

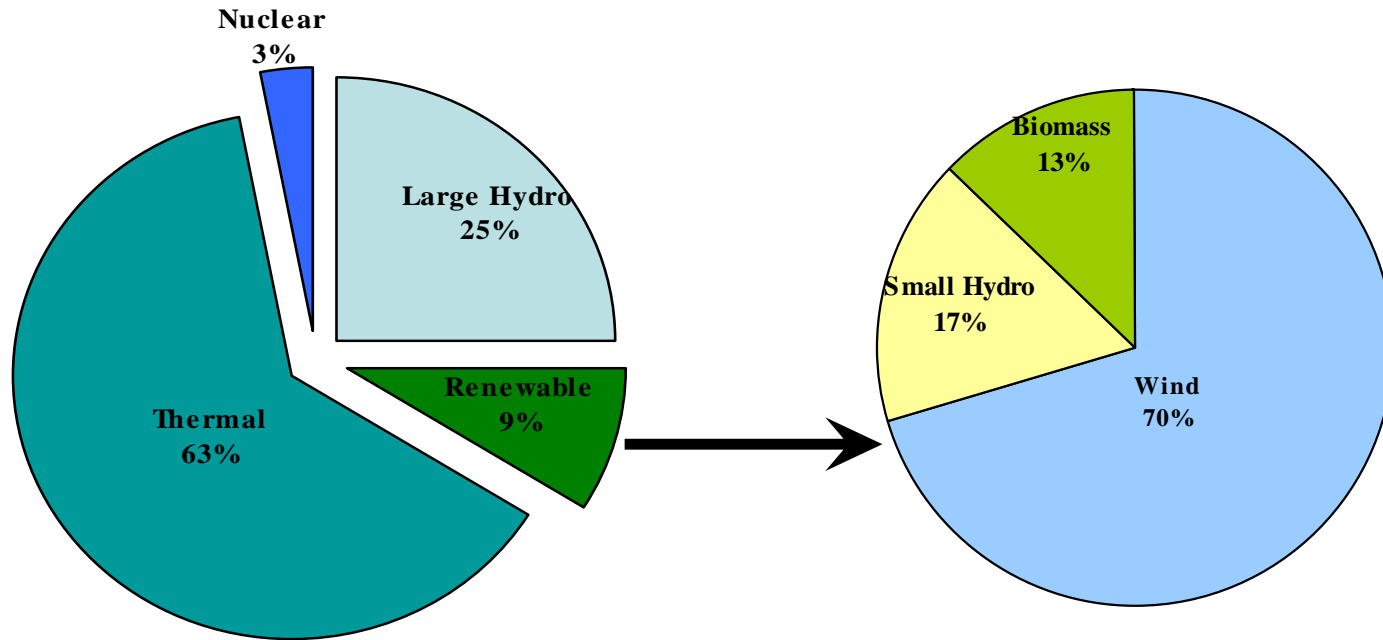
# **RENEWABLE ENERGY PROGRAMMES IN INDIA - AN OVERVIEW**

**Ministry of New and Renewable Energy  
Government of India**

# INDIA'S ENERGY PROFILE

Very low per capita energy consumption:	639 kWh/ capita (2008) Canada: 16766 kWh/ capita (2006)
Current power generation capacity:	~ 1,60,000 MW (incl. captive)
Peak power shortage (Apr 08 –Jan 09):	13.8% (8.1% Southern region - 25.4% NE region)
Projection for 2031-32 for sustained +8% eco. growth	~ 8,00,000 MW
Country meets over 25% Primary Energy Consumption (537 Mtoe) through imports, mainly oil.	
Serious energy security issues besides environmental.	
Per capita CO <sub>2</sub> emissions (2006):	1.13 tonne/ annum.

# POWER SECTOR AT A GLANCE



□ Large Hydro	36,877 MW
■ Renewable	14,000 MW
■ Thermal	93,475 MW
■ Nuclear	4,120 MW

■ Wind	9,800 MW
■ Small Hydro	2,350 MW
■ Biomass	1,800 MW

# INDIA'S POSITION IN RENEWABLE ENERGY

- Renewable Power Capacity addition  
-excluding SHP (*cumulative as of 2006*) - 5<sup>th</sup> rank
- Wind Power capacity - 5<sup>th</sup> rank
- Wind Power added (2006) - 3<sup>rd</sup> rank
- Solar hot water systems collectors  
(area added in 2006) - 4<sup>th</sup> rank

Source: Global Status Report of REN21

## POTENTIAL, ACHIEVEMENTS & TARGETS

### Grid-interactive renewable power

Source	Estimated Potential (in MWeq)	Total Achievements as on 28.2.09	Achievements during last 5 years	Target 2017	Target 2022
Wind Power	48,500	9,900	7,353	35,000	45,000
Small Hydro (upto25MW)	14,000	2,340	826	6,500	9,300
Biomass Power	16,700	700	1,134	1,500	2,500
Bagasse Cogen	5,000	1,000		3,400	4,100
Waste to Energy	3,800	58	30	600	1,100
Solar Energy	*	2	0.1	10,000	25,000
<b>Total (excl. Solar)</b>	<b>88,000</b>	<b>14,000</b>	<b>9,343</b>	<b>57,000</b>	<b>87,000</b>

\* ~ 6,00,000 MW

# MAJOR ACHIEVEMENTS

## (Off-grid/ Decentralized Systems)

	<u>Up to 28.2.09</u>	<u>Last 5 years</u>
Off-grid/ CHP/ distributed renewable power systems	346 MWeq.	275 MWeq.
SPV lighting systems, mostly in rural areas	1.4 mln.	0.17 mln.
Remote villages & hamlets provided SPV lighting	5,410 nos.	3,253 nos.
Solar collectors for water heating in urban areas	2.60 mln. sqm	1.75 mln. sqm.
Small biogas plants (2-3 cum/day.), mainly for cooking energy	4.09 mln.	0.45 mln.

# STRATEGY

Harness the best wind and small hydro potential at earliest possible.

Promote decentralized distributed generation for solar and biomass power

Reduce cost of RE technologies through R&D

Performance based incentivisation

Conducive policy & regulatory framework for attracting investments

Develop market mechanisms that promote deepening & broadening of RE sector

# POLICY & REGULATORY FRAMEWORK

## Existing Policy Provisions

- Electricity Act 2003 mandates the SERCs to fix certain minimum percentages for purchase of renewable power,.
- 12 SERCs have so far fixed such percentages which vary from near negligible to over 10%.
- Preferential tariff setting for RE sector

## Future Policy Direction -

- Introduction of Generation Based Incentives
- Ensuring continuity and revision of Renewable Purchase Obligations (RPOs) - at the State level and ultimately at the National level.
- Introduction of Penal provisions for not meeting RPOs.
- Introduction of Tradable Renewable Energy Certificates.
- Uniform Guidelines for fixation of tariff for non-firm power by CERC

# SOLAR POWER

National Mission on Solar Power seeks to create demand for 20,000 MW by 2020

Procurement of solar power through competitive bidding process

Markets include:

- Utility sector generation
- Rooftop installations
- Rural decentralized grids
- Solar home lighting systems

## SOLAR HOT WATER SYSTEMS

- Energy Conservation Building Code and city and state requirements mandate solar hot water systems in large commercial buildings
- Goal of 10 million sq. meter of solar hot water systems by 2012
- Less than 3 million sq. meter in place
- Commercially viable compared to electric hot water geysers
- Market for manufacturers, suppliers and service providers of solar hot water systems

## MARKET FOR GRID ELECTRICITY

- Renewable electricity purchase obligation for electricity distribution company and preferential tariffs for renewable electricity suppliers
- Expected demand about 25,000 MW of renewables by 2012 and 54,000 MW by 2022.
- Current installed capacity is about 14,000 MW
- Almost all installed capacity is in private sector
- 100% FDI allowed for renewable energy projects
- Availability of debt financing through IREDA and other FIs
- Market for wind energy, small hydro and biomass energy technologies

## MARKET FOR BIO-FUELS

- 10% blending of ethanol in gasoline is approved
- Gasoline use is 15 million tonnes per annum growing at 5% p.a.
- Current bio-fuel supply is 157million liters (Apr-Nov 2008)
- Only non-edible oils can be used for bio-fuel production
- Demand for bio-fuel producers, processors and suppliers

# R&D STRATEGY/ THRUST AREAS

## **Focus on:**

-Extensive RD&D efforts to make RE technologies more reliable, durable and cost effective.

- Increased investments and a dynamic PPP to revitalize RD&D efforts and lead to new RE products and services.

## **Thrust areas identified in various RE sectors**

*(covering technologies, processes, materials, components, sub-systems & products)*

**Support to R&D in thrust areas in institutions with industry participation.**

**Thank You!**