

Snapshot

-Sustainability in India

Sustainable Investment Bank - YES Bank Ltd.



Emerging Markets Sustainable Bank of the year 2008



EXPERIENCE OUR EXPERTISE

Power Scenario in India

High dependence on thermal sources

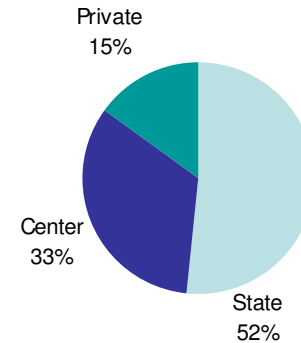
Background

- India has a current installed capacity of ~ 147,402 MW
- Power generation assets are not evenly spread across the country and there are different demand supply patterns for power consumption/ supply for each region.
- There are significant energy & peak energy shortages across the country
- Total energy shortage is approximately 9% which is as high as 14% for peak demand

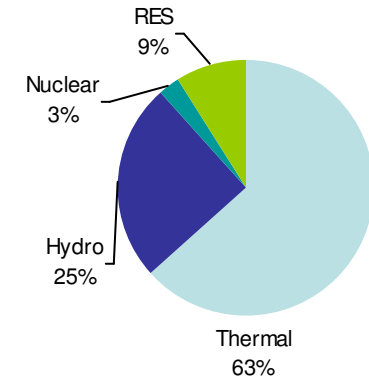
Source: Ministry of Power

Total Installed Capacity (147,402 MW)

Sector Breakup



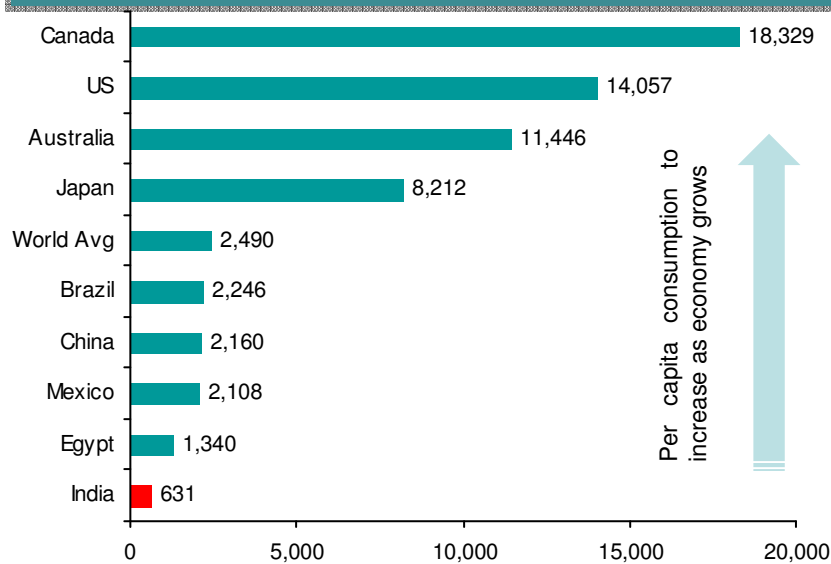
Breakup in terms of fuel



Source: Ministry of Power

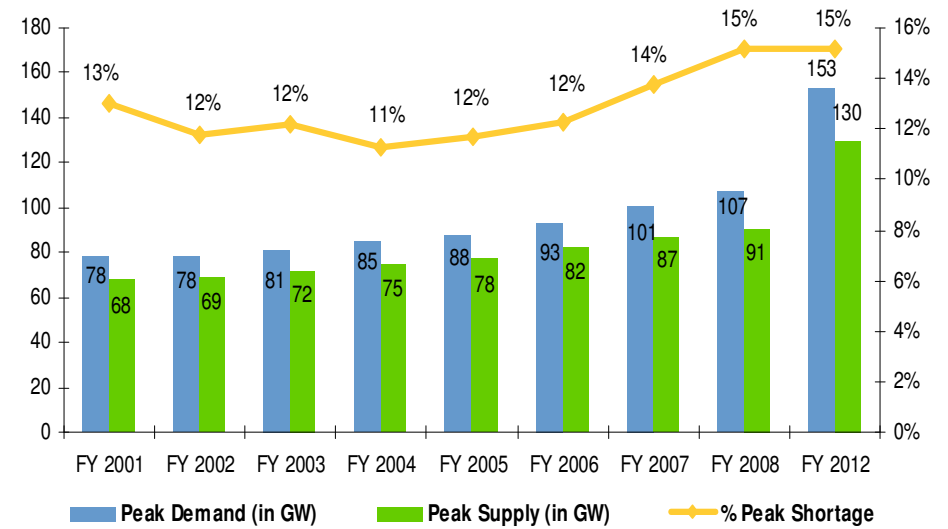
* RES = Renewable energy sources

Very low per capita consumption of electricity (kWh)



Source: UNDP, CLSA Asia-Pacific Markets

Rising Energy Deficit in the country



Source: Ministry of Power, CLSA Asia-Pacific Markets

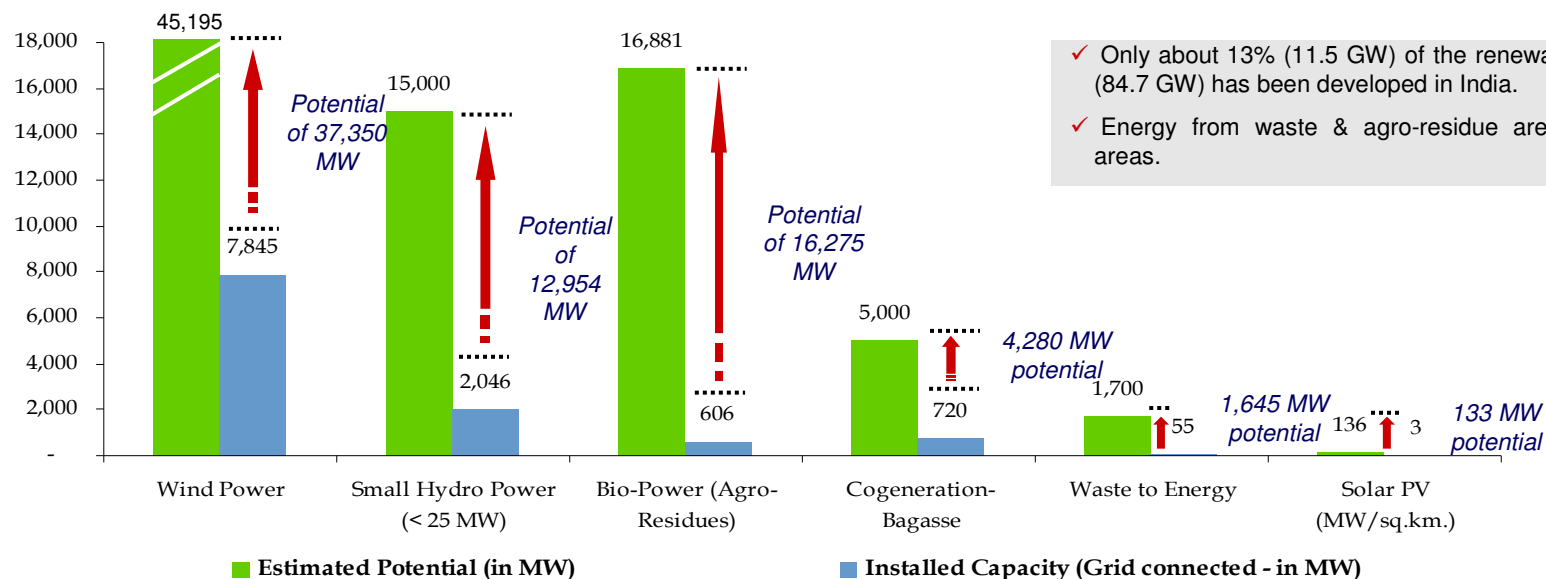
Renewable Energy Introduction

Demand – Supply gap, potential and favorable policies

Renewable Energy Growth Drivers

- ✓ Large demand-supply gap in power generation.
- ✓ India is generously endowed with RE resources like solar, wind, bio-mass materials, urban and industrial wastes and small hydro resources.
- ✓ The government has set a target to achieve 10% of all grid supplied power via RE by 2012.
- ✓ Low gestation periods for setting up RE projects.
- ✓ Increasing awareness among industry that being environmentally responsible is economically sound.
- ✓ Fiscal benefits like accelerated depreciation, excise & custom duty, sales & income tax exemption, etc.
- ✓ Soft loans & grants from IREDA and state government promotion bodies

RE Potential



- ✓ Only about 13% (11.5 GW) of the renewable energy potential (84.7 GW) has been developed in India.
- ✓ Energy from waste & agro-residue are the least explored areas.

Source: Ministry of New and Renewable Energy, Gol ; Data as on 31.12.2007

Wind Energy

Strong penetration in Indian market



Wind Energy - Snapshot

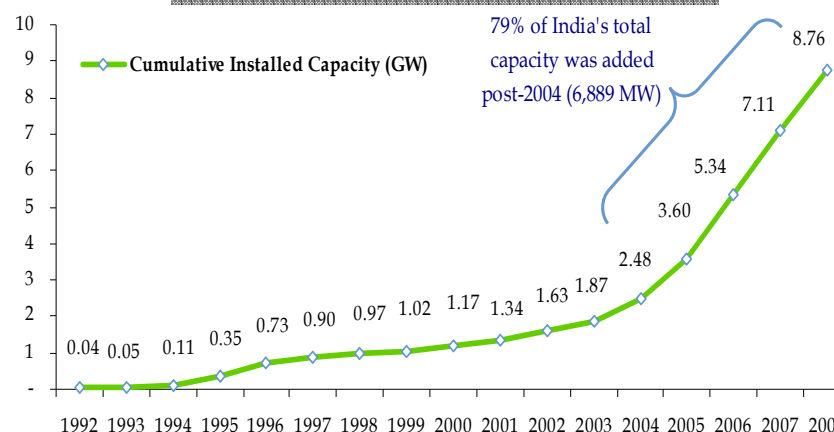
- ✓ India is the fourth largest producer of wind power in the world.
- ✓ India's installed capacity has grown from a mere 41 MW in 1992 to over 8,750 MW currently. The major fillip to the Indian wind sector occurred post-2004. Between 2004 and 2008, installed capacity grew at a 37% CAGR.
- ✓ Southern India accounts for over 57% of the total installed capacity. Tamil Nadu, in particular, accounting for 45% (3,873 MW) of the installed capacity.

Incentives

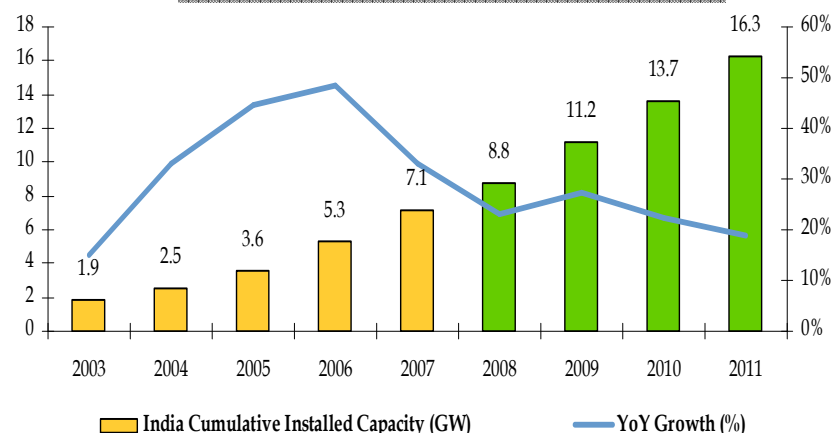
- ✓ **Accelerated Depreciation** – 80% of the investment in the first year itself
- ✓ **Tax Holiday** – No income tax for any consecutive 10 years, for the first 15 years from the date of installation.
- ✓ **Mandated Power Purchase & assured off take** – Regulations promulgated by many state governments requiring SEBs to buy a fixed amount of power from renewable sources.
- ✓ **Assured Tariffs** – Tariff in most of the states are fixed in advance
- ✓ **Lower tax rates & excise duty exemption**

Between 2008 and 2011, wind installation in India is expected to grow at 22.9% CAGR; & outperform the global growth rates of 20.7% CAGR

Cumulative Installed Capacity Growth



Installed Capacity Outlook



Opportunities for foreign players as wind-farm developers, turbine manufacturing technology, ancillary wind farm equipments and wind monitoring technology providers

Wind Energy .. contd

Strong penetration in Indian market

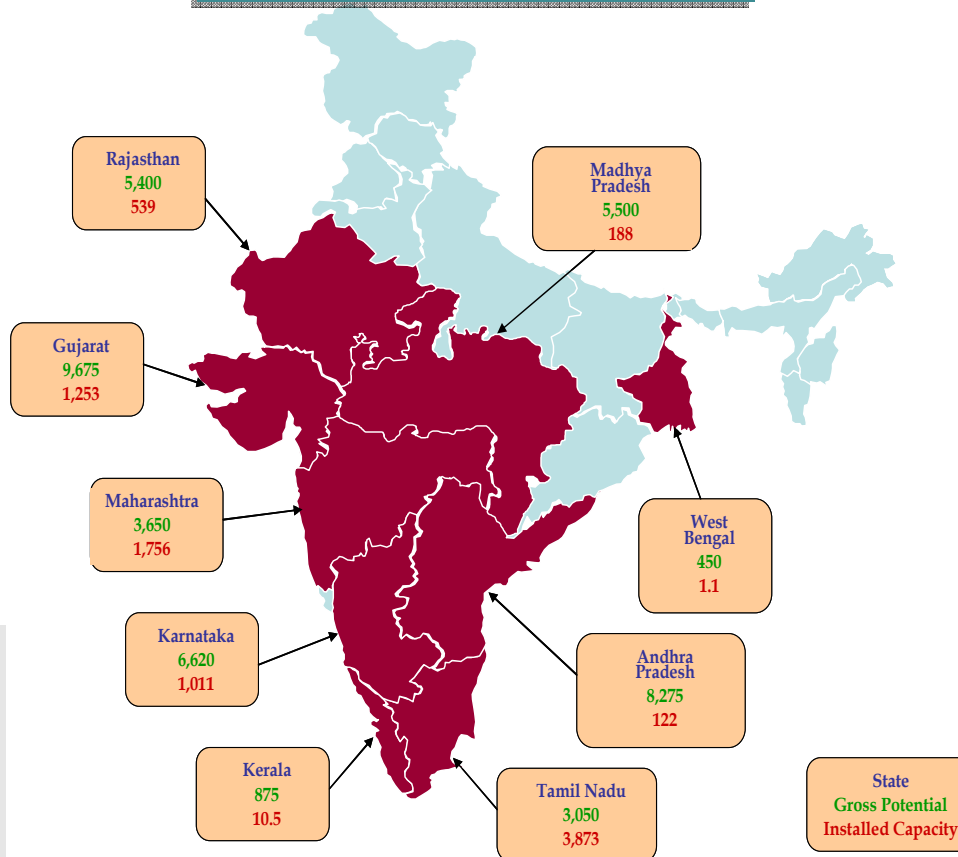
Wind Energy - Potential

- ✓ The wind energy potential in India is estimated to be over 45,100 MW.
- ✓ Enormous untapped potential of 36,437 MW
- ✓ 3 top states with maximum untapped technical potential - Andhra Pradesh (1,988 MW), Maharashtra (1,304 MW) and Madhya Pradesh (862 MW).
- ✓ **Huge engineering & service potential for the Indian economy.**

Issues

- ✓ Low PLF
- ✓ High operation & maintenance cost
- ✓ Fragmented capacity
- ✓ Grid connectivity

State-wise Wind energy Potential



Proprietary and Confidential

Solar Energy

Early days but strong potential due to favorable geographical location



Solar Energy - Snapshot

- ✓ India ranks 4th in the world PV production after Japan, Germany and the U.S. Currently, about 66 MW aggregate capacity (about 10,800,000 individual Photovoltaic / PV systems and power plants) have been installed for various applications.
- ✓ In addition, PV products of 55 MW aggregate capacities have been exported.
- ✓ Additionally, India has a significant installed base of solar water heaters, lighting systems, purifiers, etc.
- ✓ India has about 15 companies that manufacture PV modules, and over 45 companies that manufacture SPV systems. India is also a major exporter of PV modules and SPV systems.

Incentives

- ✓ The government is very supportive of the PV program in India and has aggressive programs for the promotion of renewable energy.
- ✓ The government has provided a generation-based incentive of a maximum of Rs. 12 per kWh to the eligible projects which are commissioned by 31st December, 2009.

Potential

- ✓ There are about 300 clear sunny days in a year in most parts of India. This is equal to over 5,000 trillion kWh/year, which is far more than the total energy consumption of the country in a year. The daily average solar energy incident over India varies from 4–7 kWh/m², depending upon location.
- ✓ The Government is aiming, on a short term basis, at an additional 1 million Solar Photovoltaic systems for lighting, 8,000 Solar Photovoltaic pumps for irrigation, 10,000 Solar Photovoltaic generators, stand-alone Solar Photovoltaic power plants, solar water/air heating systems, solar cooking systems etc.
- ✓ Although India is quite self sufficient with solar electricity products, there is a good market for new modern and advanced solar technologies and devices.
- ✓ Likely to receive a fillip with a number of companies making significant investment in PV fabrication facilities.

Issues

- ✓ High operation & maintenance cost.
- ✓ Maintenance difficulties at remote locations across India

Opportunities for foreign players as solar cell manufacturers, technology and R&D for solar cell,

Solar Energy Installations

Better government policies leading to a strong projects pipeline



Solar Energy – Current installation snapshot

Source/System	Estimated potential	Achievement as on 30 Sept 2008
Grid-interactive Power	(MW)	(MW)
Solar Photovoltaic power		2.12
Decentralized energy systems		
Solar photovoltaic systems	50 MW/km ²	120MWp
Solar Street lighting system	–	70474 nos
Home lighting system	–	434692 nos
Solar lantern	–	697419 nos
Solar power plants	–	8.01 MW
Solar photovoltaic pumps	–	7148 nos
Solar thermal systems		
Solar water heating systems	140 million m ² collector area	2.45 million m ² collector area
Solar cookers		6.37 lakh

Solar Energy Planned Projects

Moser Baer has signed a pact with Rajasthan government to install between 1MW – 5 MW solar power project in the state in December 2007*

Tata Power signed an MoU with Gujarat government to set-up a 5 MW solar plant in Gujarat in January 2009*

Videocon to set up a 20 MW solar power plant in West Bengal at a cost of INR 500 Cr in a 150 acre land area*

* Source www.igovernment.in Dec 4- 2007

* Source livemint.com Jan 12 - 2009

* Source Economic Times – June 12 - 2008

Small Hydro*

Fast growing industry



Small Hydro - Snapshot

- ✓ India generates 26% of its power from hydro.
- ✓ Of the total installed hydro capacity of 34,649 MW, small hydro projects - SHP (<25 MW) capacity accounts for 2,046 MW or about 4.5%.

Incentives

- ✓ In addition to financial support to new SHP projects, subsidy is provided for the renovation and modernization of existing SHP.
- ✓ Currently, 19 States have announced policies for setting up SHP through private sector participation.

Potential

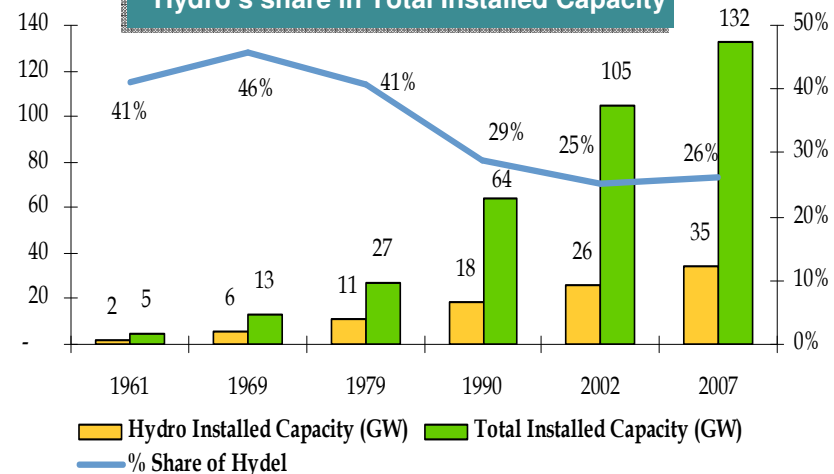
- ✓ Estimated potential for SHP is about 15,000 MW.
- ✓ MNRE has a database of 4,233 potential sites with an aggregate capacity of 10,324 MW for SHP.

Issues

- ✓ License squatters
- ✓ Inadequate hydrological studies in case of multiple sites on the same river
- ✓ Inadequate due diligence on long term environmental impact of multiple projects on the same river.

* Since small hydro does not involve rehabilitation, it is considered part of sustainable platform

Hydro's share in Total Installed Capacity



Outlook

Period	Hydro capacity additions (MW)	Investments in hydro capacity (in USD billions)
2007-08	3,568	5.8
2008-09	1,638	2.7
2009-10	2,136	3.5
2010-11	761	1.2
2011-12	2,982	4.9
Total	11,085	18.0

Source: CRISIL Research

Opportunities for foreign players as joint developers, technology providers for E&M for projects

Energy Efficiency in India

Long wait is over

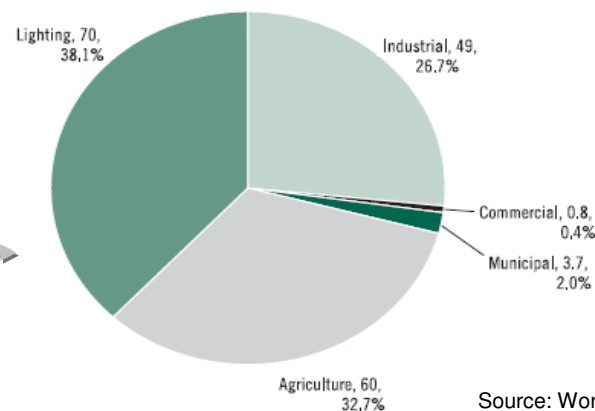
Snapshot

- ✓ The National Action Plan on Climate Change, names “enhanced energy efficiency” as one of India’s principal means of mitigating the impacts of climate change.
- ✓ India still has a relatively small energy service company (ESCO) industry compared with that of other emerging countries such as China and Brazil, partly because of investors’ limited awareness and interest.
- ✓ The majority of ESCOs’ energy efficiency projects have payback periods of less than two years, and ESCOs save clients an average of 20 to 25 percent on baseline energy costs.
- ✓ Currently, opportunities for equity investment in India’s ESCO industry are generally limited to direct investment in the larger energy service companies, most of which are vendor ESCOs – those ESCOs affiliated with or owned by an equipment or control manufacturer.
- ✓ Various sectors in India, including heavy industry and agriculture, have begun to realize the immense cost-saving potential that can be derived from energy efficiency programs, which has raised the demand for energy-efficient technologies and services.
- ✓ From 2003 to 2007, the world bank and UN Environmental Programme launched Three Country Energy Efficiency project which sought to increase energy efficiency investments in Brazil, China & India leading to five Indian banks starting energy efficiency schemes to fund these projects

Market Potential & Opportunities

- ✓ The energy saved between 2002 and 2007, the period of the Tenth Five-Year Plan set by the Indian Planning Commission, was 877 MW, but the target for the Eleventh Five-Year Plan (2007–2012) is 10,000 MW, more than a tenfold increase.
- ✓ In May 2008, the Ministry of Power stated that the energy conservation potential with today’s technologies would be 20,000 MW
- ✓ The potential for energy savings is enormous: an estimated 183.5 billion kWh per year, based on reports prepared by the Asian Development Bank and the Indian Bureau of Energy Efficiency (BEE)
- ✓ There exist strong opportunity for companies providing energy management technology/solution./products to form JV with Indian ESCO’s and expand their reach to one of the most lucrative market

Potential Opportunity in Energy Savings in India - By Sector (Billion KWh)



Source: World Resource Institute

Green Building in India

Presenting huge opportunities



Snapshot

- ✓ Construction is one of the rapidly growing sectors contributing 10% of India's GDP growing at 9.2%
- ✓ Green building movement in India has gained significant momentum in the last 5 years
- ✓ Indian Green Building council (IGBC) has taken initiative of promoting green building in India
- ✓ Green building materials have started booming with fly ash based products and recycled metal products however huge market still remains untapped

Market Potential

- ✓ The total estimated potential for Green Building materials and equipment is about 4 bio US\$ by the year 2012 (*only for LEED rated buildings*)
- ✓ Huge market exist for following green materials and equipment in the country :
Fly-ash cement, Fly-ash block, Low VOC paints Recycled Aluminum, Recycled steel, Recycled tiles, HFC based high efficiency chillers, Building Controls, Green Roofs
- ✓ Market is still evolving for the following material & equipments:
Composting toilets, waterless urinals, CRI certified carpets, FSC certified wood, CTI certified cooling towers, Living machines, etc.

*CTI: Cooling Technology Institute, CRI Carpet & Rug Institute, FSC: Forest Stewardship Council, HFC: hydro fluorocarbon

Initiatives

IGBC has taken the following initiatives

- ✓ Catalyze registration of 1000 buildings by 2010
- ✓ Tap green building materials and equipment market of INR 15000 by 2010
- ✓ Development of an accredited rating agency

Opportunities

Potential Areas for foreign companies include

- ✓ Green building material manufactures
- ✓ Green building constructors
- ✓ Consultants for green building development
- ✓ Technology and R&D for design and manufacture of green building products

Biomass/Waste to Energy

Fast growing industry



Biomass / Waste - Snapshot

The 3 main technologies being promoted by the MNRE for productive utilization of biomass are –

- ✓ **Bagasse-based Co-generation** – Current total capacity of bagasse-based co-generation is 720 MW.
- ✓ **Biomass for Power Generation** – Current capacity of 606 MW commissioned through 54 projects.
- ✓ **Biomass Gasification** – The biomass gasifier-based thermal and electricity generation applications are at a “take off” stage. Many systems have been installed and MNRE has provided partial financial support for installation of about 1,900 gasification systems in the country.

Issues

- ✓ Uncertainty of feedstock (agro & municipal waste supply)
- ✓ Quality of waste

Potential

500 million tons of crop and plantation residues are produced every year, a large portion of which is either wasted, or used inefficiently. Conservative estimates indicate that even with the present utilization pattern of these residues and by using only the surplus biomass materials, the following is the potential:

- ✓ **Bagasse-based Co-generation** – Potential of 5,000 MW.
- ✓ **Biomass for Power Generation** – Potential of 16,881 MW.

Incentives

- ✓ Central financial assistance
- ✓ Fiscal incentives such as 80% accelerated depreciation, concessional import duty, excise duty, tax holiday for 10 years
- ✓ Capital subsidy for bagasse/biomass cogeneration projects
- ✓ Additionally, State Electricity Regulatory Commissions have determined preferential tariffs and Renewable Purchase Standards (RPS).

Opportunities for foreign players as joint developers, manufacturing of equipments and technology providers

Waste Management

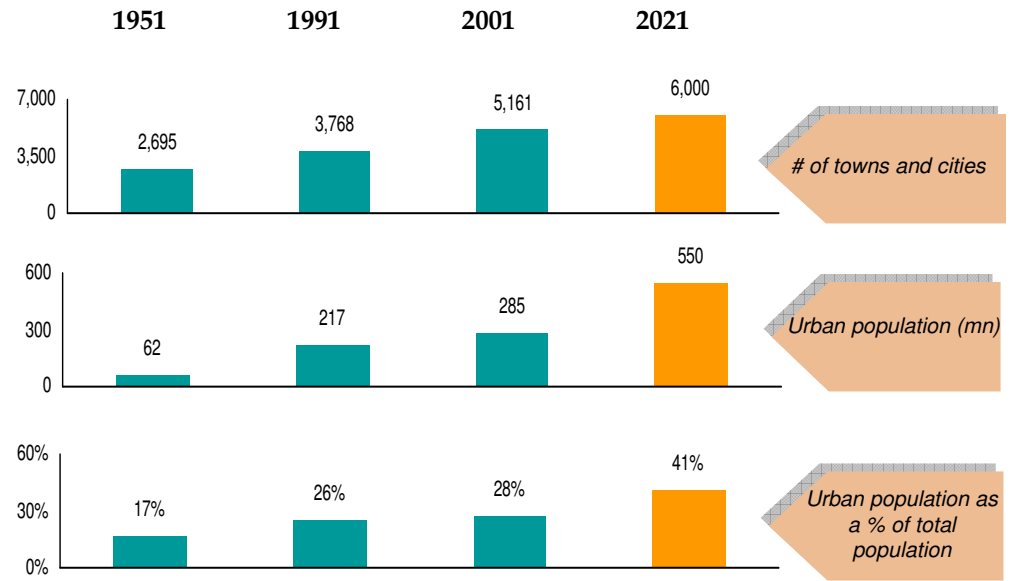
Waste is good!



Snapshot

- ✓ Multi billion dollar industry worldwide which has seen a sudden spur in India
- ✓ MSW rules 2000 have laid down operating rules for collection, transport and processing with an emphasize on private partnership
- ✓ Growing focus on environmental and health issues by government has resulted in need of waste management
- ✓ Global players like Veolia, Lara have already entered the Indian markets

Growth in Waste generation



Market Opportunities

MSW

Medical Waste

Hazardous Waste

Areas of focus

- | | | |
|--|---|--|
| <ul style="list-style-type: none"> ✓ Service providers for waste collection and management ✓ Technology for Waste management and waste to energy | <ul style="list-style-type: none"> ✓ Service providers ✓ Technology provider ✓ Equipment manufacturers | <ul style="list-style-type: none"> ✓ Technology providers ✓ Equipment manufacturers ✓ Service providers |
|--|---|--|

- Per capita waste generation increasing at 1.3 % per annum
- Urban population increasing at 3 % – 3.5 % per annum
- Yearly increase in waste generation is around 5 % annually

Fast growing urban population will result in huge growth in waste management infrastructure requirement

Others - Water & Sanitation

Fast growing with shifting emphasis

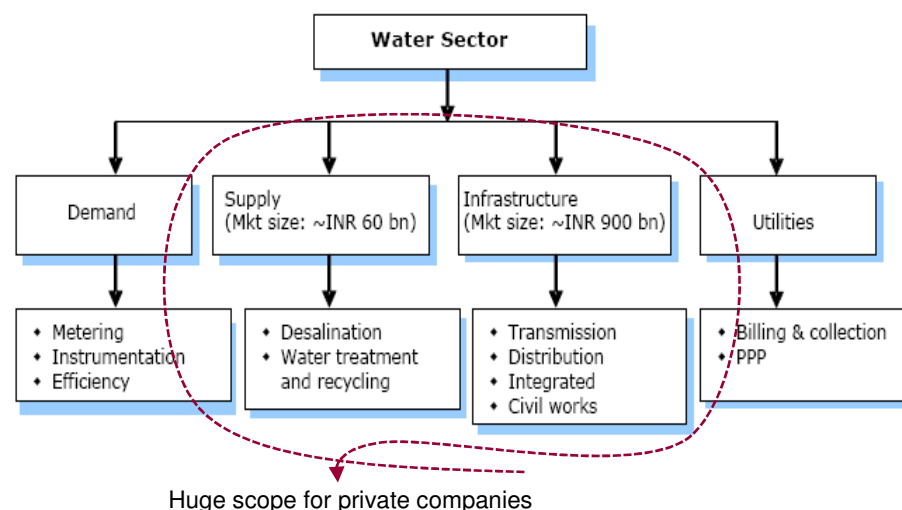
Snapshot

- ✓ Poor institutional framework and fast urban growth have resulted an immediate need of an overhaul of water infrastructure
- ✓ Only 75% of India's urban population has access to piped-water systems
- ✓ Some 18% of the urban population has no access to adequate sanitation facilities
- ✓ It has been estimated that by as early as 2020, India's demand for water will exceed all sources of supply.

Incentives

- ✓ GOI has had a paradigm shift in water policies from centralized policies to community driven approach
- ✓ Swajaldhara for rural Indian and JNNURM for urban redevelopment are two major initiative by government to spur investment in water sector
- ✓ INR 2000 bn. of investment in 11th Plan presents huge opportunities for private companies

Market Potential - Water



Market Potential -Sanitation

	Coverage achieved in 2004		
	Urban	Rural	Overall
Sanitation	59%	22%	33%

Market opportunity for infrastructure players and technology providers to increase coverage of sanitation