor energy use and provide data to businesses so they can make energy savings by changing manufacturing systems.

❖ **Smart logistics –** translate into an efficient transportation system which help in reducing fuel cost

  ➢ ICT can improve the efficiency of logistics operations in a number of ways such as software to improve the design of transport networks, inventory reduction etc.

❖ **Smart Buildings –.** These include building management systems (BMS) that run heating and cooling systems according to occupants' needs or software that switches off all PCs and monitors after everyone has gone home.

A host of BMSs already exist and as ICT applications become more sophisticated, the range of BMS functions will expand. This sector would emit 11.7 GtCO2e in 2020 and ICT offers a major opportunity to reduce emissions from this sector by 15% in 2020.

❖ **Smart Grid –** A "smart grid" is a set of software and hardware tools that enable generators to route power more efficiently, reducing the need for excess capacity and allowing two-way, real time information exchange with their customers for real time demand side management (DSM).

 ➢ It improves efficiency, energy monitoring and data capture across the power generation and T&D network.

 ➢ The potential for ICT to reduce carbon emissions through smart grid technology could be substantial; some 2.03 GtCO2e by 2020
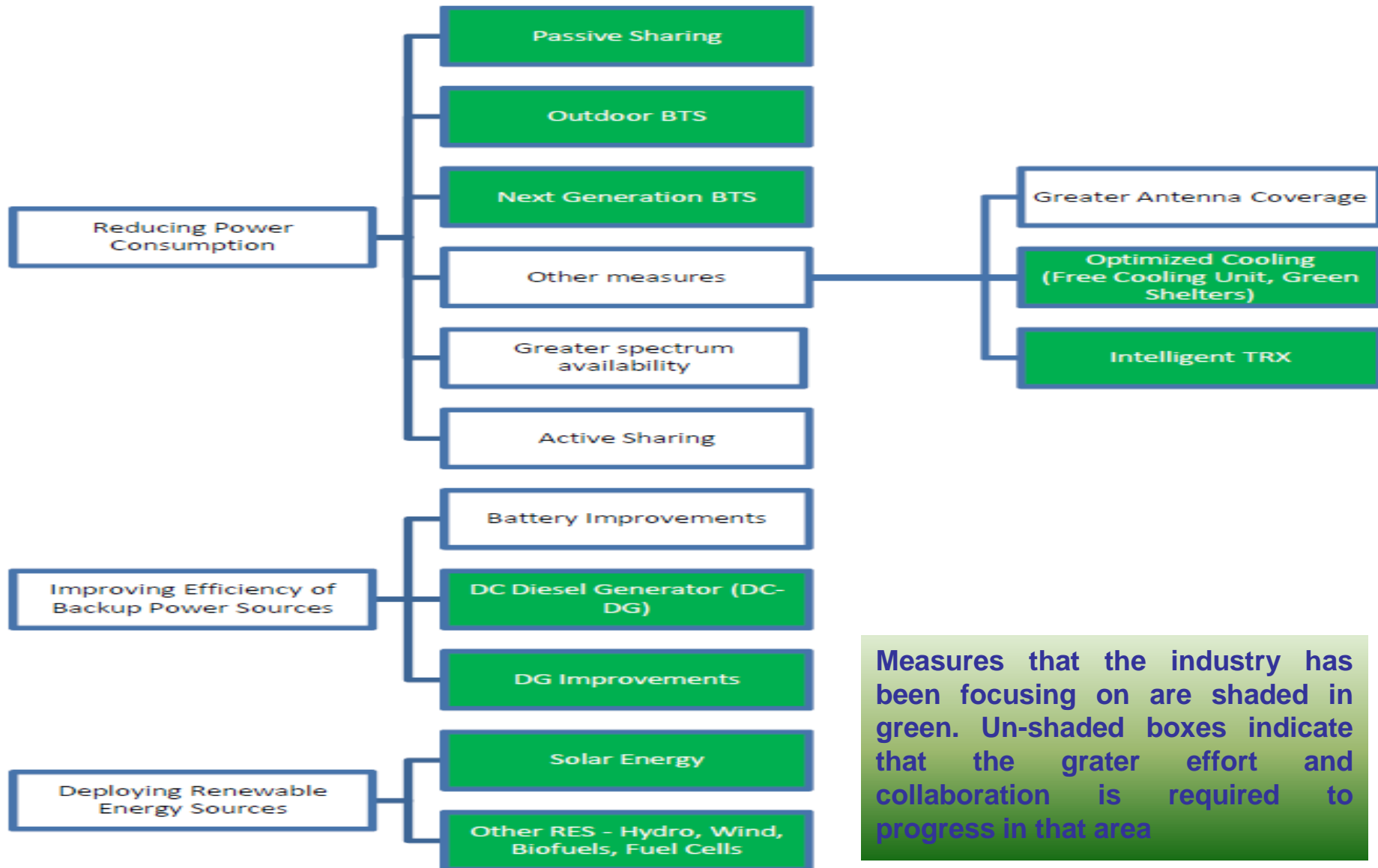
KEY INITIATIVES FOR GREEN TELECOM

DOT'S DIRECTION ON IMPLEMENTATION OF GREEN TECHNOLOGIES IN TELECOM SECTOR

❖ At least 50% of all rural towers and 20% of the urban towers are to be powered by hybrid power (Renewable Energy Technologies (RET) + Grid power) by 2015; Further 75% of rural towers and 33% of urban towers are to be powered by hybrid power by 2020.

❖ All telecom products, equipment's and services in the telecom network should be certified "Green Passport [GP]" by the year 2015. Telecommunication Engineering Centre will certify telecom products, equipment's and services on the basis of ECR ratings.

❖ All service providers should declare to TRAI, the carbon footprint of their network operations. The Declaration of the carbon footprints should be done twice in a year.

❖ Service providers should adopt a Voluntary Code of Practice encompassing energy efficient Network Planning, infra-sharing, deployment of energy efficient technologies and adoption of Renewable Energy Technology (RET) to reduce carbon footprints.

❖ Service providers should evolve a 'Carbon Credit Policy' in line with carbon credit norms with the ultimate objective of achieving a maximum of 50% over the carbon footprint levels of the Base Year (2011) in rural areas and achieving a maximum of 66% over the carbon footprint levels of the Base Year in urban areas by the year 2020.

❖ Service providers should aim at Carbon emission reduction targets for the mobile network at 5% by the year 2012-2013, 8% by the year 2014-2015, 12% by the year 2016-2017 and 17% by the year 2018-2019.

Reducing Power Consumption
- Passive Sharing
- Outdoor BTS
- Next Generation BTS
- Other measures
  - Greater Antenna Coverage
  - Optimized Cooling (Free Cooling Unit, Green Shelters)
  - Intelligent TRX
- Greater spectrum availability
- Active Sharing

Improving Efficiency of Backup Power Sources
- Battery Improvements
- DC Diesel Generator (DC-DG)
- DG Improvements

Deploying Renewable Energy Sources
- Solar Energy
- Other RES – Hydro, Wind, Biofuels, Fuel Cells

Measures that the industry has been focusing on are shaded in green. Un-shaded boxes indicate that the grater effort and collaboration is required to progress in that area

KEY INITIATIVES FOR GREEN TELECOM

## Typical reduction in CO2 emissions and diesel savings per year per site

Measure	Typical annual reduction in CO2 emissions for a given site	Typical annual diesel saving for a given site	Annual diesel savings in Rs. (per site)
Passive Sharing	10.5 tons	3,500 liters	150,000
Outdoor BTS	4 tons	450 liters	19,000
Next Generation BTS	3.5 tons	450 liters	19,000
Intelligent TRX	2 tons	200 liters	8,500
Solar Energy	8 tons	3,000 liters	126,000
Battery Improvements	4 tons	1,500 liters	63,000
DC Diesel Generator	3.5 tons	1,300 liters	54,500
DG Improvements	2.5 tons	900 liters	39,000

BTS POWER CONSUMPTION
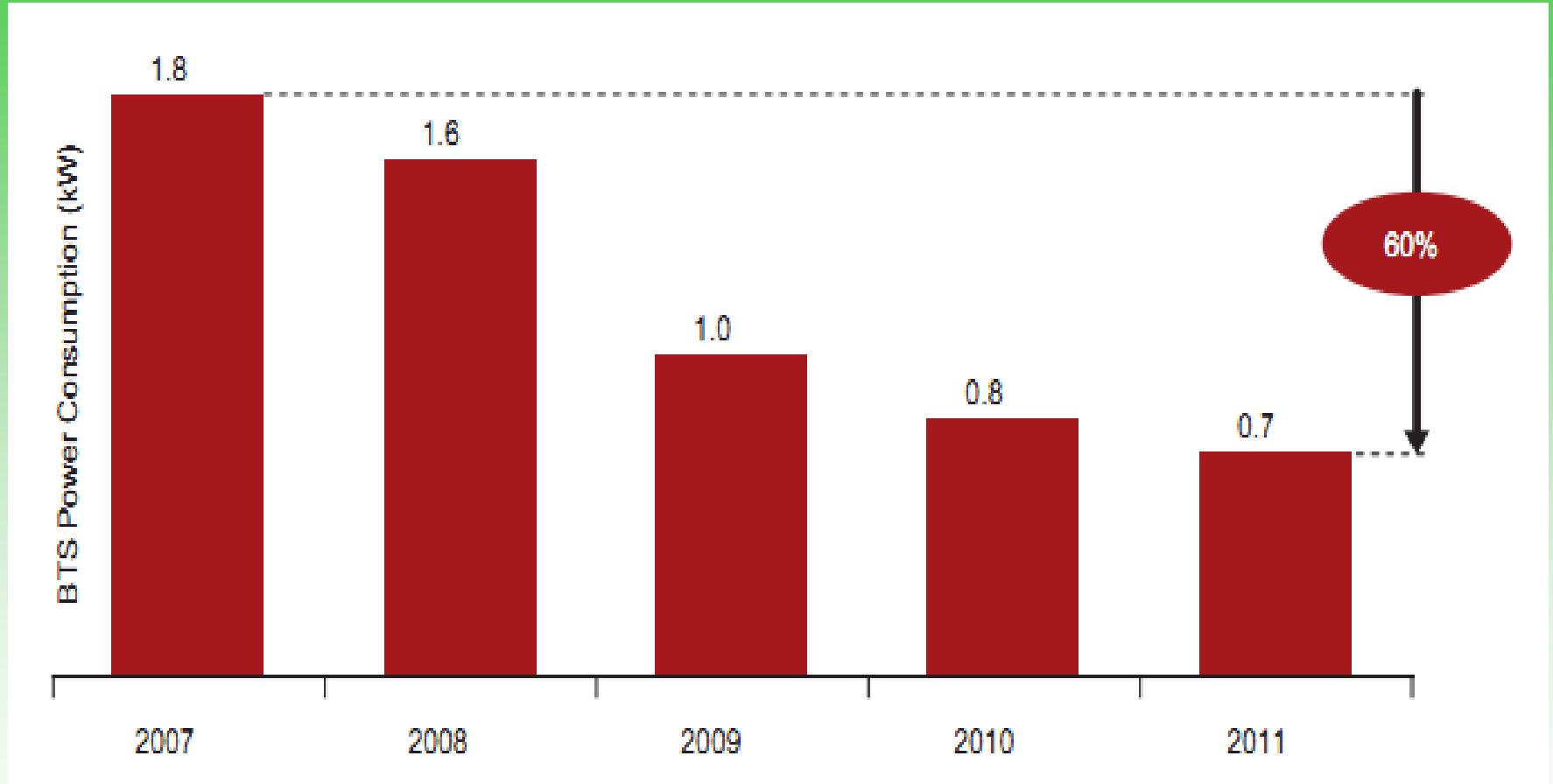
Technology has evolved and the BTS has become more efficient. The typical power consumption in the past five years has dropped by about 60%

ALTERNATE ENERGY SOLUTIONS
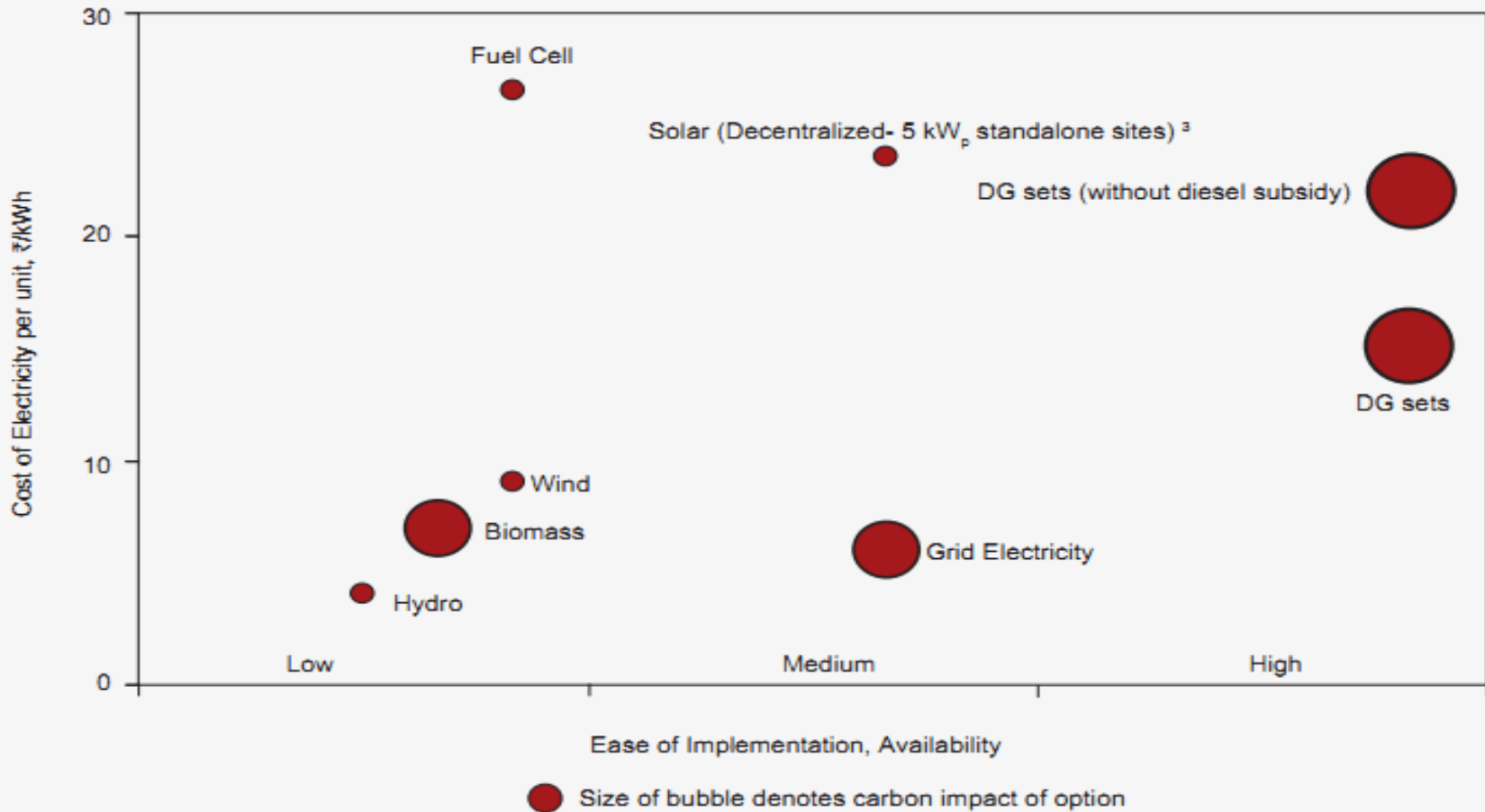
Many alternate energy solutions like fuel cells, biomass, wind energy are being deployed by operators. However the practical effectiveness of these solutions depends on the physical factors like light, wind etc. at the location of deployment

INITIATIVES TAKEN BY TELECOM INDUSTRY

INITIATIVES TAKEN BY TELECOM INDUSTRY

❖ "Green power" programmes, exploring the use of a wide range of technologies, such as **bio-diesel, fuel cells, pico-hydro, wind and photo voltaic panels**:

➢ **Aircel** has adopted green initiatives designed and implemented by Wipro Eco Energy, the clean energy division of Wipro.

➢ **Aircel** was awarded with **NDTV Toyota Greenies Eco Award 2010** under the category **Best Green Company at an award ceremony** in New Delhi graced by the **President of India, Pratibha Patil**.

➢ **Vodafone** has adopted energy efficient cooling, alternating diesel battery hybrid mode, reducing the diesel consumption.

➢ **Airtel** has been rolling out its "Green shelters" concept leading to major savings in energy consumption by its network in India.

➢ **Idea Cellular** has deployed solar and bio-fuels on trial basis for their base stations.

➢ **Uninor** was awarded the **prestigious Green Globe Foundation Award 2011** for **Best Contribution by a Corporate/Business Enterprise**.

INITIATIVES TAKEN BY TELECOM INDUSTRY

❖ Equipment vendors, tower companies and network service providers are investing heavily in bringing out in bringing out "green products".

❖ Adoption of "Green Products" and "Green Process" :

– **Ericsson** has developed the **Ericsson tower tube**, which uses natural convection cooling, to reduce feeder loss, resulting in a reduction of up to 40 percent in power consumption.

– **Huwaei's** has developed single **RAN solution based on software-defined radio (SDR) system** to truly integrate multiple networks.

As a step towards going green, all operators are moving towards paper less billing**.**

New Energy Initiatives Program- P7

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

- **IPMS -** Integrated Power Management System .

- **FCU -** Free Cooling Units

- **GenX:** GenX is a product, which converts DC power to AC power, and has the functionality of a soft starter.
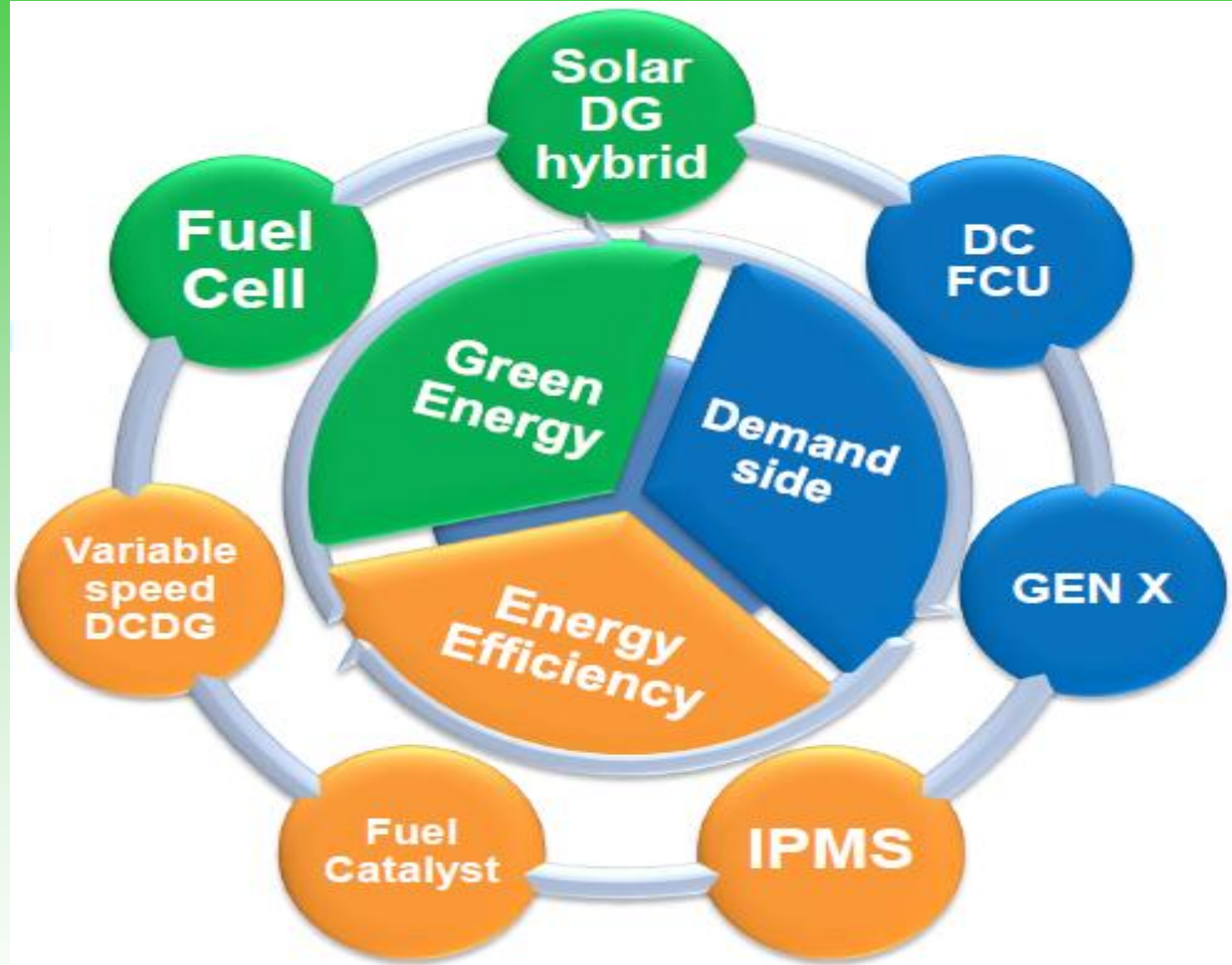
Bharti Infratel's Green Towers P7 initiative is a comprehensive energy efficiency and alternate energy programme covering seven high impact initiatives, which are aimed at reducing diesel usage and therefore the carbon footprint.

This initiative includes:

1. **Alternate energy sources like solar etc**. – these are clean energy solutions and have today proven their case as a strong alternate to conventional sources of energy. Having already deployed these at around **1050 sites (inclusive of 500 nos. of Indus Towers), which has saved 6.9 mn litres of diesel and around Rs. 280 mn.**

2. **Energy efficiency measures like Integrated Power Management System (IPMS) and variable speed DC generators (DCDG)** – this has reduced diesel consumption by 1.2 mn litres and already saved Rs. 47 mn across almost 900 sites where this has been implemented.

3. Demand side management like **Free Cooling Units (FCU) instead of air conditioners etc. substantially reducing the electrical load requirement. This has already been implemented across 3400+ sites**, saving consumption of 4.1 mn litres of diesel.

Estimated Savings: Fuel & CO_2				
Project Sub-heads	Achieved Nos.	Estimated Diesel saving (Million litres)	Estimated cost saving (Million Rupees)	Estimated CO_2 saving (Metric Tonnes)
Solar DG Hybrid	641	6.9	279.5	11652.1
DCDG	84	0.4	17.3	2140.3
IPMS	800	0.7	29.3	1954.8
Fuel catalyst	10	0.0	0.3	18.5
DC FCU	3428	4.1	165.8	11130.4
GenX	45	0.1	2.5	168.4
Fuel Cell	5	0.1	2.6	125.8

Estimates of Bharti Infratel, industry wide saving & impact likely to be much higher.

ACHIEVEMENT SNAPSHOT

Estimated Savings: Fuel & CO_2							
Project Sub-heads	Planned Nos.	Estimated Diesel saving (Million litres)	Estimated cost saving (Million Rupees)	Estimated CO_2 saving (Metric Tonnes)	Trial Status	Pilot Status	Deployment
Solar DG Hybrid	2000	21.45	872	36356	✓	☑	April 2013
DCDG	2000	10.18	412	50960	✓	In-Process	April 2013
IPMS	4658	4.2	171	11382	✓	☑	April 2013
Fuel catalyst	4836	3.31	134	8970	✓	In-Process	April 2013
DC FCU	6318	7.57	306	20514	✓	In-Process	April 2013
GenX	3534	4.88	197	13224	✓	In-Process	April 2013
Fuel Cell	500	6.58	262	12582	✓	In-Process	April 2013
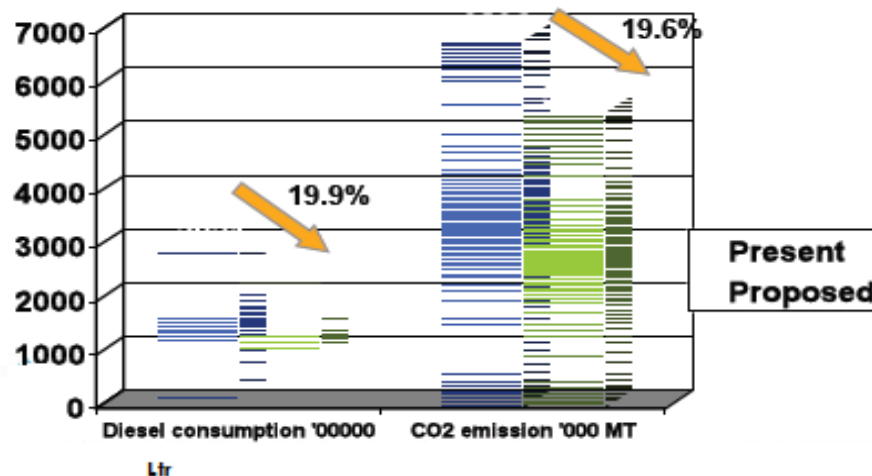
Key benefits

- Estimated saving of Rs 2352 million per annum for the company
- 58.17 million liters of diesel saving per annum for the company and for the nation
- Reduction in 1.54 million MT of CO_2 emission per annum
- Estimated saving of 45 million USD as FOREX for the nation
- Enabling rural penetration at affordable tariff

Projections for Bharti Infratel

VODAFONE'S 'RESOLVE' INITIATIVE

Vodafone started a campaign, **'ReSolve'** with the endeavor to create a sustainable models for recycling waste and conserving resources in offices.

In 6 circles Vodafone has partnered with NGOs, to recycle waste thereby creating livelihood opportunities for youth

Waste recycling as a tool for poverty alleviation

Clean & Green
- Office waste management
- Segregation at source
- Employee awareness
- Community volunteering
- Programme management

Community-based implementation
- Community mobilisation
- Waste Worker mobilization
- Waste audit and waste collection
- Employee training & engagement
- Livelihood enhancement
- Education for rag picker children
- Coordination with local bodies

External Expert
- Conceptualisation
- Programme design
- Partnership development
- Handholding
- Measurement & reporting
- Capacity building for programme management

Sustaining livelihoods & Rag picker children
- Waste collection & segregation for Vodafone offices
- Safe handling of waste
- Waste to Wealth: Reuse, Recycle, Disposal of hazardous waste

Vodafone — NGO — Consulting partner — Adopted Community in every city

Outcome & impact reviews

VODAFONE'S GREEN EFFORT ON THE NETWORK

Active Equipment Solutions –
made improvements to their base stations which include shutting down associated cabinets and extra transmitters during low traffic so as to reduce energy consumption. **This has resulted in saving nearly 4 Mn kW of electricity and reduction in CO2 emission by 3,240,000 kg per annum**.

Passive Infrastructure Solutions –

❖ **Free Cooling Boxes (FCB) -** It shuts off air-conditioning when outside air temperature is lower than 260C and thus suitable for cooling. **Vodafone has successfully implemented this at 1500 sites. This equals a reduction in CO2 footprint by 5.8 Mn kgCO2 per annum.**

❖ **Solar Powered Sites –** Vodafone has piloted this concept at 4 sites in 2010, and they seek to replicate this, where there's an absence of grid power. **Vodafone foresee a decrease in diesel dependency to the tune of 2.8 Mn kgCO2 per annum.**

❖ **Hybrid Solutions –** Vodafone has deployed hybrid solutions (diesel generator and battery working in alternate mode) **at 2200 sites** to effectively **reduce diesel consumption by 26,28,548 litres or 7 Mn kgCO2 in 2011**.

Solar DG Hybrid Solution to reduce the dependence on DG power backup

Solar panels installed along with the DG to reduce the DG running

Fuel Catalyst, breaks long chain hydrocarbons into smaller molecules, which burn more efficiently

Breaks long chain hydrocarbons into smaller molecules, which burn more efficiently. Installed in the fuel inlet pipe

Whenever the ambient temperature is < 25 degrees the compressor is switched off and the ambient cool air is pushed in the shelter

Deployment of Wind energy along with DG to reduce the DG running

Build up of outdoor sites in rural areas. Air-conditioners are not required

**Fit for outdoor sites as complete load is on DC.
Variable speed DG.**

Metered piped natural gas to replace site stored, refilling based diesel fuel

GSMA'S MOBILE ENERGY EFFICIENCY INITIATIVE

- ❖ The mobile telecom sector has adopted the GSMA Mobile energy efficiency initiative.

- ❖ The GSMA initiative aims at monitoring and benchmarking GHG emissions.

- ❖ The objective is to provide operators with information and best practices to enable them to reduce the carbon footprint.

Benefits For Operators

- ❖ A detailed analysis of the relative performance of their networks against a large dataset

- ❖ Suggested high level insights to improve efficiency

- ❖ The opportunity to participate in analysis on an annual basis to map improvements over time and quantify the impacts of cost reduction initiatives

- ❖ Demonstrate a commitment to energy and emissions reduction, which will have a positive impact on regulators, investors, customers and other stakeholders

ENCOURAGE RENEWABLE ENERGY SERVICE COMPANIES (RESCOS)

❖ RESCOs can be encouraged to set up plants based on renewable sources of energy for telecom / tower operators willing to outsource the energy component at network sites.

❖ RESCO invests in power generation and sells back the power under a defined PPA (Power purchase agreement).

❖ With enough scale built up through consolidation, the RESCOs can offer a competitive PPA rate.

❖ With some government subsidies to cover short-term losses, RESCOs can also provide this power to telecom players at government regulated tariffs.

ADVANTAGES OF RESCO MODEL

❖ Plants are set up and managed by solution providers, who are experts in the solar solution unlike telecom companies, who do not view this as a core competence.

❖ Defining the standard solar solution based on the type of tower site will result in more efficient solutions being adopted by players across the industry and can also drive down capital cost for solar solution.

❖ Identification of telecom sites by DoT in consultation with tower companies can help broad base the adoption of solar energy as an option across the country.

❖ Number of towers selected for the solar solution, makes it more viable for the solution providers as well.

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.

Reduction in Power Consumption at Network Sites

❖ **Encourage innovation in equipment and backup technology**
  - ➢ Technological innovations like energy efficient BTS, longer backup life batteries

❖ **Increase spectrum availability**
  - ➢ Optimal amount of spectrum per operator can result in reducing the requirement for the number of sites and their energy consumption

❖ **Promote replacement of legacy equipment**
  - ➢ Government can help speed up the process by providing fiscal incentives to companies which are undertaking replacement of legacy BTSs.

Deployment of Solutions based on Renewable Energy Sources

❖ Encourage Renewable Energy Service Companies (RESCOs)

❖ Provide Subsidy and Viability Gap Funding

❖ Reduce cost of allied products and services
  ➢ The government can consider tax benefits for Balance of System (BOS) items like cables, controller etc.

❖ Support and monitor non-Solar Renewable Energy Options

Drive greater EB availability for telecom sector

Government to formalize and finalize the carbon credits policy so the industry can use this to augment its investments in alternate energy sources

THANK YOU