

Renewable Energy in India: Status and Future Prospects

“.....the time is running out...soon, there will be nothing left to burn on earth but earth itself...”

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Development Context



Developed India emits double the allowable carbon emissions set to prevent climate change chaos.



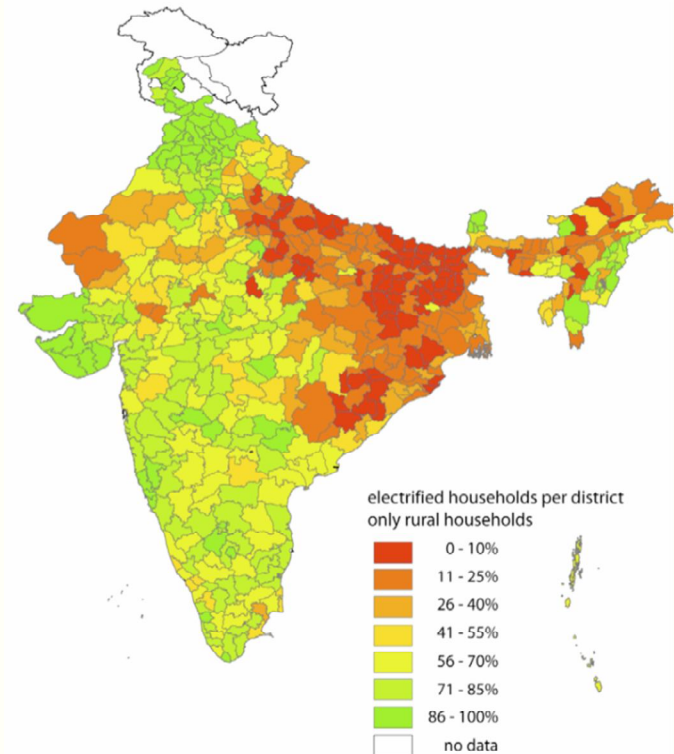
Developing India, 80% of the total population, mostly in rural areas, emits **1/4** of the carbon emitted by Developed India.



As urban populations increase, **irreversible stress** is put on **urban infrastructure**; heavily **fossil fuel dependent**.

Unfulfilled Needs: Energy - Resource Constraints

- ❑ **High Cost of Irrigation**
... lack of productivity and reduced profitability
- ❑ **Lack of power for local value-addition**
... absence of enterprise and livelihood opportunities
- ❑ **Primitive cooking and lighting solutions**
...negative health effects, lack of productive time and inefficient resource use



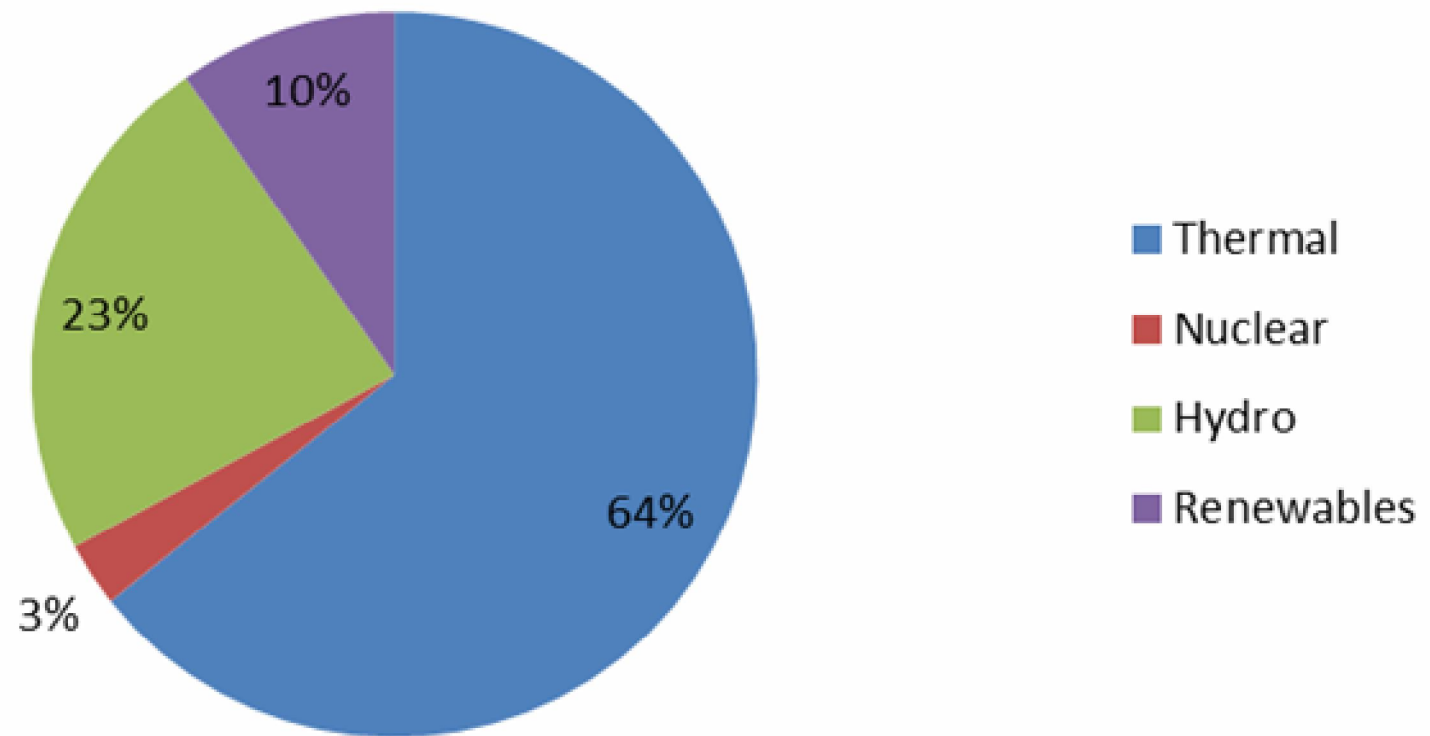
Energy in India: Climate context

- ❑ Consumes 3.7% of the world's commercial energy - 5th largest consumer of energy globally.
- ❑ Energy consumption set to triple (1936 Mtoe) by 2030 , (IEA 2007)
- ❑ Set to become 3rd largest emitter of CO₂ by 2015 (IEA 2007)
- ❑ Power plants emit 0.94 kg CO₂ per kWh,
- 50% higher than world average
- ❑ 9-13% loss to GDP by 2100 in comparison to non climate change scenario (CDP 2007:12)

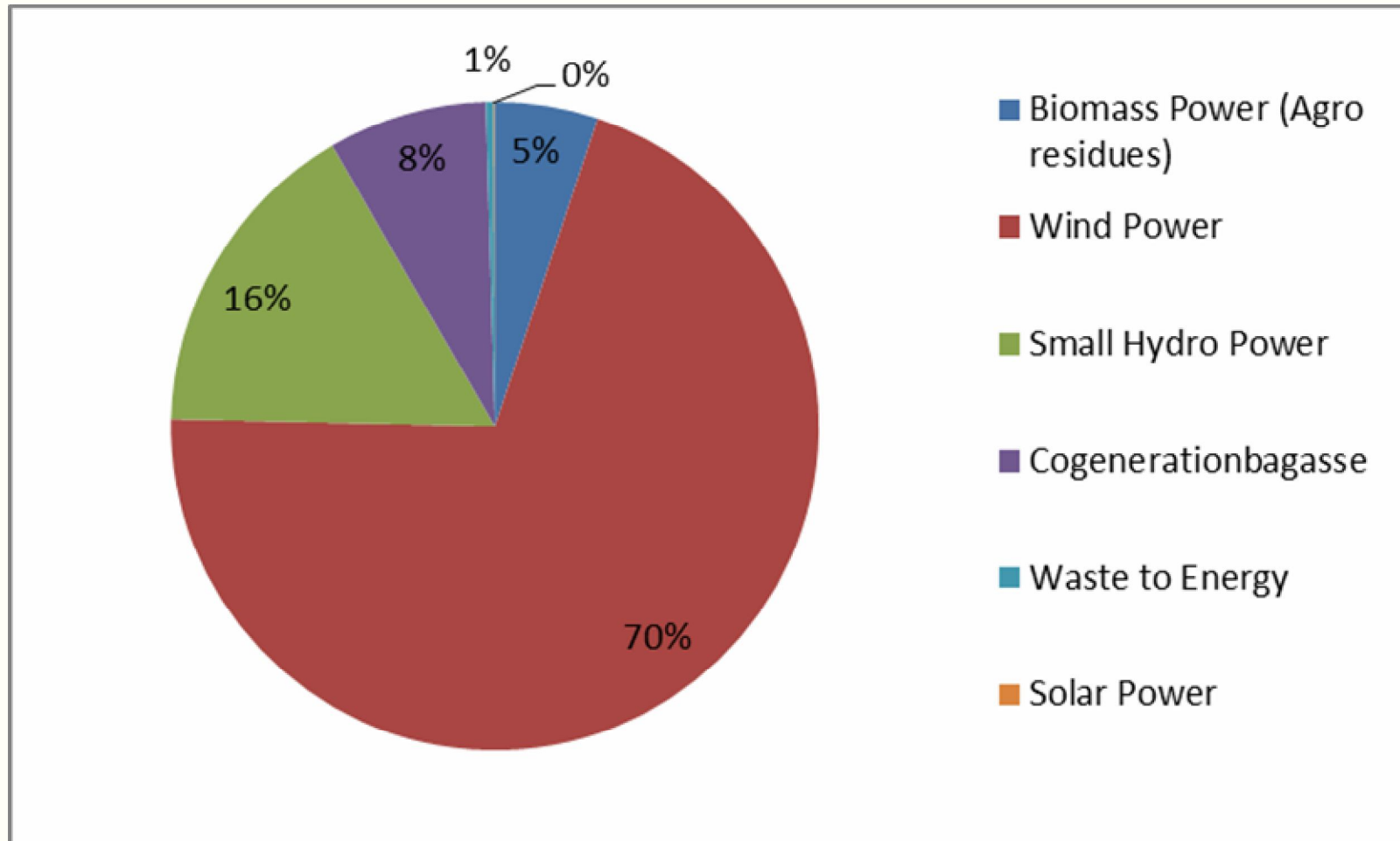
*Due to heavy dependence on coal, more susceptible to future changes
international treaties*

Indian Power Sector

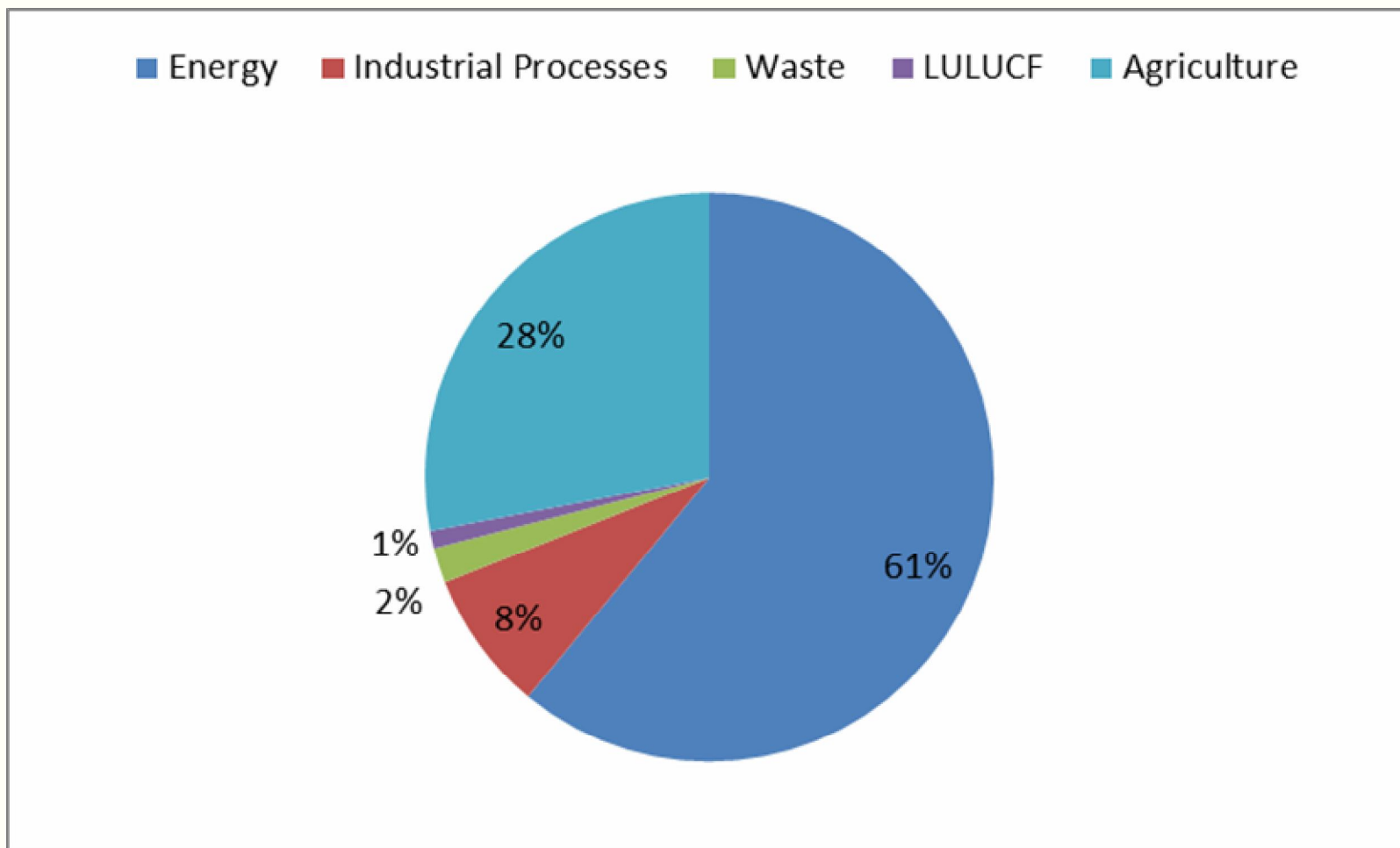
Total Installed Capacity - 159396 MW March 2010



Installed Capacity from Renewable Energy as on March 2010



Sectoral Distribution of GHG Emissions



Total Emission 1.2 Gte 2006

Energy Scenario in India

- ❑ Rapid economic development & Increasing population = High demand for Energy
- ❑ A sustained 8% GDP growth of India requires an annual increase of:
 - a) Commercial energy supply from 3.7% to 6.1%
- ❑ Limited supply of COAL, coupled with its poor quality, low level of technologies advancements and high environmental hazards.
- ❑ Limited domestic reserves and uncertain foreign supply of hydrocarbons.

Why Renewable Energy for India?

- ❑ Power shortage
- ❑ Rising Prices of Oils & Gases
- ❑ Ecological Hazards
- ❑ Ample resources and sites available
- ❑ Abundant sunshine
- ❑ Government incentive
- ❑ Increased financing options

India – An Attractive Renewable Energy Market

- India has a large potential for energy generation by utilization of renewable energy source
- MNRE has planned a target capacity addition of 10,000 MW during the 11th five year plan
 - 10% of annual power capacity additions to be from Renewable between 2003-2012
- High potential for development across various renewable source

Summary of Potential Returns in RE base Generation Projects

- ❑ Given the comparatively higher cost of generating energy from renewable sources, **necessity for financial support for the industry.**
- ❑ Government has introduced subsidies to make returns attractive for developers.
- ❑ Indicative expected returns:

Returns \ Type of Project	Wind	Hydro (PPA)	Hydro (Merchant)	Biomass	Solar
Costs (Rs. Cr/MW)	5-6	5-6	5-6	4-5	18-20
Equity IRR	20-25	15-18	20-25	16-20	--

Challenges: RE in India

Key Barriers in Renewable Energy Development

- ❑ Optimal pricing of power generated from the renewable energy sources
- ❑ Quality and consistency issue of renewable power
- ❑ The costs of technology development and production need to be reduced significantly from current levels
- ❑ Availability of financing especially project finance for Renewables
- ❑ Slow pace of rural electrification and pace of reforms in the rural electricity sector

Areas RE Development

- ❑ Grid interactive Renewable Energy Generation systems
- ❑ Renewable Energy for Urban, Industrial and Commercial applications
- ❑ Renewable Energy for Rural applications, Irrigation, enterprises, cooking, lighting etc.
- ❑ Research, Design and Development in new Renewable energy generation and applications

Measures undertaken by government to promote RE development

The ministry is aiming for 10% share for RE or 10,000 MW in the power generation capacity to be added during the period up to 2012.

Regulatory Support for RE Development

□ ***Electricity Act, 2003***

- Promoted generation of electricity from renewable sources.

□ ***National Electricity Policy, 2005***

- The Policy emphasized on the full development of feasible hydro projects and Laid down procedures for the speedy implementation of the same.

□ ***Integrated Energy Policy, 2006***

- Emphasized use of Renewables for reducing dependence on energy imports.

□ ***Rural Electrification Policy, 2006***

- The Policy recognized that non-conventional energy sources can be appropriately and optimally utilized to make available reliable supply of electricity to each and every household.

Measures undertaken by government to promote RE development

Encouragement of FDI

- 100% equity investment allowed with permission from FIPB, proposal to make it under the automatic route
- Foreign investors can enter into a financial/technical JV with an Indian partner
- Foreign investors can set up RE-based power generation projects on Build, Own and Operate (BOO) basis

Source : Renewable Energy Policy

Future growth drivers for RE in India

- ❑ Demand Supply Gap
 - Supply regularly being over stripped by demand
- ❑ Large renewable energy potential
 - Abundance of sites for tapping natural & renewable sources of energy
- ❑ Availability of New forms of capital – Private equity, CDM
 - Increasing presence of PE funds in Clean energy
 - India emerging as a dominant player in CDM projects
- ❑ Increasing state level initiatives
 - States such as Punjab, Haryana, AP taking the lead in development of RE projects

THANK YOU