Transaction Advisory Services

Renewable Energy in India : Opportunities and Challenges

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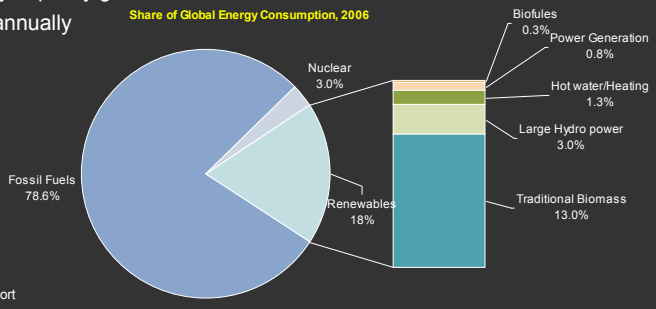
Global Market Overview – Renewable Energy

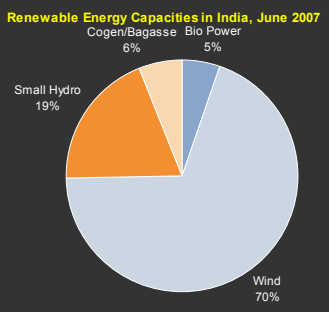
- Renewable electricity generation capacity reached ~ 240 gigawatts (GW) in 2007, an increase of 50 percent over 2004.which represents 5% of total capacity
- Including large hydro, the capacity supplied by renewable energy is close to 20%
- The fastest growing energy technology in the world is grid-connected **solar photovoltaics** (PV), with 50% CAGR over 2005-07
- Renewable energy comprises of 18% of the world's final energy consumption.
- Global renewable energy capacity grew at rates of 15–30 percent annually during the five-year period 2002–2006.



Source: Renewable 2007, Global Status Report

Renewable Energy in India – An Overview

- Total installed capacity in the country is 141,500 MW as on February 29, 2008
- As of June 2007, in India, Generation capacities based on renewable resources are around 10.7 GW showing a y-o-y growth rate of 30%
  - This represents ~7% of the total installed capacity, below global average
- Including large hydro capacity, renewable capacity is ~46 GW



- India consumes 3.7% of the world's commercial energy - the 5th largest consumer of energy globally
- India is facing large supply-demand mismatches, with some areas without any access to electricity altogether
  - Period from Apr-07 to Feb-08 witnessed a deficit of 16998 MW, or 15.8% of the demand

Key drivers for renewable energy in India

- Ample number of sites for Wind, Hydro and Solar Plants
- Government incentives
- Increasing sources of finance

Source: CEA,MNES

India – An Attractive Renewable Energy Market

- The Indian subcontinent has a large potential for power generation by the effective utilization of renewable energy
- The Ministry of New and Renewable Energy (MNRE), Govt. of India has planned a target of 10,000 MW renewable energy during the 11th five year plan (i.e. 2007 to 2012).

- India ranked among the most attractive countries worldwide based on regulatory environment, feasibility for renewable energy generation and other incentives for development
- Overall score of 64/100 for all Renewables

Ernst & Young Renewable Energy Country Attractiveness Indices
(All Renewables Index at Q2 2007)

Ranking	Country	Index						
		All Renewable	Wind Index	Onshore Wind	Offshore Wind	Solar Index	Biomass/ Other	Infrastructure
1	USA	72	73	80	58	75	64	76
2	India	64	65	75	43	61	55	65
2	Spain	64	64	71	48	72	58	76
2	UK	64	65	63	69	50	58	69
5	Germany	63	63	62	64	73	61	60

Source :http://www.renewingindia.org/finren.html, Ministry of New and Renewable energy

Indian Solar Power Sector Overview

Large Potential Exists..

- Among top 5 destinations worldwide for Solar Energy development as per Ernst & Young's renewable energy attractiveness index
- Daytime production peak coincides with peak electricity demand making solar ideal supplement to grid

Though Limited growth till now..

- Cost of solar electricity versus conventional electricity has restricted past growth

Government encouraging Solar energy investments..

- The ministry is providing various incentives and duty concessions for both manufacturers and users of solar products for eg. :
  - To help in running of solar projects, there is a subsidy of Rs 12/Kwh
  - Capital subsidy available in case of semiconductor based units
  - Provisions for Accelerated depreciation available for solar manufacturers
  - NIL excise duty for manufacturers
  - Low import tariff for several raw materials and components
  - Soft loans to users, intermediaries and manufacturers
- State governments such as Punjab, Haryana are also pursuing solar energy development aggressively with good response from industry

Source: E&Y Research, MNES

Indian Wind Energy Sector Overview

Current Scenario

- 4th largest producer of wind energy in the world with a capacity of 7 GW
- Capacity growth now touching 40% y-o-y
- Tamil Nadu, Maharashtra & Karnataka are the leaders in wind capacity.
  - Of the 1.7 GW added in FY 07, ~ 76% was contributed by these three states.

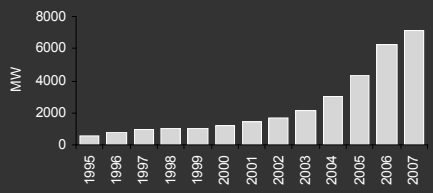
Key Issues

- Short construction period and low O&M cost make it an attractive proposition
- Some Regulatory/institutional hurdles exist for wheeling

Future Potential

- Cumulative installed capacity is expected to reach 12GW by 2010.
- Over the last 10 years wind capacity has grown at a CAGR of 22%.
- The cumulative investment is currently more than Rs 25,000 bn; expected to touch Rs 35,000 bn by 2010.

Wind Energy Capacity growth in India



State	Capacity (MW)
Tamil Nadu	3,493
Maharashtra	1,488
Karnataka	821
Gujarat	637
Rajasthan	470
Andhra Pradesh	122
Madhya Pradesh	57
Kerala	2
West Bengal	1
TOTAL	**7,091**

Note: As on end of FY07

Indian Hydro Power Sector

Large Potential for Hydro power Generation

- India ranks 8th in terms of hydro-electricity generated, thus making it one of the largest producers of hydropower.
- Hydro power potential located mostly in North and North Eastern parts of India
- Attractive on various counts
  - Proven Technology
  - Low O&M costs
  - Equipments have longer lifetime
  - High energy conversion efficiency (around 70%)
- Key weakness lies in high gestation period and capital costs

Government keen to promote Hydro Power

- Investment in hydro sector, and power sector is driven by the government's target to reduce energy shortage
- Hydro capacity expected to reach 57 GW by 2012
- To encourage private investments in the renewable energy sector, MNRES has introduced subsidy schemes for small hydro projects upto 25MW.

Source: Central Electricity Authority

Source: E&Y Research

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Historical challenges facing 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 arising from the intermittent nature of electricity from wind and small hydropower,
- The costs of technology development and production need to be reduced significantly from current levels
- Availability of financing especially project finance for Renewables
- Creditworthiness of counterparties has posed challenges
- Slow pace of rural electrification and pace of reforms in the rural electricity sector

Utilization has remained marginal in spite of government's efforts

Future growth drivers for RE in India

- Demand Supply Gap
  - Supply regularly being over stripped by demand
- Natural Resource Scarcity
  - Limited amount of fossil based fuel sources
- 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
- Fiscal incentives Provided by government
  - Various incentives provided by the government to make projects more attractive
- Increasing state level initiatives
  - States such as Punjab, Haryana, AP taking the lead in development of RE projects

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.

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

Fiscal Incentives offered by government to promote RE development

Various fiscal incentives are offered by the government for encouraging renewable energy development, including but not limited to

- Industrial clearances are not required for setting-up a renewable energy industry
- Soft loans are available through IREDA for RE equipment manufacturing
  - Finances equipment in all sectors in renewable energy
- Financial support is available to RE industries for R&D projects in association with technical institutions
- Customs duty concession is available for RE spares and equipment
- Excise duty on a number of capital goods in the RE sector has been reduced or exempted.
- Subsidy is available for various sectors such as solar, urban waste etc.
- Accelerated depreciation on renewable energy-based devices or projects
- 10 year Tax holiday under 80IA
- Other similar holidays have been offered under other sections

Various measures provided by the government to promote growth

Historical & Emerging Avenues in funding of RE projects

- Following sources have traditionally been tapped to finance renewable energy projects in India
  - Captive/process industries where there is a possibility of cost reduction
  - Financing through IREDA, Investor's bankers, and few nationalized & scheduled banks
    - IREDA provides Loan assistance
- New sources of finance are emerging in the form of :
  - Private Equity Funding
    - Recent deals include
      - Merrill Lynch's investment in Vestas RRB india
      - ChysCap & CVC's investment in Suzlon
      - DE Shaw's investment in Soham Renewable Energy
    - Investors such as IDFC PE, IFC, Actis and others are aggressively looking at the sector
  - Certified Emission Reductions Revenues (CDM) – CER Revenues enhance bankability of project and improve returns

Source : As per ADB norms

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Power Sector Experience – Recent Credentials

Power Finance Corporation.

Successfully Advised Power Finance Corporation for the Bid Process Management of 4000 MW Ultra Mega Power Projects

Uttar Pradesh Rajya Vidyut Utpadan Nigam

Assistance in inviting private sector participation for setting up 1000 MW Anpara 'C' power project

Patni Projects

Advisory Services and Fund Syndication for 270 MW Imported Coal based Power Plant

Coal and Oil Group

Fund Syndication and Equity Arranging for 1080 MW Imported Coal based Power Project

Maharashtra Airport Development Company

Bid Advisory Services for selection of a developer for the 100 MW Captive Power Plant

Indian Oil Corporation

Project structuring and review of international best practices for **India-Pakistan –Iran Gas pipeline**

Renewables Experience – Select Credentials

Leading Indian Infrastructure Developer

Advisory on entry strategy in the Indian Wind Energy Market and technology acquisition advisory for mega watt turbines

Leading Telecom Infrastructure Provider

Acquisition Advisory and Business Due Diligence for fuel cell / gas microturbine / and wind micro-turbine companies in USA

DLF Limited

Investment Advisory for developing 200 MW of Wind Projects in India

Narmada Valley Development Authority

Financial evaluation of bids for two hydroelectric multipurpose projects with an aggregate capacity of 1,520 MW

Large Indian Conglomerate

Sole financial advisors for divestiture of equity stake in Biomass projects

Malana Power

Advisory for setting up 192 MW Allain Duhangan Hydel Project

Renewables Experience – Select Credentials

Tata Power Company Limited

Advisory for investment in 330 MW Srinagar hydel power project in Uttaranchal

Tata Power Company Limited

Advisory for investment evaluation of 125 MW hydel project on Marsyangadi river in Nepal

Tata Power Companies Limited

Advisory for proposed acquisition of hydel project in Uganda

LNJ Bhilwara Group

Advised on project agreements and financing for the 192 MW Allain Duhangan hydel project

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Thank You

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