Bharti Infratel

Business Drivers & Strategies for Green Energy In Telecom

GSMA Conference

Nov 23, 2010

Sairam Prasad
Chief Technical Officer

Agenda

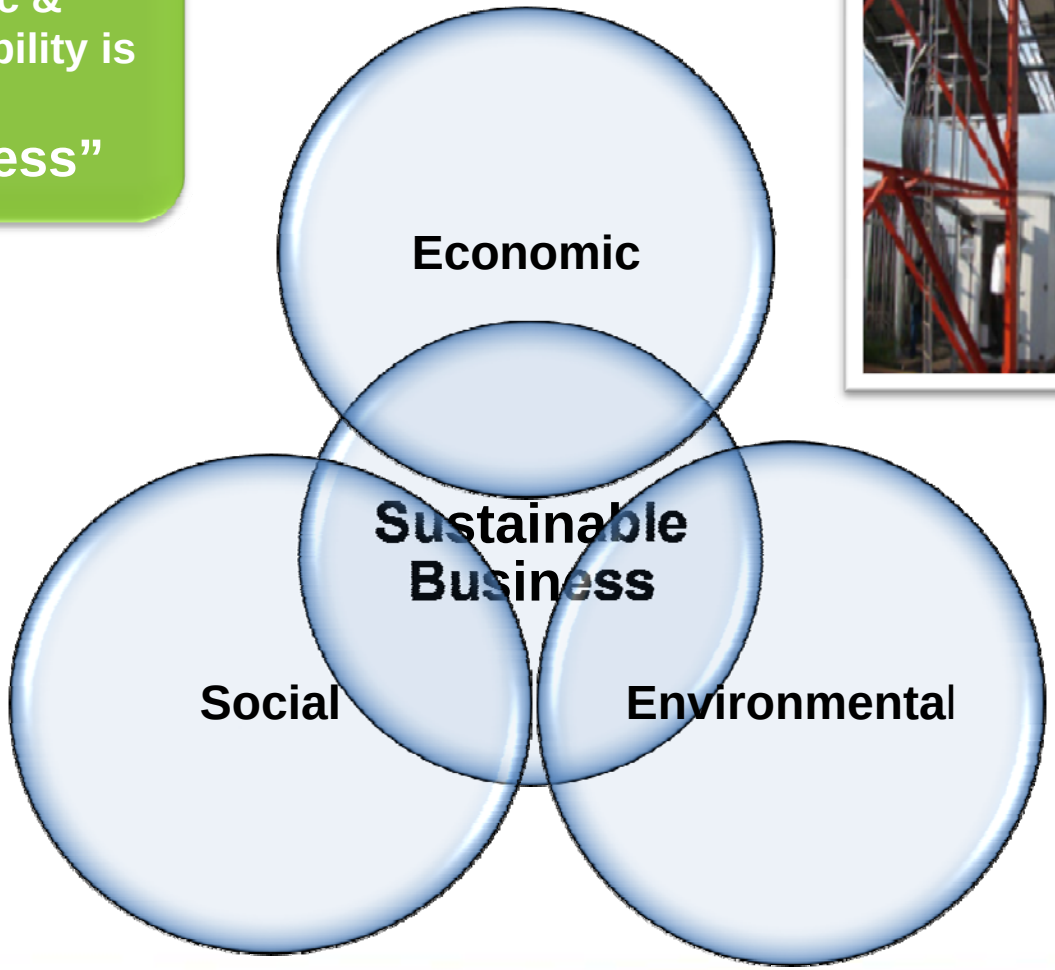
- **Business Drivers**
- **Business Enablers**
- **Key Green Energy & Energy efficiency Strategies**
  - Technology
  - Applicability
  - Adoption of Technology
  - Technology Penetration potential
  - Saving potential
  - Environmental Impact
  - Challenges
- **Energy Initiatives at Infratel**

Business Drivers

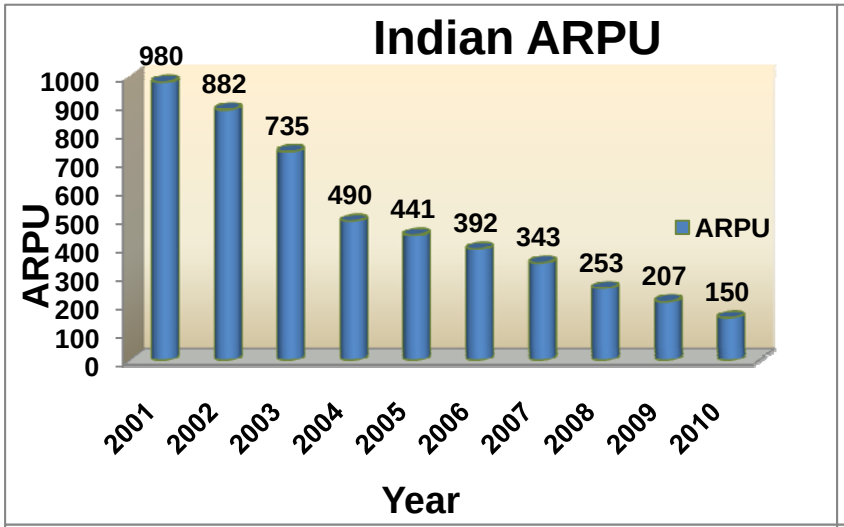
Positive Socio Economic & environmental sustainability is the key driver for "sustainable business"

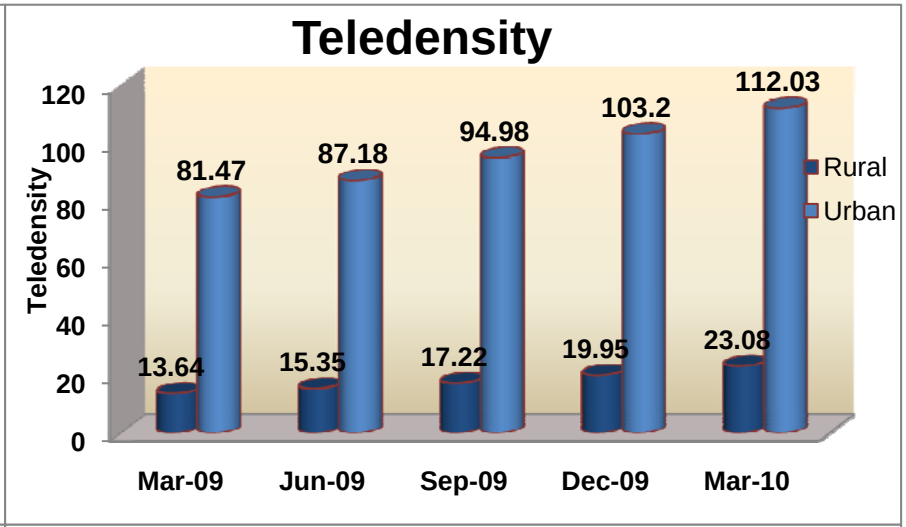


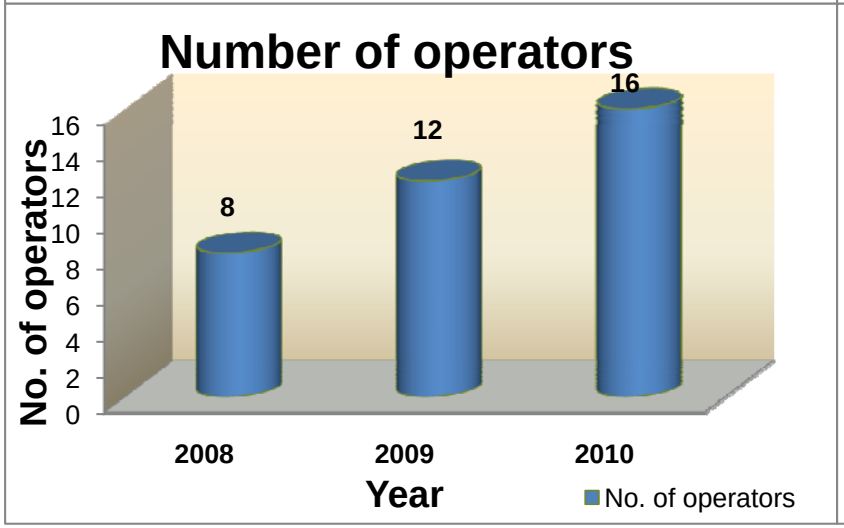


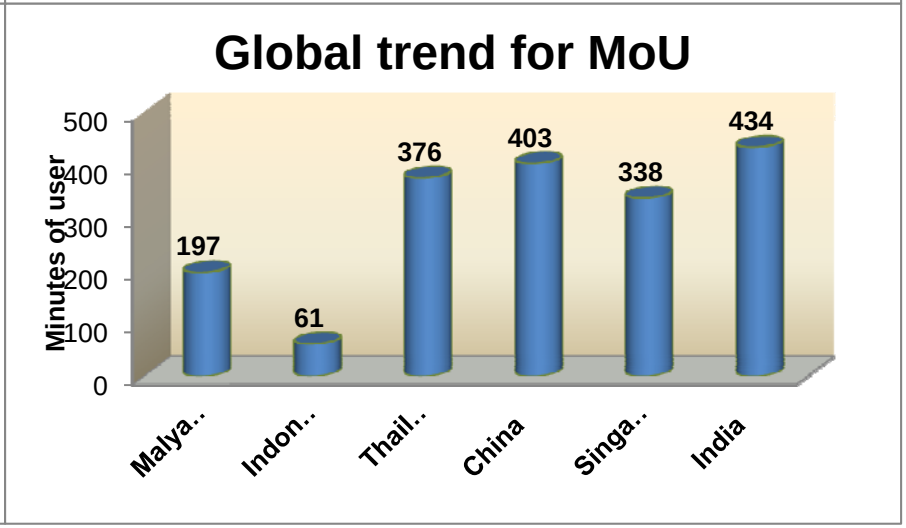


Market Drivers



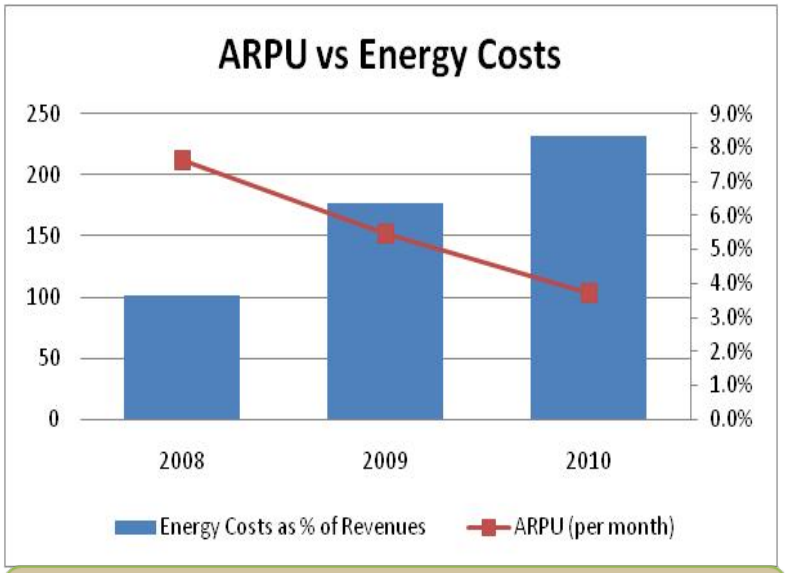


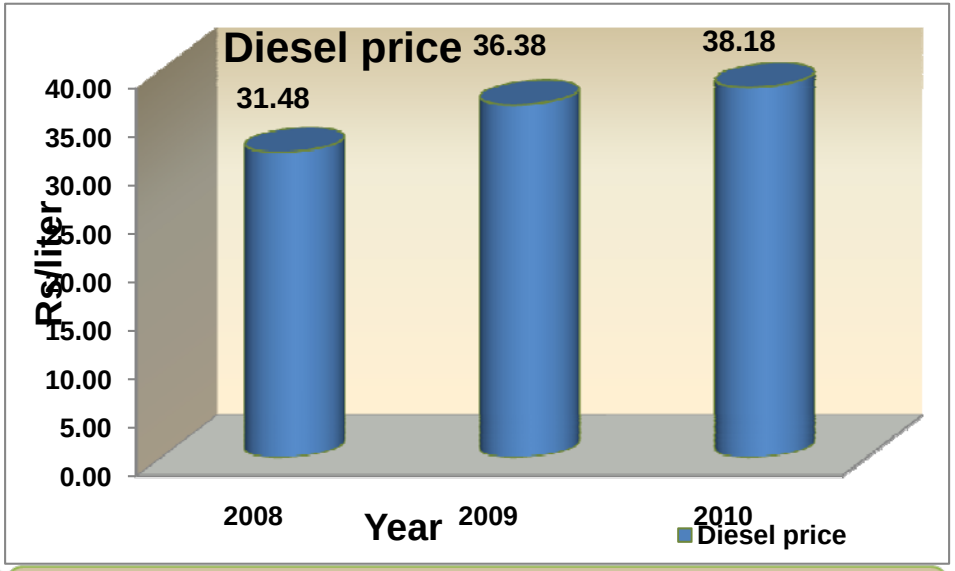




Falling ARPU, Rising MOU & increased competition forcing telecom players to look for low cost solution for sustainability

Energy Cost drivers





- 10% Telecom Towers: No Grid supply
- 50% Telecom towers < 12 hours of Grid supply
- Poor EB quality like Low voltage,Single Phasing & Voltage fluctuation leading to DG run even while grid power is available

- National Solar Mission launched
  - Soft loans @ 5% interest rate.
  - 30% subsidy on capex invested .
  - 90% subsidy for special category states and in other remote and difficult areas
- Reduction of carbon emission using Green technology fetches Carbon Credits .
- USO Funds for use of renewable energy at remote sites

- Diesel preice has increased by more than 20% in the last three years & is expected to rise further.
- 2 Bn litres of diesel has been consumed by telecom industry every year.

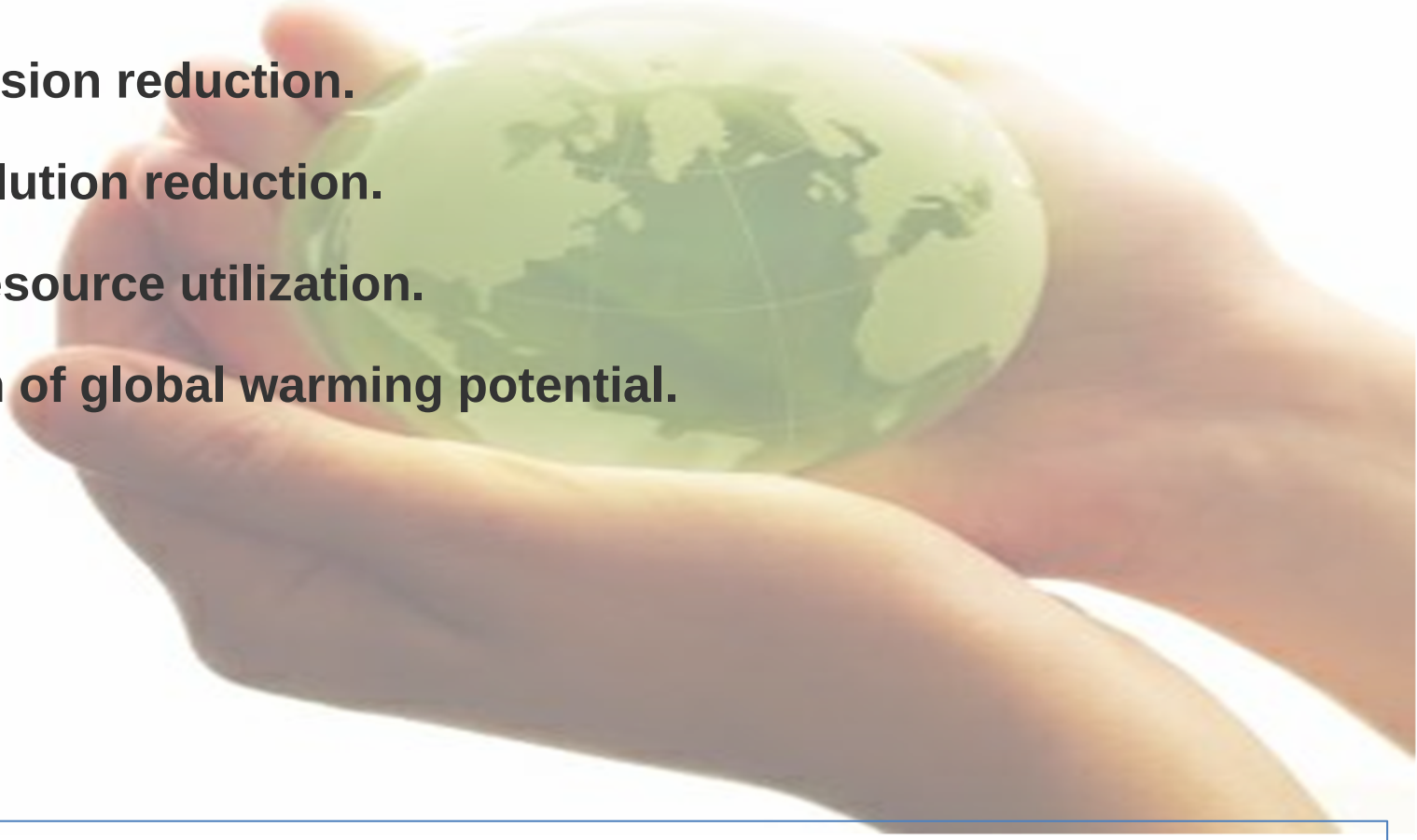
Social Drivers

- India has committed to a reduction of 20-25% in carbon intensity from 2005 levels by 2020 – India`s Commitment at Copenhagen
- Increasing Rural footprint at affordable cost.
- Optimization of available grid power
- Enabling Local community participation.

Environmental Drivers

Key Environmental Drivers Include

- **CO_2 emission reduction.**
- **Noise pollution reduction.**
- **Natural resource utilization.**
- **Mitigation of global warming potential.**

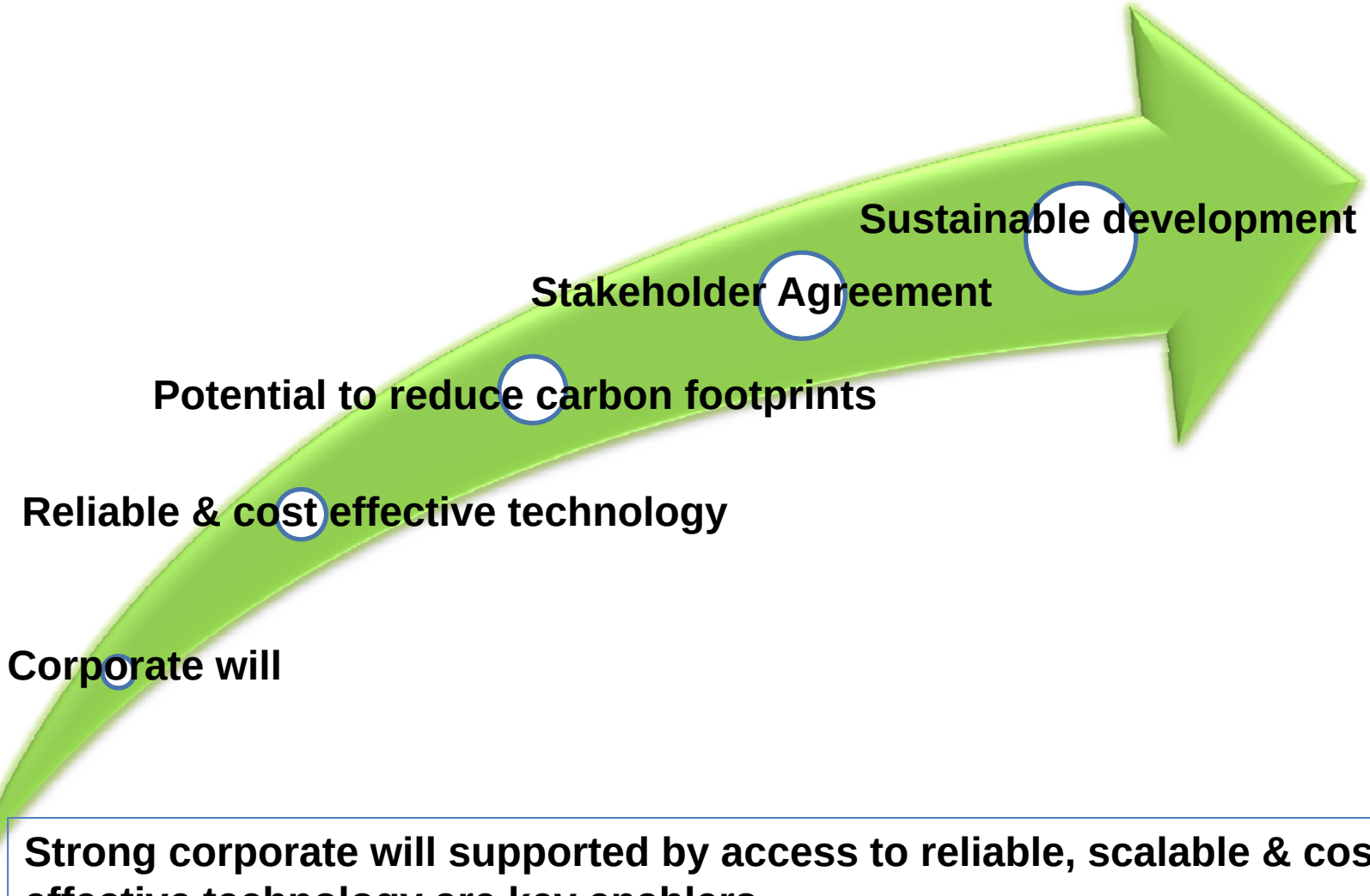


Close to 300K towers that consume more than 2 Bn Litres of Diesel every year generates 5.4 million Tons of CO_2.

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Enabler for Green & New Energy Initiatives



Strong corporate will supported by access to reliable, scalable & cost effective technology are key enablers.

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Technology

Green Energy

- Solar DG hybrid
- Wind DG hybrid
- Biomass
- Fuel cell

Energy Efficiency

- IPMS
- DCDG
- FCU
- Fuel catalyst

Above eight technologies tried & found suitable for telecom cell sites

Green Energy Strategies - Applicability



Solar

Crystalline Solar PV cells

Good saving potential upto 3 kW DC load.

Solar DG hybrid is preferred model

Best suitable for GBT outdoor Poor Grid.



Wind

Vertical Axis

Minimum Wind speed of 6m/s

Wind (DG/solar) hybrid

OD BTS with poor Grid



Biomass

Biomass Gasification- 50kW

Site up to 15kW

Community Power

NON EB rural sites



Fuel Cell

Hydrogen available as by product

Fuel Cell EB hybrid

Best suitable for GBT & Medium EB availability ID/OD sites

Above four Green technologies tried & found suitable for telecom cell sites

Energy Efficiency Strategies - Applicability



IPMS

Integrated DC & AC power system

4%more efficient than conventional system

Applicable for Poor EB quality sites & new sites



DCDG

variable speed with PMA generates DC power of 6.5-9kW

Saves up to 50% Fuel wrt ACDG

Best used in High DG Run hours sites.



Fuel Catalyst

Fuel Oxidation catalyst increases combustion efficiency by 5%

Best fit for High Diesel consumption sites.

Fix & forget for 12000 hrs



DC FCU

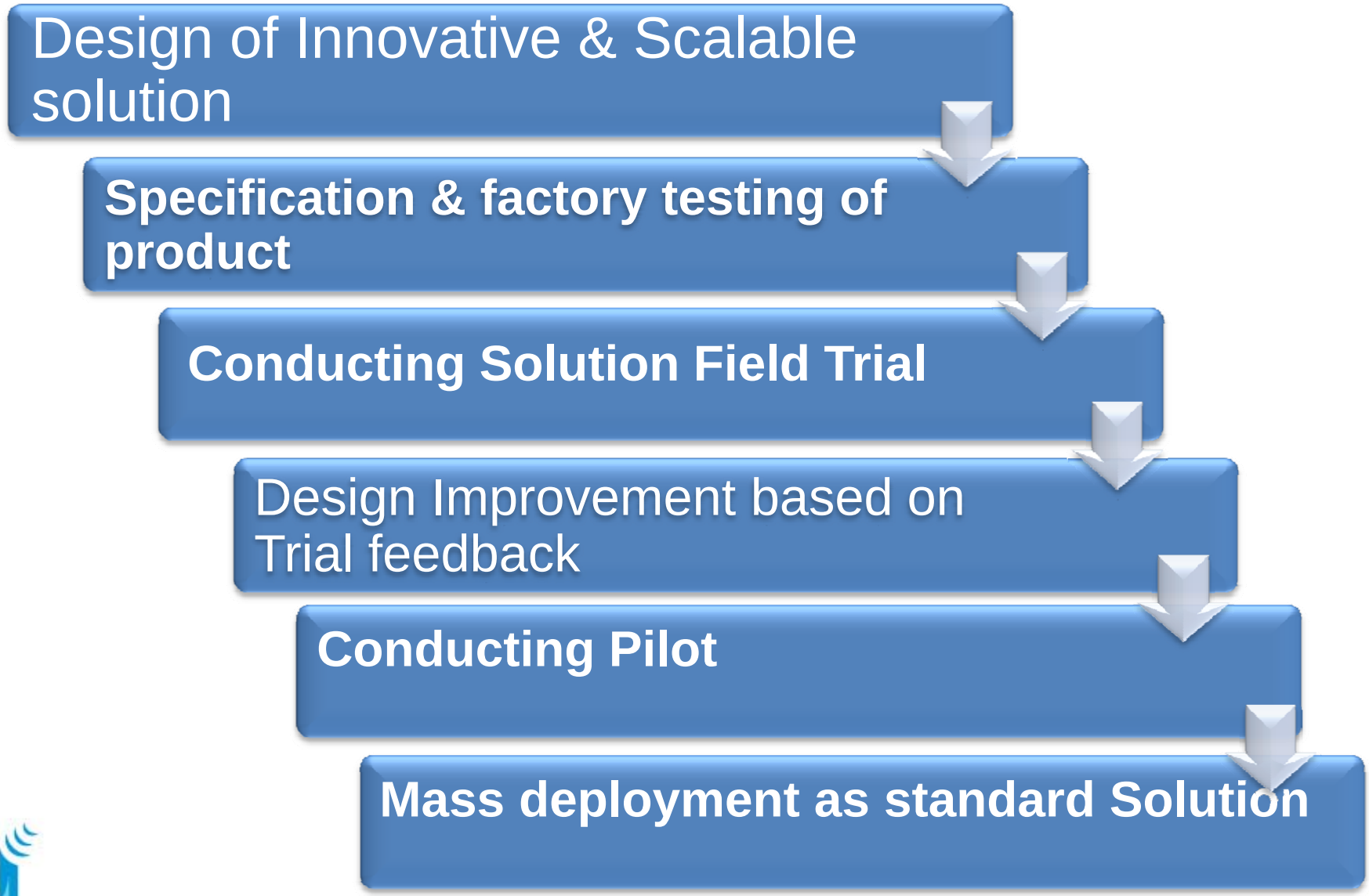
Direct cooling by mixing ambient cold air

Saves upto 15% of energy cost

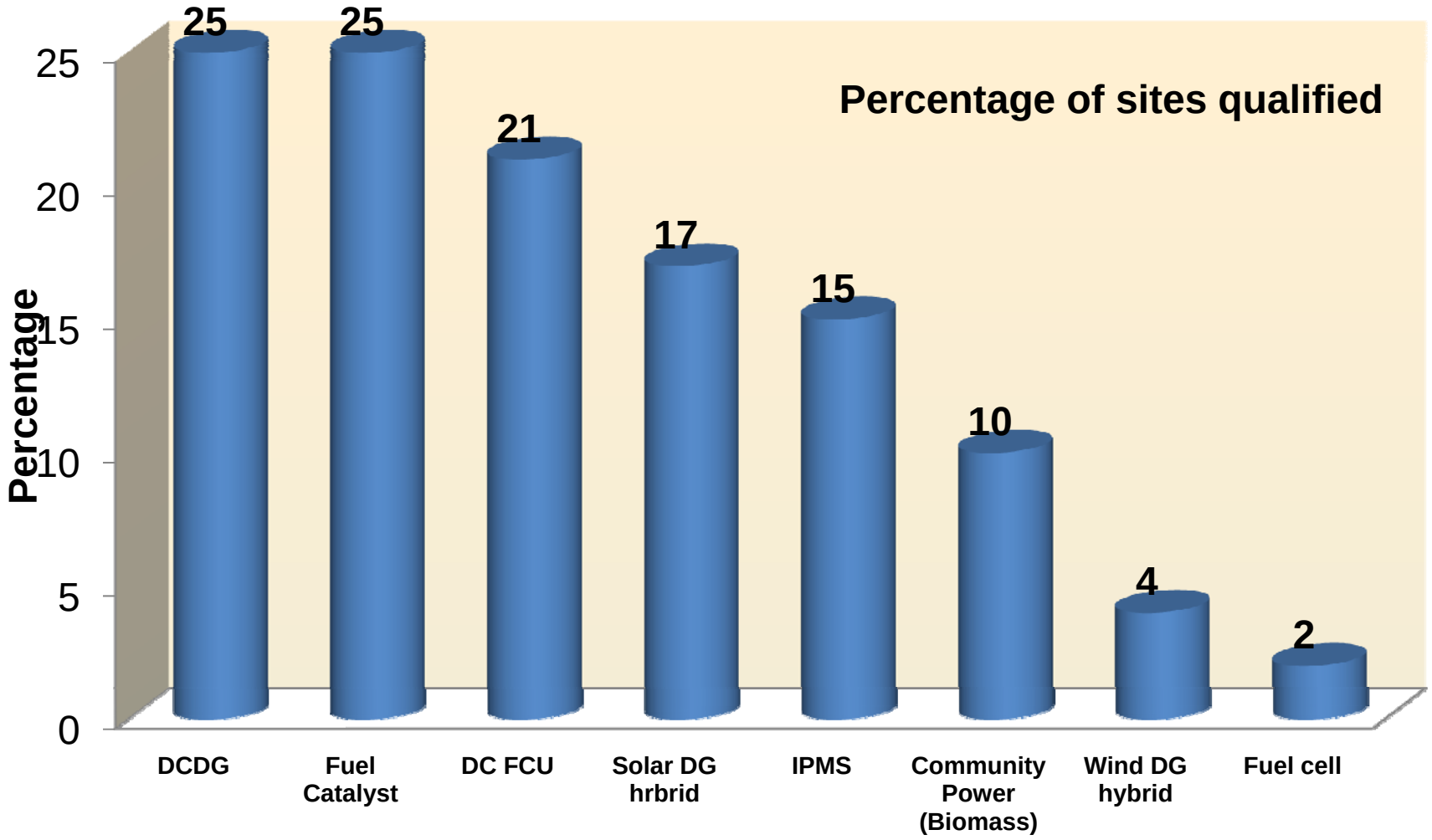
Best suitable for Indoor sites with ambient below 25°C for > 5000 hrs/yr.

Above four energy efficient technologies tried & found suitable for telecom cell site

Technology Adoption Strategies

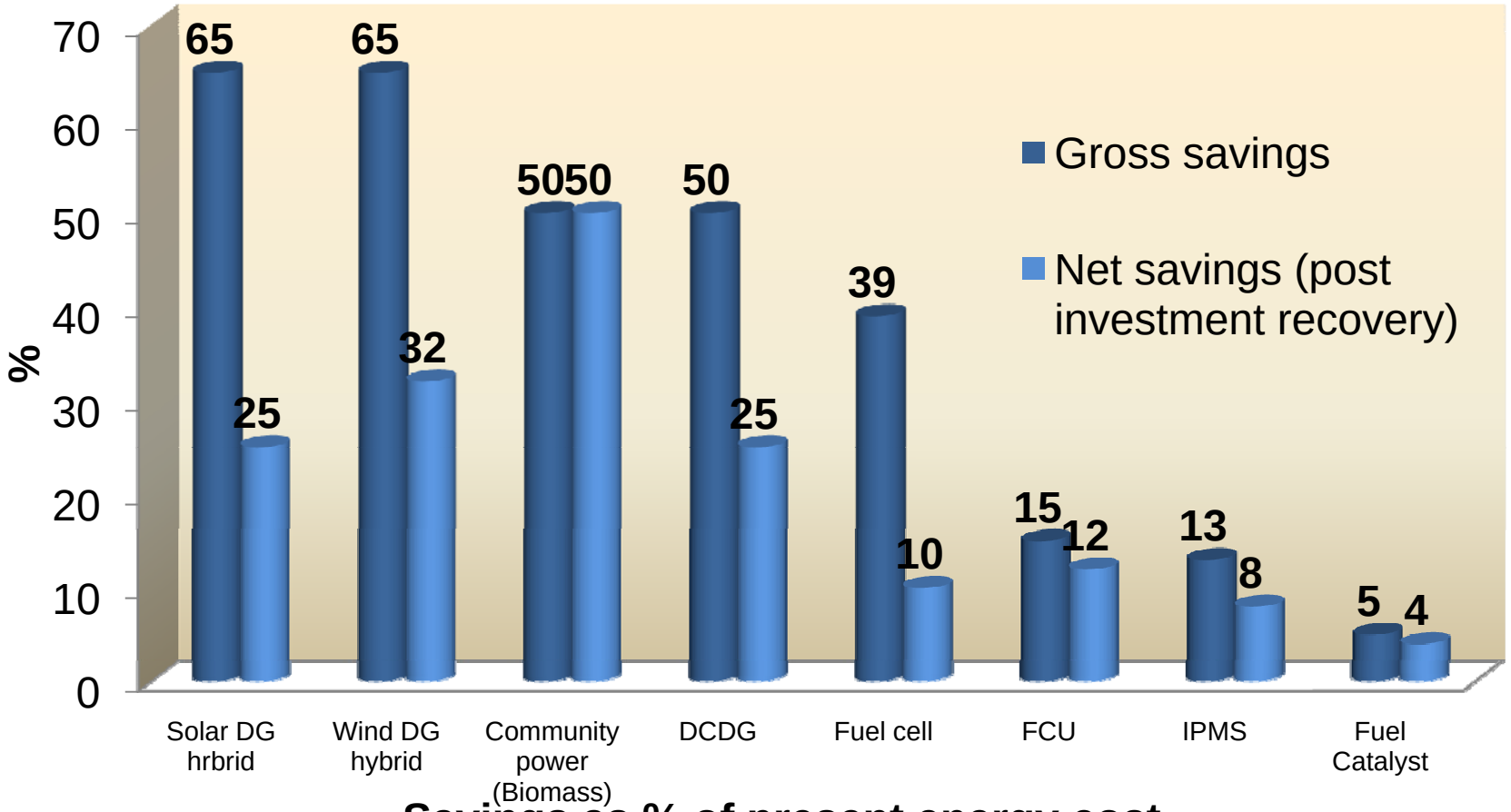


Technology Penetration Potential



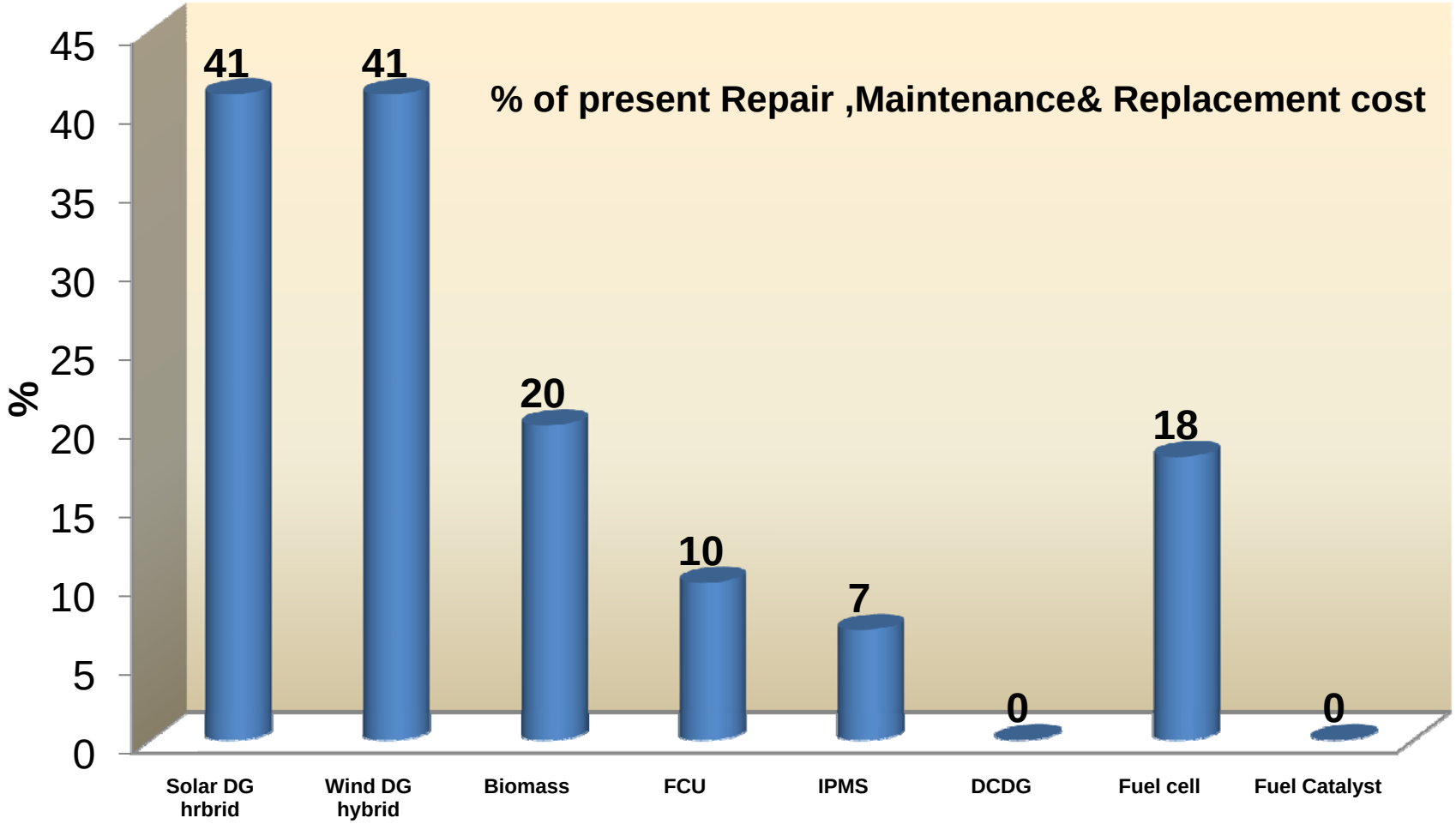
Green energy technologies Penetration potential can be improved substantially once prices reduce with more use.

Estimated Energy Cost Saving potential



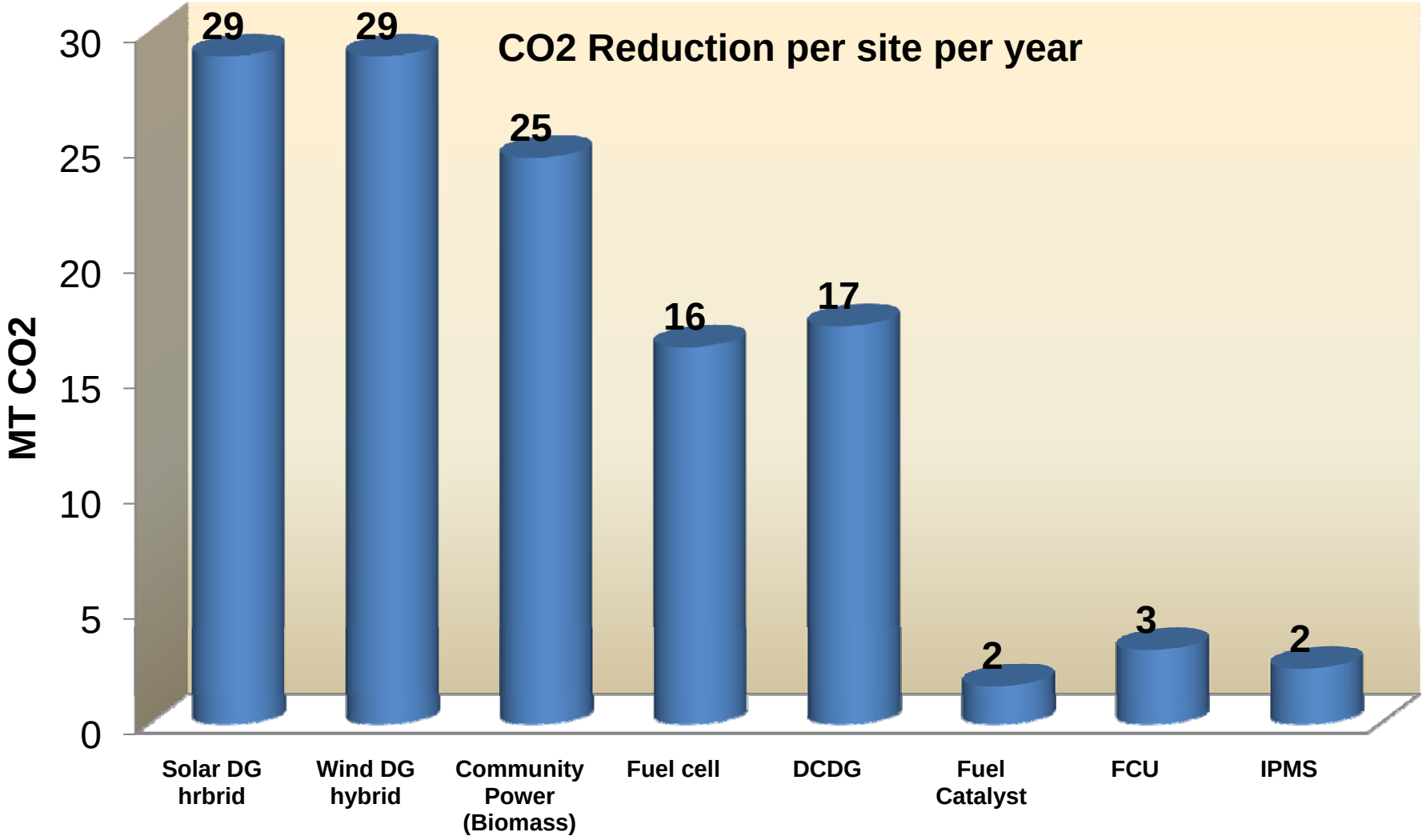
- **Huge Gross energy saving possible using Green Energy technologies.**
- **Net energy savings using green energy technology can be improved with possible reduction in pricing of green technology solutions.**

Estimated Maintenance cost Saving



Upto 40% reduction in site Maintenance expenditure for tower companies using green energy technology

Environmental Impact



Green energy initiatives have greater potential to reduce GHG emission.



- **High capex can be avoided & new technology performance can be guaranteed by looking at opex fee model from generated savings.**
- **Local entrepreneurs can be encouraged.**

Agenda

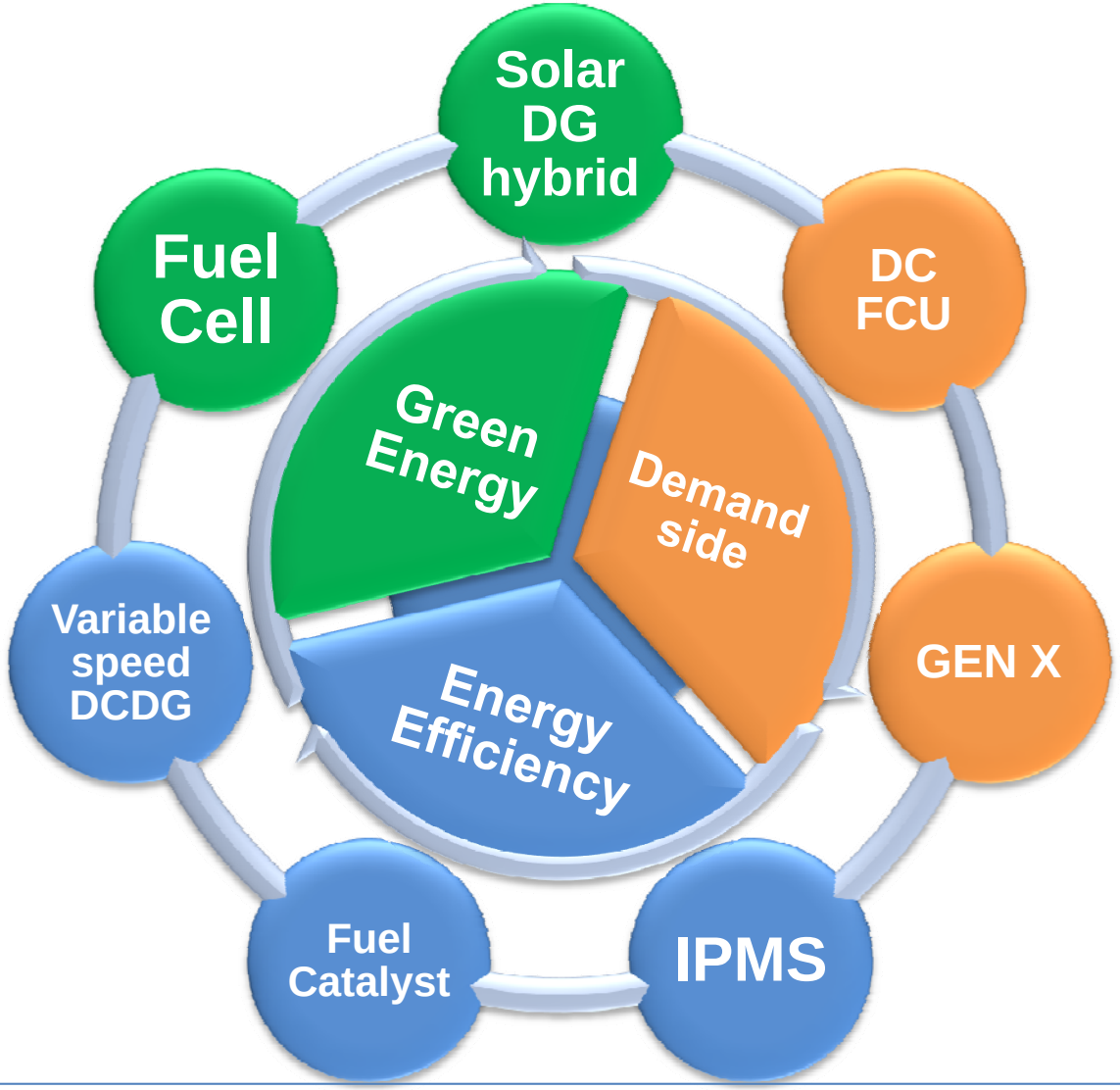
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Towering Your Telecommunications

- **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
- Having a **big first-mover advantage** in India, its strong differentiator is of having service presence in some of the toughest terrains and remotest rural areas
- Provides best-in-class telecom infrastructure services and a **compelling capital investment saving opportunities to wireless operators**
- A **Strong telecom heritage**, coupled with **deep industry understanding** and capabilities, people and processes

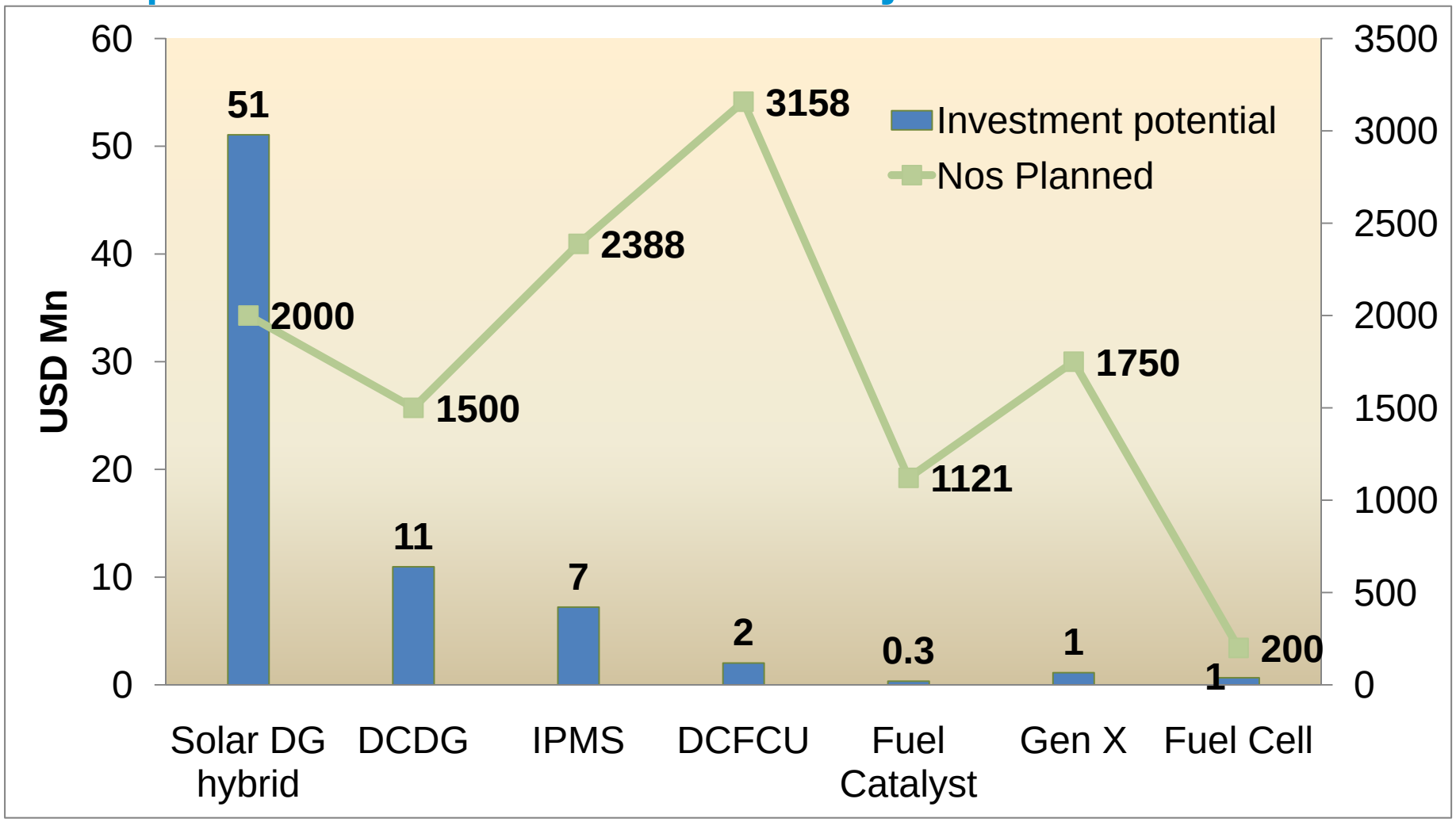


Energy Initiatives at Bharti Infratel -P7 program



In our endeavour to become more environmental friendly & energy efficient company we initiated P7 program.

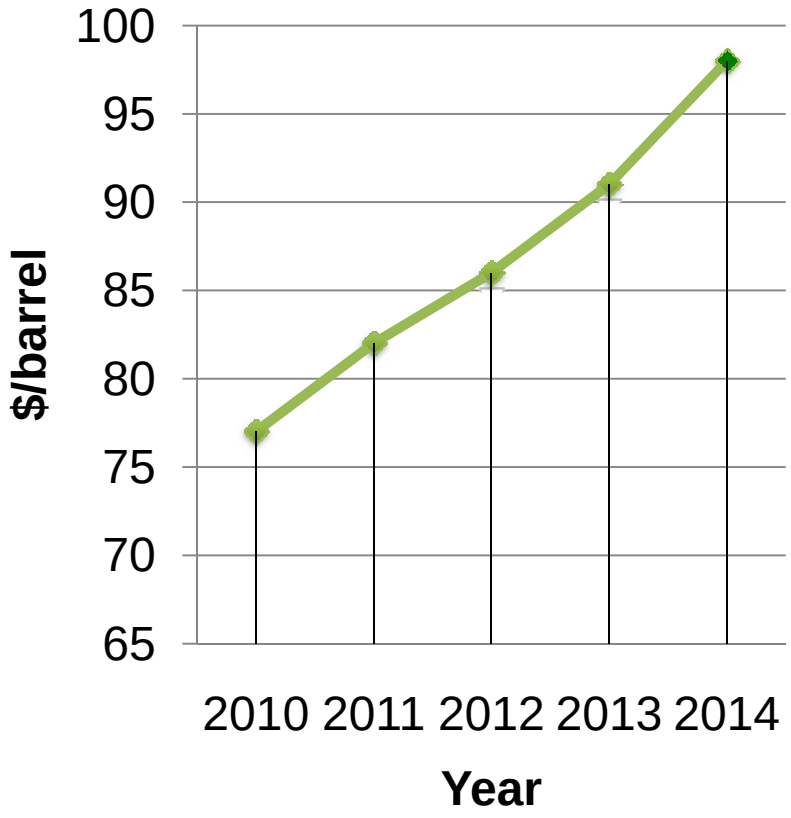
Capex Investment – P7 Projects



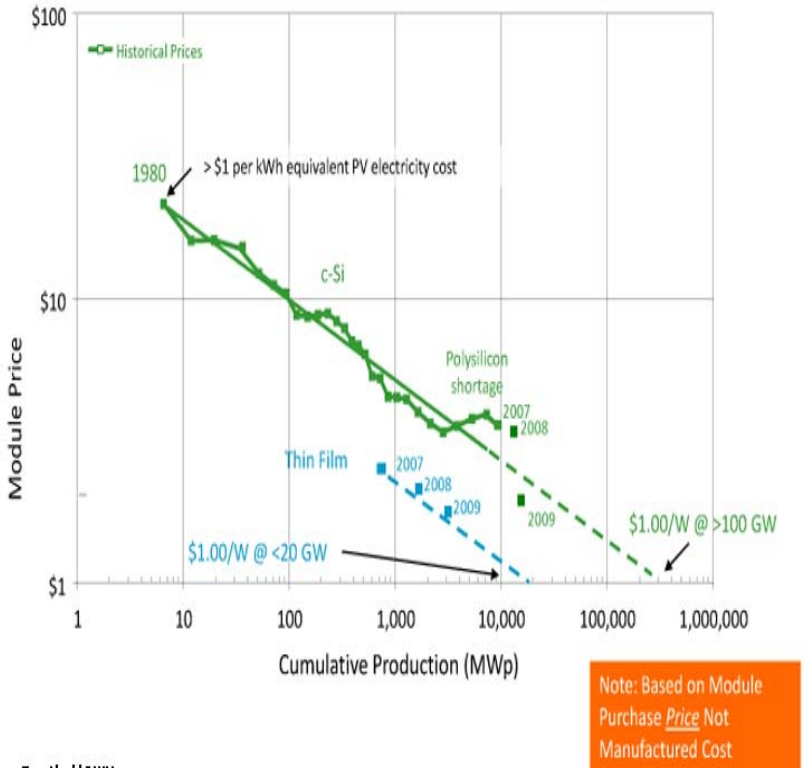
Solar DG hybrid solution requires an estimated investment of USD 51 Mn towards PV cells, Batteries, Charge Controller & solar structures

Green Energy Viability

Crude Oil Projection

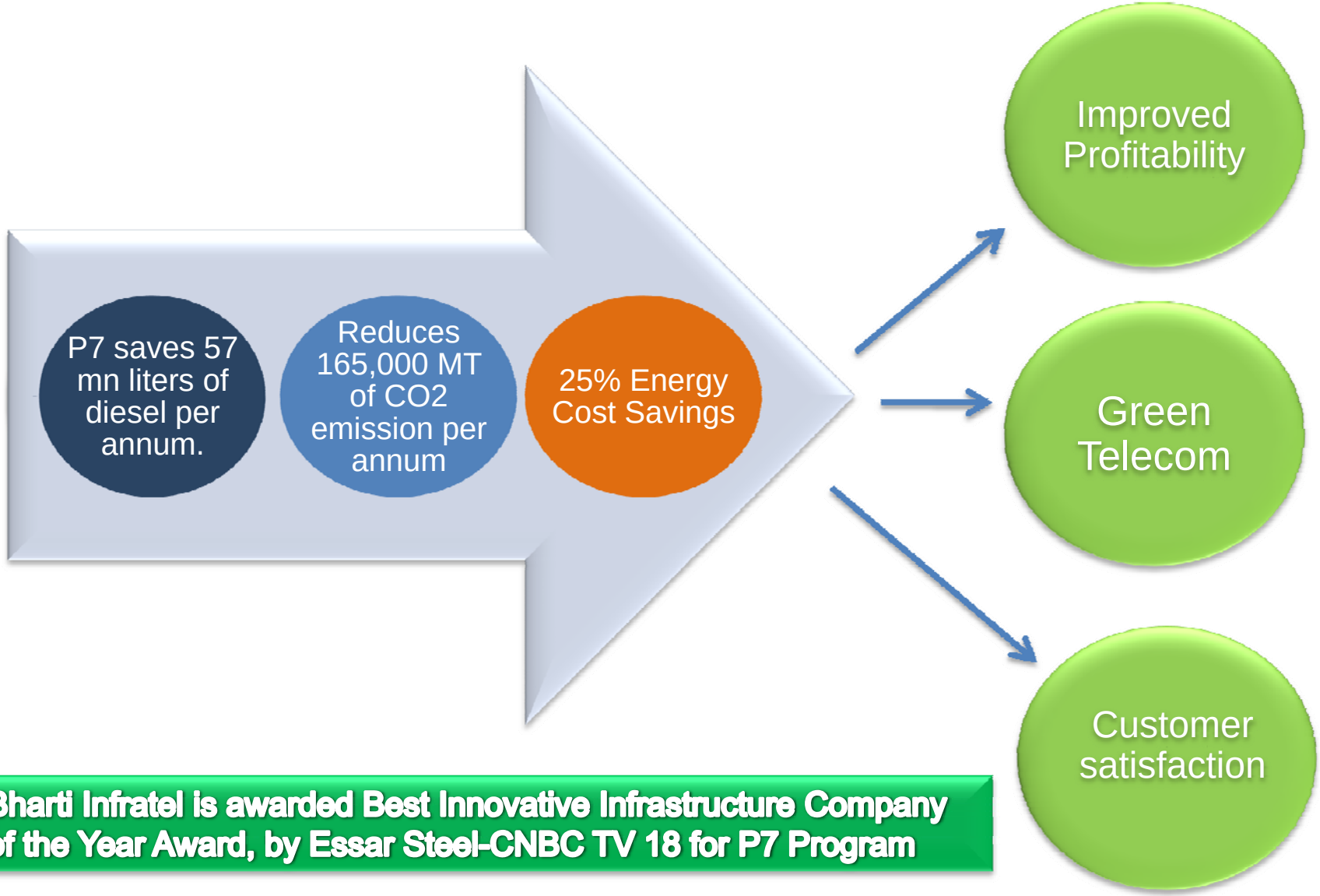


Solar PV Projection



With decrease in PV panel prices due to volume increase & increasing diesel price, adaptability of Green Energy sites improves further in future.

P7 Key Benefits



Bharti Infratel is awarded Best Innovative Infrastructure Company of the Year Award, by Essar Steel-CNBC TV 18 for P7 Program



Bharti Infratel Limited
www.bharti-infratel.com

Opex saving calculation

Opex expenditure	DG	AC	Technician	Battery	Diesel filling	PIU & other	Total
Rs per month	**12000**	**250**	**1100**	**3000**	**1000**	**100**	**17450**

P7 Initiative	DG delay	Opex savings	savings as % of total opex
Solar	12	7200	41%
DCDG	0	0	0%
GENX	3	1800	10%
DCFCU	3	1800	10%
IPMS	2	1200	7%
Fuel catalyst	0	0	0%
Fuel cell	13	3120	18%

Rent & security services charges are not considered while calculating site opex charges.
DG opex charges of Rs 20/hr includes Repair & maintenance charges.