

# Renewable Energy and Energy Efficiency Business Forum

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## *All India Total Installed Capacity (As on 22.10.2014)*

Sector	MW	%age
State Sector	94,153	37.1
Central Sector	68,993	27.2
Private Sector	90,903	35.8
<b>Total</b>	<b>2,54,049</b>	

Fuel	MW	%age
<b>Total Thermal</b>		
Coal	1,52,971	60.2
Gas	22,608	8.9
Oil	1,200	0.5
Hydro (Renewable)	40,799	16.1
Nuclear	4,700	1.9
<b>RES (MNRE)</b>	<b>31,692</b>	<b>12.5</b>
<b>Total</b>	<b>2,54,049</b>	

- ❖ India is a vast country of 3287590 sq. Km spread across north and south and east and west. There are mountains and difficult terrains.
- ❖ The latest census gives India's population as 1210 million.
- ❖ With the population growth of 1.5% p.a. It is likely to reach 1331 million in 2020.
- ❖ But as on date only 75% of the population has electricity.
- ❖ The comparison in the next slide gives an indication as to where we are today.
- ❖ In India the captive power plants as installed is total 34000MW

	India	Pakistan	Brazil	China	UK	USA	World
Population in millions	1270	185	202	1395	64	323	7259
Literacy rate in % of Population	74	55	91.3	95.1	99	99	84.1
% having no electricity	25	44	15	15	Nil	Nil	22%
Per capita consumption (In Kwh) approx)	900	449.3	2438	3298	5472	13246	3044

# Capital Cost of Setting up a Power Plant (Rs. Crores)

Type of Plant	Raw Material	Cost/MW In Rs. Crores	Advantage	Disadvantage
<b>Thermal</b>	<b>Coal</b>	<b>5</b>	<b>Most Popular</b>	<b>Non Availability of Ind Coal</b>
				<b>Additional cost of Coal Mining</b>
				<b>Pollution hazards</b>
	<b>Oil</b>		<b>Easy to set up</b>	<b>Escalation cost of Liquid fuel</b>
	<b>Gas / Combined Cycle</b>	<b>6</b>	<b>Utilization of Waste Heat</b>	<b>Non availability of steady supply of gas</b>

# Capital Cost of Setting up a Power Plant (Rs. Crores)

Type of Plant	Raw Material	Cost/MW In Rs Crores	Advantage	Disadvantage
<b>Hydro</b>	<b>Water</b>	<b>6-11</b>	<b>Low</b>	<b>Higher set up cost</b>
<b>Large</b>	<b>Dam/Reservoir</b>			
<b>Small/Mini</b>	<b>Storage Pumping</b>			
<b>Micro</b>	<b>Run of the river</b>			<b>Maintenance</b>
<b>Nuclear</b>		<b>8</b>		<b>Non availability of Raw Material</b>

# Capital Cost of Setting up a Power Plant (Rs. Crores)

Type of Plant	Raw Material	Cost/MW In Rs Crores	Advantage	Disadvantage
<b>Renewable</b>	<b>Small Hydro(less than 25MW)</b>	<b>7</b>		<b>Non Availability of Latest technology</b>
	<b>Wind</b>	<b>7</b>	<b>Easy to set up</b>	<b>Seasonal</b>
	<b>Solar-Thermal</b>	<b>7</b>	<b>Abundant Energy</b>	<b>Large Space required only daytime generation</b>
	<b>Solar-PV</b>	<b>12</b>	<b>Abundant Energy</b>	<b>Very Expensive/Large space requirement/only daytime generation</b>
	<b>Biomass-Energy Plants-</b>	<b>6</b>	<b>Easy to grow</b>	<b>High space requirement</b>
	<b>Biogas/Biofuel/Landfill gas/Sewage Gas</b>	<b>6</b>		<b>Limited availability</b>
	<b>Waste to Energy(MSW)</b>	<b>7</b>	<b>Large quantity of Municipal waste required</b>	<b>Organic/Non organic waste mixed</b>
	<b>Waste Heat Recovery</b>	<b>6</b>	<b>Exhaust Gas available</b>	<b>Linked with another Plant</b>

## *Finance required to set up a Power Plant*

- Coal Based Power Plants-Rs.5 crores/MW
- Hydro Power Plant-Between Rs.6 to 11Crores/MW
- Nuclear Power Plant- Rs. 8 Crores/MW
- Renewable:
  - Solar Thermal-Rs.5to 7 Crores/MW
  - Solar PV-Rs.12to 13 Crores/MW

On this basis

Investment required for 80000 MW in 11th five year plan is Rs.480000

Investment required for 100000 MW in 12th five year plan is Rs. 600000

Total

- Equity(30%)
- Debt(70%)

Where is the money going to come from?

The Govt. of India and the Indian Private Sector will find it extremely difficult to raise this kind of money

**Therefore FDI is a must.**



# Types of Renewable Energy :

- *Solar Energy*
- *Wind Energy*
- *Geothermal Energy*
- *Hydroelectric Power*
- *Biomass*



## *Renewable Energy in India at a Glance (As on 31.07.2014)*

<b>Sl. No</b>	<b>Major Programme/Systems</b>	<b>Cumulative Achievements</b>
1	Biomass Power (Agro residues & Plantations)	1365.20 MW
2	Wind Power	21692.98 MW
3	Small Hydro Power (Upto 25 MW)	3826.18 MW
4	Cogeneration -Bagasse	2680.35 MW
5	Family Type biogas Plans (Nos.)	47.40 Lakhs
6	Street Lightning Systems	75376 nos
7	Home Lightning Systems	434692 nos
8	Solar Lanterns	697419 nos

## *New & Renewable Energy-Cumulative achievements*

(As on 31.07.2014)

Sl. No	Major Programme/Systems	Achievements during 2013-14 (Upto 31.07.2014)	Cumulative Achievements
<b>1</b>	<b>Power from Renewables</b>		
1	Biomass	100.4 MW	1365.20 MW
2	Wind Power	2031.83MW	21692.98 MW
3	Small Hydro Power (upto 25 MW)	119.43 MW	3826.18 MW
4	Cogeneration- Bagassee	342.92 MW	2680.35 MW
5	Waste to Energy	10.5 MW	106.58 MW
6	Solar Power	914.00 MW	2753.00 MW
	<b>TOTAL (IN MW)</b>	<b>3519.08 MW</b>	<b>32424.29 MW</b>

## *Subsidies and Incentives to Investors in Renewable Energy Sector*

- *The Government of India through their Ministry used to offer subsidies/incentives to attract Private Sector invest in Renewable Sector.*
- *These were in the form of Capital Subsidy, depreciation benefits, lower interest rate etc.*
- *These subsidies were available as long as the World Bank line of Credit was available.*
- *Now that the World Bank line of Credit is not available, these subsidies have been withdrawn.*
- *However IREDA still offers attractive interest rates however subject to stringent guarantee conditions.*
- *The indirect incentives offered by Govt. of India are:*
  - *Some state's regulatory commission have made it mandatory for the power distributor to buy a specific amount of power produced from renewable sources.*
  - *For solar PV tariff upto Rs12/kwh allowed*
  - *For solar thermal tariff upto Rs.10/kwh allowed*
  - *For wind power incentive of Rs.0.50/kwh for 10 years*

## *Governments special incentive for Solar Power*

- *Announcement of Jawaharlal Nehru National Solar Mission on 23/11/09*
- *20000MW of Solar Power by 2022 in Phases*
- *1100MW Solar Grid Power and 200 MW Solar PV by 2013*
  - *Phase 1*
    - *Balance by 2022*
    - *Phase 2-by 2017*
    - *Phase 3-by 2022*
- *Special provision of Solar Power purchase tariff.*
- *Sale of Solar Power to PSUs like NTPC*
- *Price mix between Solar Tariff and normal Tariff for unallotted Power to States*
- *Special drive to encourage Manufacture of Solar Thermal and Solar PV in the country*

## *Renewable Energy Advantages:*

- *Inexhaustible and non-pollutant*
- *Zero or less chance of depletion, available throughout the world*
- *Minimal cost of operation*
- \* *Cost of renewable energy technologies continues to drop steadily and expected to drop even more*
- *Use of renewable energy helps in conserving limitedly available fossil fuels*
  - \* *Ideal choice for bringing electricity to remote corners of the country-DDG concept*
  - \* *Hybrid R.E. power wind/solar/hydro is the answer to village electrification*

# *Energy Conservation through Renewable Energy :*

*“We do not inherit the earth from our parents, we borrow it from our children”*

- *Fossil fuels will not replenish in our lifetime.*
- *Huge dependence upon fossil fuels for power generation makes it necessary to investigate alternate sources of energy.*
- *Renewable energy sources (RES) are typically indigenous resources and can reduce dependence on energy imports.*
- *Renewable energy sources can be exploited locally, used both for centralised and decentralised power generation.*
- *Energy saved is Energy conserved - Renewable energy saves fossil fuel sources.*

## About IPPAI:

### Who We Are

- *As the first Indian independent body that provides a neutral platform for the discussion and examination of issues critical to the development of the private power sector in India, IPPAI was set up in 1994, after the Government of India opened power generation to private players and invited developers to set up power projects in India.*
- *IPPAI provides a cerebral platform for engaging interface between players in the Energy Sector, Policymakers (Central and State level), Electricity Boards, Financial Institutions, Ministries, Power Developers, Indian & Multinational Companies, Equipment Suppliers, EPC Contractors and Consultants.*



## *About IPPAI:*

- *At the core of IPPAI initiatives are its industry acclaimed conferences, that focus on current energy & related affairs.*
- *IPPAI's conferences provide a platform for top level speakers to address issues of direct relevance to the energy needs of today.*
- *IPPAI has, over the past few years conducted over a hundred Workshops, Round table meetings, Energy Summits and International Conferences, featuring a wide range of subjects from Financing, Regulation, Policy Initiatives, Security Issues and Environmental and consumer concerns by NGOs.*
- *IPPAI has, on its advisory committee, a number of experts from diverse fields with a unique knowledge base and decades of experience in the Indian energy sector.*

## *About IPPAI:*

*IPPAI has been an integral part of the key decision making in the Indian Power Sector, since its inception: -*

- *Hosted over 15 workshops in India debating over the contents of the Electricity Act 2003*
- *Closely involved with parliamentary agencies prior to the finalization of the Electricity Act*
- *Worked with the CEA in determining the 8th and 9th Five Year Plans for the Power sector*
- *Strategized with various state governments on how to attract investments*
- *Involved in showcasing India with various ministerial missions*

*Thank You*

