

Renewable Energy in India



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Renewable Energy Sources

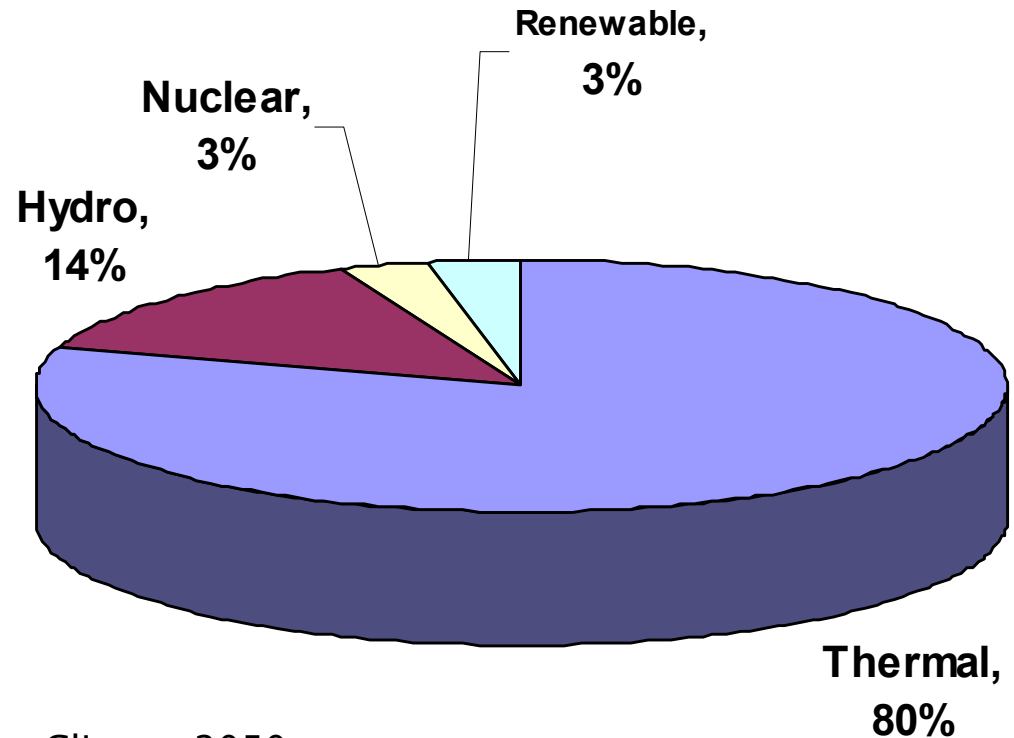
- Solar energy
- Wind energy
- Biomass
- Small hydro
- Waste to energy
- Biofuels.....

- For power generation as well as other applications



Power Situation in India

- Present power generation highly dependent on thermal power generation
 - Coal
 - Hydro
 - Nuclear



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Power Situation in India

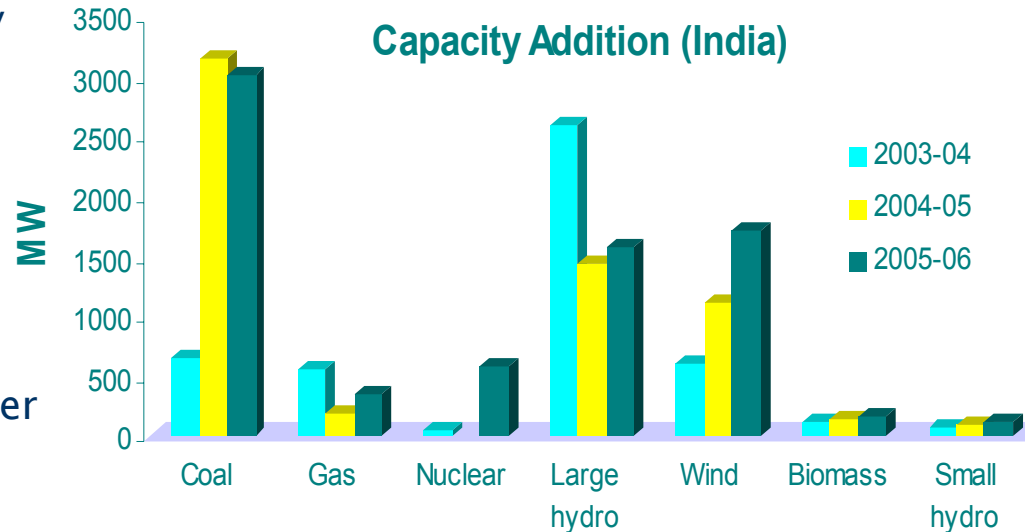
- ❑ Present energy deficit 3% to 21%
(April – June 2007)
- ❑ Projected peak deficit of 16% and
energy deficit of 13%

Projections by Central Electricity Authority



Status of Renewable Energy in India

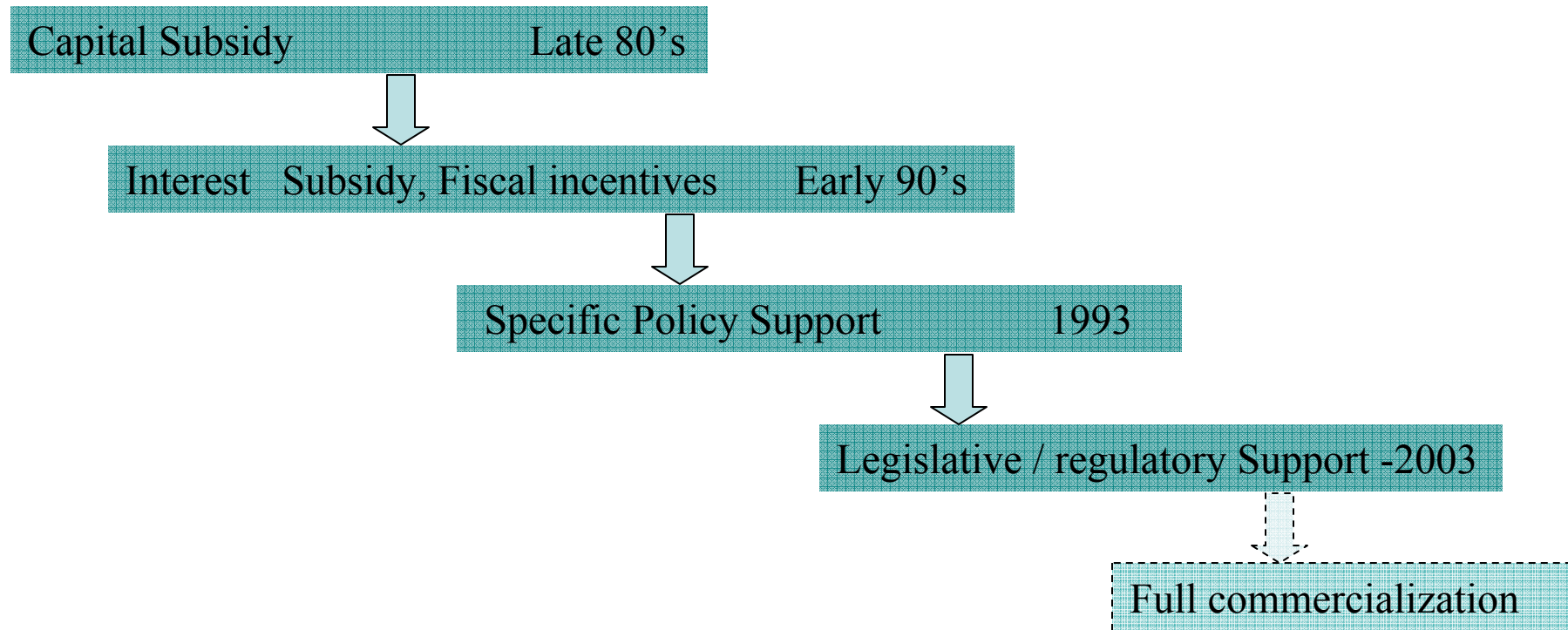
- ❑ India has installed close to 10,000 MW of grid connected renewable energy (Sept, 2007)
 - More than nuclear based capacities
- ❑ Wind energy market size has increased in the 1,500–1,700 MW per year
 - \$2250million – 2500million per annum



Source:
[-www.powermin.nic.in](http://www.powermin.nic.in)
[-www.infraline.com](http://www.infraline.com)
[-www.indiastat.com](http://www.indiastat.com)
[-www.cea.nic.in](http://www.cea.nic.in)

Renewable Power: Background

The renewable energy policies in India had followed a “classical” developmental process



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Renewable Power: Background

- ❑ Ministry of New and Renewable Energy Sources Guidelines in 1993
 - Sale of power from renewables at 5.6cents/unit, with 5% annual escalation.
 - Other guidance on wheeling and banking
 - These guidelines were adopted with different variation by utilities in different states



Renewable Power: Background

- ❑ Electricity Regulatory Commissions Act 1998
 - o The state commissions became the key player for determining (power purchase) tariffs



Electricity Act 2003

- ❑ Section 61: The Appropriate Commission shall, subject to the provisions of this Act, specify the terms and conditions for the determination of (power purchase) tariff, and in doing so, shall be guided by the following, namely:–
 - (h) the promotion of co-generation and generation of electricity from renewable sources of energy



Electricity Act 2003

- ❑ Section 86(i): The State Commission shall discharge the following functions, namely:
 - (e) promote cogeneration and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee;



Other Policies

- ❑ The national electricity policy (2005)
 - Need for promotion of renewable energy
- ❑ National tariff policy (2005)
 - Step by step introduction of competition
 - ∞ Preferential tariff
 - ∞ Competition within same technology
 - ∞ Competition within renewables
 - ∞ Competition with other sources



Status of Regulation

State	Status of RPS Regulation	Minimum Quantum
Madhya Pradesh	Final order	10%
Karnataka	Final Regulation	5-10%
Orissa	Final Regulation	3% (Wind+Hydro)
Gujarat	Final Regulation	2%
Rajasthan	Order & Final Regulation	7.5%
Uttar Pradesh	Order issued	7.5%
Andhra Pradesh	Final Regulation	5%
Tamil Nadu	Order issued	10%
Kerala	Final Regulation	5% (wind+hydro)
Maharashtra	Final Regulation	3-6%
West Bengal	Final Regulation	3.8%
Haryana	Final Regulation	2%-10%

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Current Policy Framework

❑ Fiscal

- o 80% accelerated depreciation allowed in the first year, under Section 32 of Income Tax
 - ∞ Companies can avail the derived tax shelter
- o Section 80IA benefits on energy sales/savings

❑ EA 2003

- o Section 86(i)e of EA 2003
 - ∞ Mandates minimum %age procurement from renewables by discoms

❑ Feed-in Tariff



Analysis of Market Models

- ❑ Pre-EA 2003
 - Industries been overcharged by SEBs
 - Wheeling & Banking at nominal rates pushed ‘captive market model’, and ‘third party sales model’ in wind energy

- ❑ Post- EA 2003
 - Section 86(i)e favors “sell to DISCOM” model
 - ∞ Various SERC have fixed percentage & ‘procurement tariff’
 - Liberalization of ‘captive’, ‘open access’, ‘transparency’, and rationalisation of ‘tariff’, will reduce the rates of Industrial segment – however will take some time (say 3–4 years)



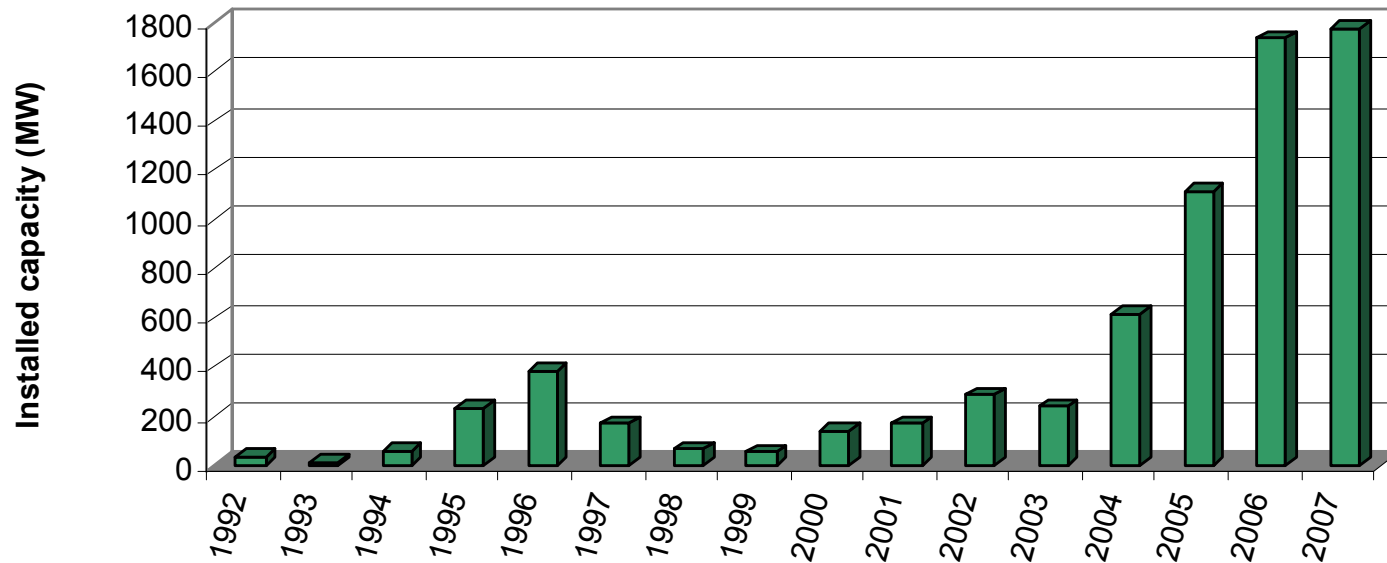
Growth Example: Wind Power

- ❑ Initiated by Government of India in mid-80's
 - Private sector investments started in early '90s
 - Resource potential of 65,000 MW +

- ❑ Installation >7,000 MW by Sept, 2007
 - Fourth in the world
 - 1700 MW + in the FY 2006, 2007
 - High growth in the past 5 years



Growth Example: Wind Power



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Issues

Share of Renewables

Pricing

Grid connectivity



Share of Renewables

- ❑ Deciding percentage
 - o How: based on potential, present achievements, possible impact on consumer tariffs
 - o Inclusion of non utility power consumption
 - ∞ Off grid/captive/open access
 - o Renewable power from other licensee area/state
 - ∞ Presently envisaged within state
 - ∞ Will need implementation mechanism for inter state procurement



Pricing of Power from Renewables

□ Basic pricing approach

o Short term:

- ∞ The NTP indicates preferential tariffs

- ∞ Benchmark /cost plus

 - Issue of benchmarking of cost and performance parameters

o Long term: competition within “renewable energy technology” as per the National Tariff Policy



Grid Connectivity Issues

Intermittency

- o Technical issues/standards for connectivity

Evacuation

- o Cost sharing

- ∞ Section 86(e).. providing suitable measures for connectivity with the grid..

Wheeling

- o Estimation of actual loss/gain due to renewables



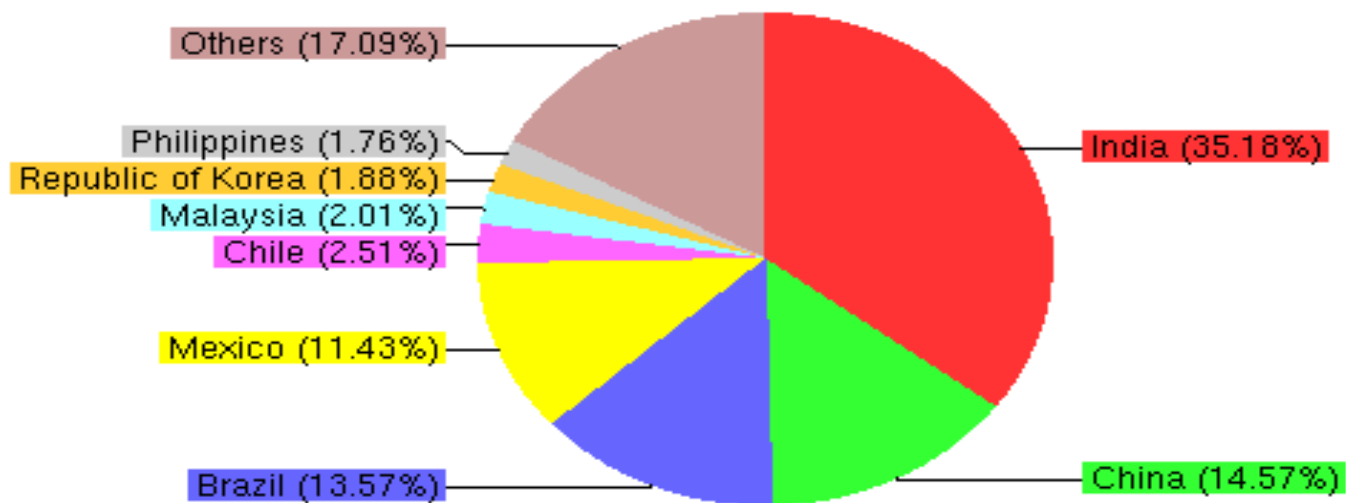
Other Applications

- Decentralized power generation
 - o Solar PV, Biomass, Small hydro
- Thermal applications
- Biofuels
- Policy support from the government
 - o Village electrification targets
 - o Municipal by-laws
 - o Direct/ indirect subsidies
 - o Biofuels policy



The CDM angle

Registered project activities by host party. Total: 796



The CDM angle

- ❑ Out of 282 registered projects from India, 187 are renewable energy projects
- ❑ CDM facilitating the development of Renewable projects.



CDM challenges

□ Limiting factors

- uncertainty beyond 2012 creates problems for CDM projects – limits market supply value from CERs
- Limited knowledge of carbon finance, especially in national investment/banking sector
- Lack of clear policy on tax and VAT treatment of emissions certificates

