

THE SIZE OF THE CAKE

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Renewable energy is the hot new investment destination. World over, the sector continued to show robust growth in 2005. The following statistics from the 'Global Status Report' on Renewables 2006 published by the Renewable Energy Policy Network (REN21) testifies to this growth. Wind power registered 24 per cent growth by adding 11,500 MW to reach a total installed capacity of over 59,000 MW. Small hydro increased by 5000 MW to a total of 66,000 MW, out of which 38,500 MW was in China where the sector continues to boom. Capacity addition in biomass power generation was about 3000 MW, bringing global installed capacity to 44,000 MW. In many European countries, annual increases in biomass power production range from 50 per cent to 100 per cent. Grid connected photovoltaics continued to be the fastest growing power generation technology with a 55 per cent increase, taking in cumulative installed capacity to 3100 MW, up from 2000 MW in 2004. Overall installed capacity of power generation from renewables expanded to 1,82,000 MW, up from 1,60,000 MW in 2004. These figures do not include large hydro power which also, in a sense, qualifies as renewable energy.

Growth in other areas has also been significant. Solar thermal water heating increased by 14 per cent and reached 88,000 MW thermal (MWth). Tremendous growth is also happening in the transport fuel sector. Ethanol production increased from 30.5 billion litres in 2004 to 33 billion litres in 2005 – an 8 per cent increase. Brazil and US remained the dominant producers. Biodiesel production grew much faster. Global production of biodiesel grew from 2.1 billion litres in 2004 to 3.9 billion litres in 2005. The fastest growth was in Europe where it registered 75 per cent increase.

Consequently, the investment flows were also on the upswing. It is estimated that \$38 billion was

Fig 1: Annual Global Investment in Renewable Energy 1995 – 2005



(Source: REN21 Report 2006)

invested in new renewable energy capacity worldwide in 2005, up from \$30 billion in 2004.

Table 1 shows selected indicators of the renewable energy sector.

According to Table 2 which shows top five countries and their annual capacity addition and existing capacity in 2005, India figures as the fourth largest producer of power from wind and top 5th country with maximum renewable power capacity. But our untapped potential for power generation from renewables is huge and the country has a long way to go in tapping this vital resource.

Table 3 demonstrates the renewable energy potential in India upto 2032. This is a medium term projection and does not include quantification of the huge solar potential. The 45,000 MW potential of wind is a conservative estimate and with the growth in unit size of turbines, greater land availability, and expanded wind resource exploration, this potential should go up significantly. The possibility of technology leapfrogging in the renewable sector is also considerably great. Even at the conservative total estimated potential of 1,72,000 MW (without

Table 1: Selected Indicators

Selected Indicators	2004	2005
Investment in new renewable capacity (annual)	\$30	\$38 billion
Renewables power capacity (existing, excl. large hydro)	160	182 GW
Renewables power capacity (existing, incl. large hydro)	895	930 GW
Wind power capacity (existing)	48	59 GW
Grid-connected solar PV capacity (existing)	2.0	3.1 GW
Solar PV production (annual)	1150	1700 MW
Solar hot water capacity (existing)	77	88 GWth
Ethanol production (annual)	30.5	33 billion litres
Biodiesel production (annual)	2.1	3.9 billion litres
Countries with policy targets	45	49
States/provinces/countries with feed-in tariff policies	37	41
States/provinces/countries with RPS policies	38	38
States/provinces/countries with biofuels mandates	22	38

(Source: REN21 Report 2006)

Table 2: Top Five Countries' Annual Capacity Addition and Existing Capacity in 2005

Annual amounts or capacity additions in 2005	#1	#2	#3	#4	#5
Annual investment	Germany/China(equal)		US	Japan	Spain
Wind power	US	Germany	Spain	India	China
Solar PV (grid-connected)	Germany	Japan	US	Spain	France
Solar hot water	China	Turkey	Germany	India	Austria/Greece /Japan/Australia Spain/India
Ethanol Production	Brazil/US		China		
Biodiesel production	Germany	France	Italy	US	Czech Republic
Existing capacity as of 2005					
Renewables power					
Capacity (excl. large hydro)	China	Germany	US	Spain	India
Large hydro	US	China	Brazil	Canada	Japan/Russia
Small hydro	China	Japan	US	Italy	Brazil
Wind power	Germany	Spain	US	India	Denmark
Biomass power	US	Brazil	Philippines	Germany/Sweden/Finland	
Geothermal power	US	Philippines	Mexico	Indonesia/Italy	
Solar PV (grid connected)	Germany	Japan	US	Spain	Netherlands
Solar hot water	China	Turkey	Japan	Germany	Israel

(Source: REN21 Report 2006)

considering the solar energy sector), the investment potential in the country is Rs.8600 billion!

India also has considerable potential for production of biofuels. The current estimates are over-optimistic. But if properly planned and executed, India's investment potential in biofuels can grow to the same levels as in renewable power generation technologies. Other potential investment destinations include a whole host of downstream production facilities, components development for renewable power technologies, manufacture of silicon cells and films for solar panels, co-gen applications in industries, solar thermal devices, etc. Two critical thrust areas to propel and leverage investments in the sector are:

- ▶ Comprehensive policy frameworks for the whole cycle of development of each of these new and renewable technologies.
- ▶ Innovative, affordable, and sustainable financing mechanisms to facilitate investments.

India already has a reasonably good policy framework for power generation from technologies like wind power and biomass. This has been discussed elsewhere in this issue. But much needs to be done in the area of solar energy. Similarly, there is an urgent need to evolve a comprehensive and realistic framework for biofuels development in the country. The Indian

financial institutions are not yet fully sensitised to the potential, urgency, and opportunity for investment in renewables. This is an area which needs to be addressed in a holistic manner to direct investment flows to the sector. Proper planning of foreign direct investment and channelising them into environmentally and socially sustainable activities is also of great relevance. Another area which can turn the tide in favour of renewables is the concept of ethical investments in the stock markets. Investors can make good money by investing ethically in environment-friendly industries. Green is also profitable. Some

recent examples in the Indian share market relating to Indian renewable energy companies amply demonstrate the potential of this sector. Renewables is the happening sector for investments. It is only our inertia which prevents us from optimally utilising the potential of this sector where the size of the cake is indeed very, very big.

Table 3. R.E. Potential in India (upto 2032)

Sr. No.	Resource	Estimated Potential (in MW)
A.	Renewable Power:	
I	Grid-Interactive Renewable Power	
1.	Bio Power (Woody biomass)	52,000
2.	Wind Power	<45,000
3.	Small Hydro Power (upto 25 MW)	15,000
4.	Cogeneration - bagasse	5,000
5.	Waste-to-Energy	5,000
6.	Solar Power	4-7kWh/sq.m./day
7.	Geothermal Energy	neg*
8.	Tidal Energy	neg*
Grid-Interactive Renewable Power-Sub-Total		1,22,000
II	Distributed Renewable Power	
1.	Distributed Renewable Power-Rural	30,000
2.	Captive generation-industrial, commercial	20,000
	Distributed Renewable Power-Sub-Total	50,000
III	Renewable Power-Total	1,72,000
*Feasible potential for near commercial applications is negligible		

(Source: MNRE Annual Report, 2005-06)