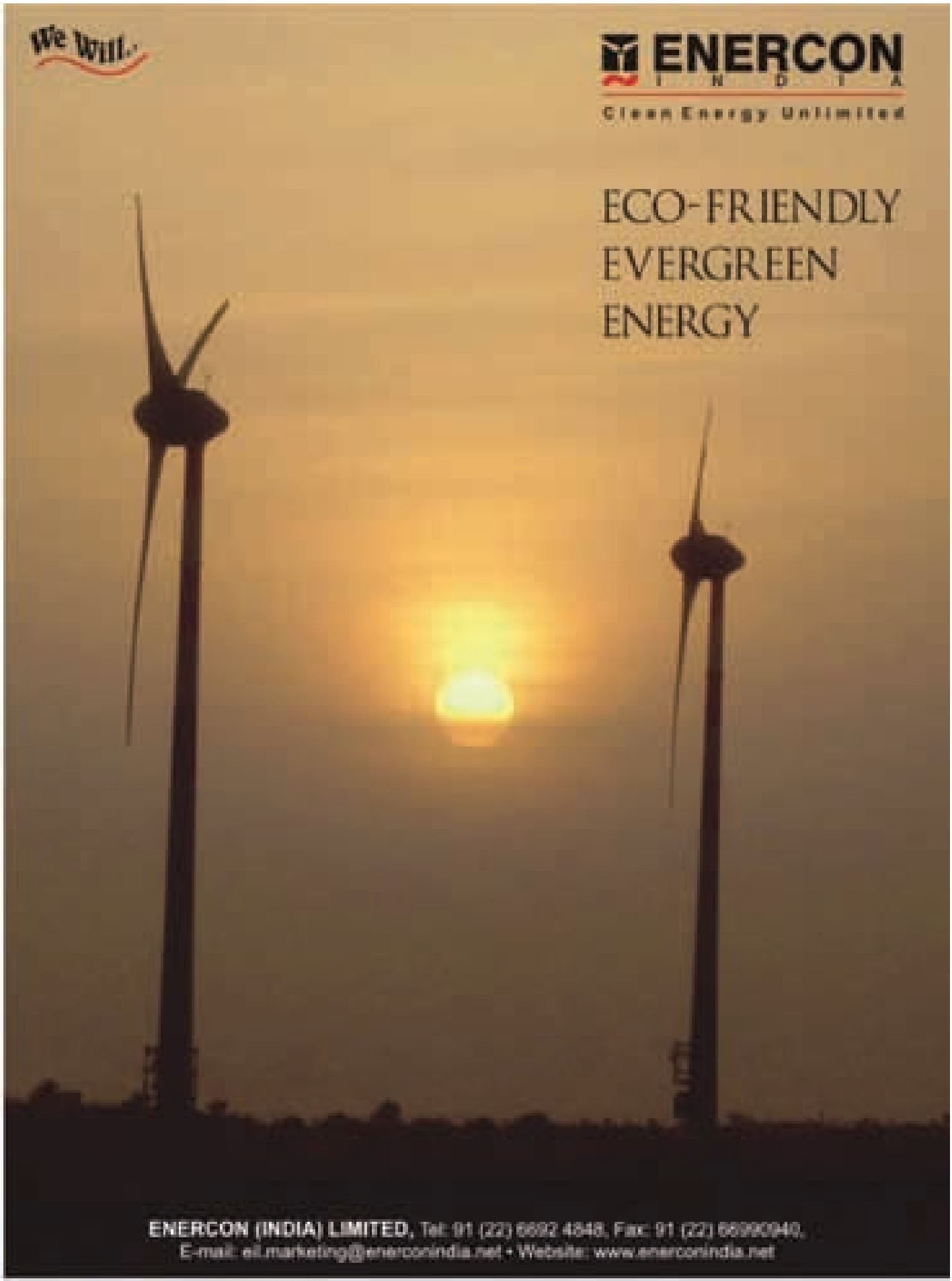
WINDPRO

Issue No. 161 March 2011



Enercon India Limited has a pending dispute with Enercon GmbH on the use of ENERCON

SUZLON

From the Editor's Desk...

I was going through the website and news items related to the Ministry of Power, Government of India. Hon. Power Minister Shri Sushil Kumar Shinde has said that India will add 15,000 Mw of power in the current financial year ending 31 March 2011. Since April 2010, it has already added 10,460 Mw of capacity till date. He added that this [adding 15,000 MW] will be the highest capacity addition in any year. Hon. Minister has further added that he is little afraid that if he does not get enough coal and fuel, the Ministry may not be able to meet out [capacity addition] targets. Coal production in the country should increase by 2 -4 per cent each year to meet demand from power generating companies and 10 million to 11 million metric tons of coal have been imported until now this year. The power ministry had fixed an import target of 35 million tons of coal for the current financial year.

It appears that India is expected to add only 50,000 Mw of power generating capacity in 11th plan against re-revised target of 62374 Mw. In the 11th Five Year Plan (2007-12), the power capacity addition planned was 78700 Mw and this target was reduced to 62374 Mw during mid-term plan appraisal. Keeping in view the present status of ongoing projects it may not even cross 50,000 Mw. As per Central Electricity Authority the present addition in the current five year plan up to Jan. 2011 is 32512 Mw and balance of about 30000 Mw in next 15 months is not at all practical.

The Planning Commission targets creating an additional 1,00,000 Mw of generating capacity during the 12th five year plan (2012-17) of which 50 per cent would be delivered by the private sector, against 33 per cent currently generated by independent power producers. The primary reason for failure to increase generation capacity is the shortage of coal as per the CEA observations and it has forecast an acute shortage of power-grade coal in the country and that thermal coal imports will grow 85 per cent to 85 million ton by 2012.

According to CEA, failure to assure coal linkages to power plants proposed by private sector investors was the prime reason for slippages in targets, and if the situation persists, a 50 per cent incremental capacity from the private sector envisaged in the 12th plan would not materialize. Coal Ministry is not able to supply coal as per the requirement. The Coal production in 2008-09 and 2009-10 was 492.76 and 526.16 million tons respectively. The estimated, demand for coal in 2021-22 will be 1,353 million tones against the 1,084 million tones production, leaving a shortfall of 269 million tones.

Target for wind Power capacity addition in 11th Five Year Plan (2007-12) is 10500 MW and the achievement is 5970 MW till Dec. 2010 in 3 years 9 months leaving 4530 MW to be achieved in 15 months left in the plan period.

In power sector, nowhere I have found that anybody talking about the Renewable Energy- the Wind Power. The Ministry of Power and Central Electricity Authority are not talking about use of wind energy in India. It looks that the responsibility of development of Renewable Energy has been left on MNRE. MNRE is only a nodal ministry. If the Ministry of Power and Planning Commission are determined to end the power shortage in the country, they can make it happen. Renewable energy like wind and solar power are source of sustainable development of power without pollution. These renewable sources are required to be encouraged. For that all the Ministries like Power, Finance, Planning Commission, Industries and Renewable Energy have to sit together and chalk out a plan of development of energy in India.

Keeping the above in mind, our Association has submitted a memorandum to The Planning Commission, the copy of which is being published in this issue, impressing upon the importance of wind energy and also indicating the ways and means to develop the wind energy in India. We hope that the 12th Five Year Plan will see more wind energy.

INDIAN WIND POWER ASSOCIATION
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Contents...

List of Advertisements

Drive Trains, The Changing Gears

David Solomon, Scientist, R&D, C-WET

Wind Turbine Technology has had many of its own conventions. A few have fallen by the way over time like the stall technology but many have stood the test and one amongst them is the geared way of drive train. This mode of torque and speed transfer has been on the overdrive for a very long time. 'Every good time comes to an end' says a common adage. Will the magnets do that honours to the geared technology. It is a matter of preferences and prejudices which would decide the fate here. When the Permanent Magnet Generators (PMG) came into vogue it made possible the fact that a slow spinning rotor could be directly coupled to a generator to produce power, and thus dispensing off the gearboxes and along with them the greasy platforms of a nacelle and the downtimes due to their failures. But every rose has its thorn goes another adage and accordingly buried deep in the annals of IPR offices in USA are a few direct drive patents that G E owns by virtue of its acquisition of many erstwhile wind turbine companies that poses as a major impediment for other manufacturers in their usage and deployment. As always time is a good healer and a way around has been found for this. Many of these patents start to expire in 2011 and this would be welcome breather for other players in the field enabling them to take these concepts to greater heights.

Gearboxes were found to be sufficiently efficient and sturdy in smaller wind turbines. But as the sizes of the wind turbines started ballooning from a few hundred kilowatts to the present day mega watt models, the complexities of design requirements have increased many folds. To design a gearbox for a MW turbine is a skilled craft in itself and very few have mastered the technology. A frequently failing gearbox is a major drain on an entrepreneur's purse and a bad impression for the sector.

Alternatively doing away with the gear box means the burden shouldered by a gear box of handling the huge amount of torque and the associated stress falls on the PMG. In the process of enabling the PMG to handle huge torque and the stresses, a very bulky and heavy alternator design ends up on the nacelle of a direct drive wind turbine. It has been found that the nacelle mass of a direct drive gearless wind turbine is more than that of a geared conventional wind turbine for the same power rating.

Optimality is name of the game. A judicious mix of technology as seen in the 5 MW Multibrid wind turbines installed in the Alpha Ventus test offshore station in the German North sea in 2007, where the turbines had a gearbox with a single stage deployed between the slow spinning rotor and the multi-pole PMG. Since then the Multibrid design itself has had evolution in its single gearing setup and world over the present preferred system is a PMG coupled to a rotor through a two stage gearbox. The cause for such an iteration in design was the fact that it was more economic and more reliable than its previous unitary gearing iteration. There have been eager takers for this concept evolution with Gamesa pitching in with its G10 X 4.5 MW wind turbine model having two planetary staged gearbox having 1:37.88 gear ratio running with a Permanent magnet synchronous generator.

Since time immemorial small wind turbines have been using the PMGs in their systems to tide over the issue of handling more copper and electrical sub-systems in the rotors of their generators. In that order of business Small Wind Turbine (SWT) manufacturers should be given the credit of championing the cause of PMGs for a very long time till at latter time companies manufacturing larger wind turbines picked up the technology and commercialised it with a lot of success. SWTs are still where they are, impoverished while the large turbines have reached the zenith. The major reason for the PMGs to a preferred choice over that of the conventional induction generator was the fact that they were capable of having better part load efficiencies. This improved efficiency meant that better harvesting of electrical energy during low and moderate wind regimes. In many locations inside India, these permanent magnet generators are producing higher generation than the induction generator based wind turbines and in the process aided in achieving better-break-even in the cash flow for their investors. With availability of low cost neodymium-iran-boron rare earth magnets being exported from China, which has vast reserves of the rare earth element neodymium, the economics of having PMGs in the drive train has got tilted in its favour for the time being till China is magnanimous.

The industry is split middle way in its support for both the geared and gearless drive train technology, having ardent manufacturing support for either technologies in both the camps. The tides of favour could turns around either way based on economics for these technology and newer patrons will come in to who shoulder their run through the commercial market. The market awaits a technological iteration that would have the unanimous support of manufacturers and becomes the next conventional drive train and that would be the shifting of real gears in this field.

Courtesy : PAWAN News Magazine

2nd International Conference and Exhibition on
From 15th to 17th February 2011
Exhibition

3 Tier

GE Wind Energy

Lincoln Helios

MSPL

Bonfiglioli

ReGen Powertech

RRB Energy

Wind Energy 20 by 2020
at Hall No. 12. at Pragati Maidan, New Delhi
Photos

Letiner Shriram

Enercon

Kenersys

Vestas Wind Technology

Gamesa Wind Turbines

Suzlon Energy Ltd

CHW Forge

Shri T.B. Chikkoba Awards Wind Farms For The

The Awards for the Best Performing Wind Farms instituted by Indian Wind Power Association for the years 2008-09 and 2009-10 were given away during the 2nd International Wind Energy Conference and Exhibition (WE 20 by 2020) at Pragati Maidan, New Delhi. The awards were presented by Dr. Pramod Deo, Chairperson, Central Electricity Regulatory Commission (CERC) and Dr. S. Gomathinayagam, Executive Director, Centre for Wind Energy Technology.

FOR THE YEAR 2008-09

Shri. Savari Aanadham of M/s. Dalmia Wind Farm receiving the Award from Dr. Pramod Deo, Chairperson, CERC, New Delhi for Above 2 MW Category in "Aralvoimozhi Pass" for the year 2008-09

Shri. D. Saravana Kumar of M/s. Cape Flour Mills Ltd receiving the Award from Dr. S. Gomathinayagam, Executive Director, C-WET, Chennai for Below 2 MW Category in "Aralvoimozhi Pass" for the year 2008-09

Shri. Bala Venkat of M/s. Indo Wind Energy Ltd receiving the Award from Dr. Pramod Deo, Chairperson, CERC, New Delhi for Above 2 MW Category in "Shengottah and Palghat Pass" for the year 2008-09

Shri. Patel of M/s. Sahyadri Industries Ltd receiving the Award from Dr. Pramod Deo, Chairperson, CERC, New Delhi for Above 2 MW Category in "Maharashtra, Gujarat, Rajasthan and Madhya Pradesh Pass" for the year 2008-09

Mr. Arvind Prasad, Managing Director, M/s. Ushdev Power Holdings receiving the Award from Dr. Pramod Deo, Chairperson, CERC, New Delhi for Below 2 MW Category in" Karnataka and Andhra Pradesh Pass" for the year 2008-09

For The Best Performing Years 2008-09 And 2009-10

FOR THE YEAR 2009-10

Shri. Arumugam of M/s. Tamilnadu Newsprint and Papers Ltd receiving the Award from Dr. Pramod Deo, Chairperson, CERC, New Delhi for Above 2 MW Category in Aralvoimozhi Pass for the year 2009-10

Shri. D. Saravana Kumar of M/s. Cape Flour Mills Ltd receiving the Award from Dr. S. Gomathinayagam, Executive Director, C-WET, Chennai for Below 2 MW Category in "Aralvoimozhi Pass" for the year 2009-10

Shri. Sivakumar of M/s. Tamilnadu Newsprint and Papers Ltd receiving the Award from Dr. Pramod Deo, Chairperson, CERC, New Delhi for Above 2 MW Category in "Aralvoimozhi Pass" for the year 2009-10

Managing Director and Mr. Chawla of M/s. Yamuna Power and Infrastructure Ltd jointly receiving the Award from Dr. Pramod Deo, Chairperson, CERC, New Delhi for Below 2 MW Category in "Mahararashta, Gujarat, Rajasthan and Madhya Pradesh Pass" for the year 2009-10

Mr. Sanjay Chaturvedi, M/s. Nuziveedu Seeds Ltd receiving the Award from Dr. Pramod Deo, Chairperson, CERC, New Delhi for Above 2 MW Category in" Karnataka and Andhra Pradesh Pass" for the year 2009-10

WIND MONITOR TABLE FOR THE MONTH OF FEBRUARY 2011

This Section has been started to give an idea to our members on the behavior of wind at different locations of Tamil Nadu to start with. For purposes of easy comparison, the daily generation have been converted to Kilo Watt hours per Mega Watt basis under ideal conditions of 100% Grid Availability and 100% Machine Availability

Date	ACC Limited (ACC)	Tamilnadu Newsprint and Papers Limited (TNPL - 1)	Tamilnadu Newsprint and Papers Limited (TNPL - 2)	VVD and Sons Limited (VVD - 1)	VVD and Sons Limited (VVD - 2)
	Aralvoimozhy Pass	**Shengottah Pass**	**Shengottah Pass**	**Aralvoimozhy Pass**	**Shengottah Pass**
	Location - Udayathur District - Tirunelveli Make - Suzlon Capacity - 1.500 MW Hub Height - 78.5 Meter Rotar Diameter - 82 Meter	Location - Devarkulam District - Tirunelveli Make - NEPC Micon Capacity - 0.250 MW Hub Height - 30 Meter Rotar Diameter - 26 Meter	Location - Devarkulam District - Tirunelveli Make - NEG Micon Capacity - 0.750 MW Hub Height - 55 Meter Rotar Diameter - 48.2 Meter	Location - Udayathur District - Tirunelveli Make - Suzlon Capacity - 1.500 MW Hub Height - 78.5 Meter Rotar Diameter - 82 Meter	Location - Sankarankoil District - Tirunelveli Make - Suzlon Capacity - 2.100 MW Hub Height - 79 Meter Rotar Diameter - 88 Meter
01.02.11	12558	940	2951	11395	3546
02.02.11	10699	816	2745	14532	3618
03.02.11	9253	400	1744	7958	1246
04.02.11	5136	272	783	5723	455
05.02.11	14240	374	1285	10447	1807
06.02.11	3424	328	1331	10185	853
07.02.11	3264	204	529	4682	172
08.02.11	1520	152	520	1673	179
09.02.11	4624	236	756	3413	281
10.02.11	9632	513	1097	5953	1075
11.02.11	11321	400	1645	12600	1481
12.02.11	11344	664	1417	10707	1923
13.02.11	8000	472	861	9929	576
14.02.11	2432	180	511	5339	235
15.02.11	256	164	488	567	480

WIND MONITOR TABLE FOR THE MONTH OF FEBRUARY 2011

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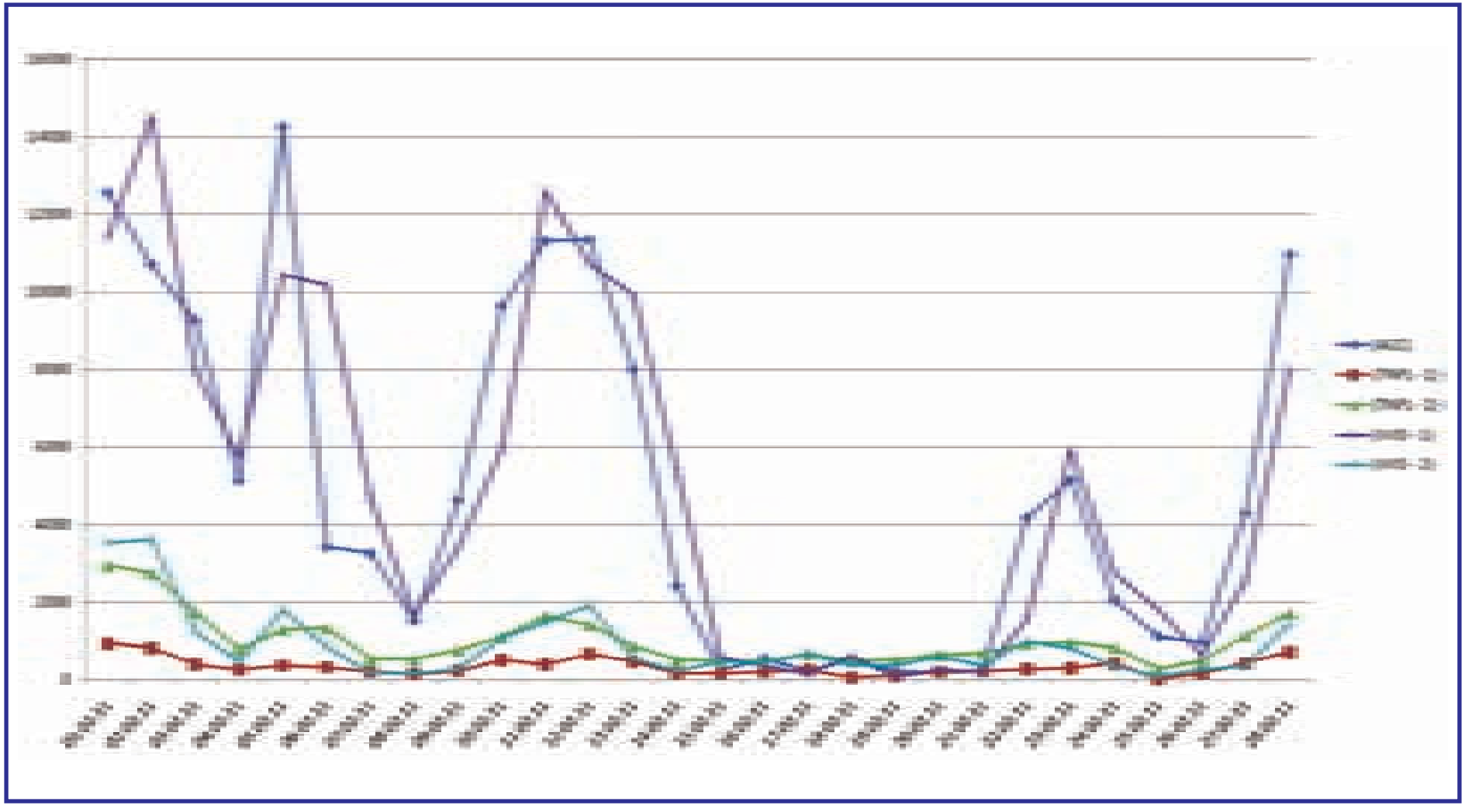
16.02.11	544	204	461	363	443
17.02.11	256	255	663	141	677
18.02.11	512	60	496	622	377
19.02.11	224	108	514	62	389
20.02.11	192	204	628	262	612
21.02.11	224	224	681	212	383
22.02.11	4176	275	919	1548	995
23.02.11	5152	303	963	5925	809
24.02.11	2064	424	812	2748	358
25.02.11	1120	28	284	1809	95
26.02.11	976	168	480	624	270
27.02.11	4304	432	1133	2572	368
28.02.11	10962	708	1727	8007	1455
Total	**138409**	**9508**	**28424**	**139998**	**25158**

WIND MONITOR - GRAPH FOR THE MONTH OF FEBRUARY 2011



Pioneer Wincon, the market leader in 250 kw wind turbines, now introduce their most powerful and cost-effective 750 kw wind turbines with 49 metre rotor diameter at hub height of 61.1 metres. These robust, easy to maintain turbines extract maximum energy from the wind. A part of the Pioneer Asia Group, Pioneer Wincon provide comprehensive turnkey wind power solutions to their customers, ensuring high return on investment. The superior Danish technology backed by full fledged operations and maintenance service, provides complete peace of mind to the customers. Invest in Pioneer's unmatched expertise in wind energy and watch your profits soar. **Pioneer for Prosperity.**

- **More than a decade of expertise**
- **Confirms to latest international standards**
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Abdul Razaq 1st Street, Saidapet, Chennai - 600 015
Phone : +91 44 2431 4790 / 91 / 92 / 93
e-mail : marketing@pioneerwincon.com
www.pioneerwincon.com

IWPA Letter to Deputy Chief Minister

To,

23.02.2011

Mr. M.K. Stalin,
The Hon'ble Deputy Chief Minister
Government of Tamilnadu
Secretariat
Chennai

Respected Sir,

Sub : Urgent Redressal needed for Wind Energy sector In Tamil Nadu

We submit the following few lines for your kind consideration and early favourable orders please.

We are an Association of stake-holders in Wind Energy. We have around 1100 Members spread all over India and our members have more than 4000 MW of installed capacity of Wind Mills. Our main objective is to develop Wind Energy in India and particularly in Tamil Nadu. Electrical Power is a basic necessity and Tamil Nadu is at present facing Power Cut.

Sir, you are well aware the part played by Wind Energy in helping the TNEB to tide over its difficult days during summer months. Further Wind Energy has the shortest gestation period of 3 to 4 months and also the Wind Mills are erected by Private Entrepreneurs' without any financial burden to the Govt. It is a Distributed Generation helping the grid to improve its quality and also pollution free environment friendly power. Being installed in rural areas it helps to improve rural economy.

So far Tamilnadu is in the No. 1 position in installation of Wind Mills. We humbly admit Sir that this is possible only due to the encouragement given by the Government of Tamilnadu and TNEB. But, we are now afraid whether we can retain this position for long. This is based on the recent developments at TNEB which are listed below.

1. **Delayed Payment for the Wind Energy Supplied to TNEB :**

   Wind Energy Generators produce around 1000 crore units of electrical energy annually and feed the same to the grid. Out of this 500 crore units are sold to TNEB which works out to a payment of Rs. 1500 crores to the developers. Though TNEB collects the money from the consumers in about a week's time, the payment to the Wind Energy suppliers is delayed by nearly 6 to 8 months. Many of our members have to get payments from July 2010 to date, which upsets their credibility to banks. Their due to be paid without any further delay.

2. **Evacuation of Generated Energy :**

   Though many developers from all over are to Installing wind mills in Tamilnadu, TNEB is not in a position to absorb wind energy generated for want of infrastructures like 400KV Sub-Stations, Transmission Lines to load areas in Coimbatore and Chennai from generation areas in South Tamilnadu created in time to evacuate the Power that may be fed to the grid by these additional 1000MW of wind mills now under installation and many more that may come.

   Sir, we are enclosing a news item from Economic Times, which says that a Chennai based party has chosen to shift their project of 300 MW of Wind Power to Maharashtra and Gujarat, what this means to Tamil Nadu is

   a) Loss of investment of around Rs. 2000 crores
   b) Loss of Electrical Energy of around 80 Crore units to the Grid
   c) Confidence of Investors Shaken

3. **Third Party Sales :**

   Though Third Party Sales is permitted by an order from TNERC and followed by Circular dated 28 December 2010 from TNEB, we feel order is not user friendly. The Third Party Sales agreement has to be without lapse of units or penalty as in Karnataka.

   Though there are a few other minor irritants from TNEB, we feel that the above three matters require to be addressed immediately. Hence, we request your intervention, Sir, to solve the above three issues urgently, which will boost the confidence of the Investors and we will be maintaining the No. 1 position for many more years to come.

   We sought an audience with you. Since we could not get it we submit this letter. We now look forward to you for suitable instructions to TNEB and help to save the Wind Energy in Tamil Nadu from its present difficulties.

   With kind regards,

   Yours faithfully,
   For Indian Wind Power Association

   Sd./-

   K. Kasthoorirangaian
   Chairman

News Item

Orient Green Power to Shift its Wind Farm Project to Maharashtra, Gujarat

Sangeetha Kandhavel, Chennai

Orient Green Power Company a renewable energy venture of the Chennai-based Shriram group, has decided to move its proposed 300 mw wind farm project from Tami Nadu to Maharashtra and Gujarat due to issues relating to evacuation of power.

"We have some evacuation issues in Tamil Nadu and that is why we are moving out from here. We will first be moving to Maharashtra and we are looking at a total capacity of 84 mw there. In the first phase in Maharashtra, we will have around 40 mw involving investments of around ₹ 250 crore", P Krishna Kumar managing director and CEO of OGP told ET.

"We are also looking at a capacity of around 40 mw in Gujarat. The investments here would vary from ₹ 6 to ₹ 6.5 crore per mw, " he added. Power produced by private players need to be evacuated to the grid to be sold to users.

Orient was promised by the government that facilities will be ready by April but no progress has been made, so far. Kumar also said that the company intends sell stake for a strategic joint venture partner in Orient Green Power Europe BV, a wholly owned subsidiary, bringing down is shareholding to 51%.

The joint venture is expected to bring the necessary technical and operational skills required for the presence and growth in Europe, it added. It will also put in $4 million (about ₹20 crore) to expand its business in Sri Lanka.

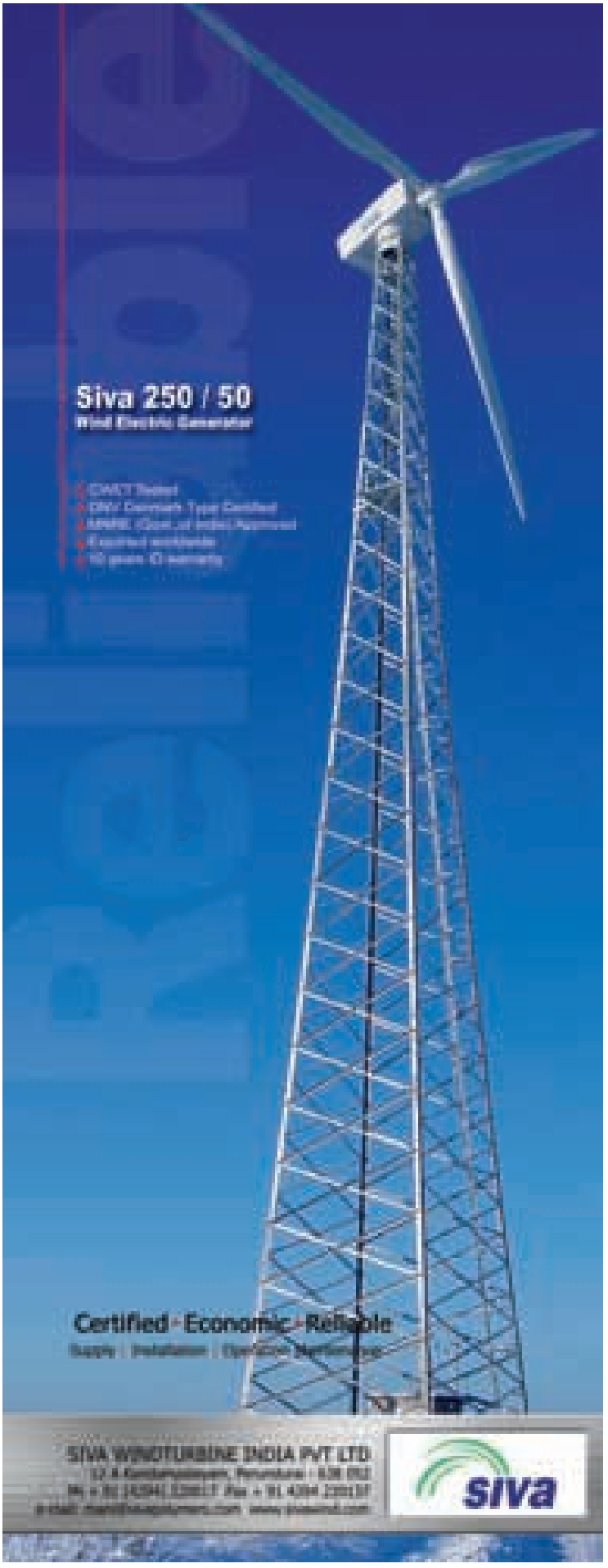
According to a recent World Bank report, wind energy dominates India's renewable energy industry, accounting for 70 % of the installed capacity. The sector has received more support than any other renewable energy sector to date.

Wind will continue to be the biggest renewable energy sector in India, in terms of both current installed capacity (11 gw) and total potential (40 gw). A substantial proportion of wind capacity (about 27 gw) is available in the four states of Andra Pradesh, Gujarath, Karnataka and Tamil Nadu and the cost of wind power varies between ₹ 3.8 and ₹ 5.2 per kWh.

Orient Green Power was formed as a joint venture between Shriram EPC and Bessemer Venture Partners in 2006, with both the firms pooling in $20 million in equity capital. It was followed by another round of $55 million in private equity funding led by Olympus Capital, which invested from its $250 million, Asia Environmental Partners.

The Company raised ₹ 900 crore via an initial public offering last year and the shares are currently trading at ₹ 24.60, below its issue price of ₹ 47.

Courtesy : The Economic Times



Review Of Renewable Energy Development in China

CHINA RENEWABLE ENERGY MARKETS

As China's soaring economy consumes more energy, the government has prioritized renewable energy development to increase the country's energy supply; safeguard energy security; tackle environment pollution; boost sustainable social and economic development; and to fulfil its commitment to responding to climate change. To meet these challenges, China adopted a goal of generating 15% of the country's energy from renewable sources by 2020.

In 2005, China passed the Renewable Energy Law. This bedrock legislation was followed the adoption of the Mid-and Long-term Development Plan for Renewable Energy in 2007. In 2009, the Renewable Energy Law was further expanded via amendment. With the support of the government, China is fast-tracking renewable energy development. Small hydro power, wind power, biomass, solar energy, geothermal energy, and ocean are all steadily developing. In recent years, large scale market development of wind power has created a complete value chain. Biomass has been widely promoted, leading to the maturation of methane gas and biomass power generation technology, and the refining of biomass for liquid fuels. Additionally, the market for solar energy appears promising. Supported by national policies, local government are also issuing renewable energy development plans.

This update analyzes China's renewable energy market and policies. it first analyzes the current state of and future trends for the wind power, biomass, and photovoltaic markets. It then gives a brief analysis of the Chinese government's renewable energy policies and their consequences. Finally, it concludes with a look at the challenges that renewable energy development faces in China.

MARKET OVERVIEW

Renewable energy in China plays an increasingly important strategic role in the country's energy development. Total renewable energy capacity reached 226 GW in 2009, including 197 GW of hydro, 25.8 GW of wind, 3.2 GW of biomass, and 0.4 GW of grid-connected solar PV. Renewable energy now constitutes over one quarter of China's total installed power capacity (860 GW).

As an example renewable energy's growth in China, wind power capacity grew thirty-fold from 2005-2009 from just 0.8 GW at the end of 2004. China is now second only to the U.S. in total wind capacity, tied with long-time leader Germany. China surpassed both of those countries in new capacity by adding 13.8 GW in 2009. 22 GW of new hydro, 0.4 GW of new biomass power, and 160 MW of additional grid-connected solar PV were also added in 2009. Additionally, Installations of grid-connected solar PV accelerated in 2009 as a true domestic market began emerging. Furthermore, small capacity amounts were added for both geothermal (34 MW) and marine energy (4 MW).

In just four years , China's wind turbine manufacturing industry became the world's largest. Three Chinese producers, sinovel, Goldwind, and Dongfang, are now among the global top-10, and more than 80 domestic manufacturing firms now exist. Moreover, most Chinese turbines now belong in the 1.5 - 2 MW, improving on the sub-1 MW models of earlier years.

China is now also the largest manufacturing of solar PV, supplying almost 40% of the global market in 2009. The manufacturing capacity of China's 500 + solar PV firms was about 4 GW at the end of 2009. The top three Chinese producers were Sun tech Power (704 MW), Yingli Green Energy (525 MW), and JA Solar (524 MW).

In other developments, the growth of the solar water heater market accelerated from 31 million m^2 or 22 Gw thermies (Gwth) added in 2008 to 42 million m^2 (29 Gwth) in 2009. A new rural energy subsidy program for home appliances, which included solar water heaters, was partially responsible for this growth. The total existing solar water heating capacity increased to 145 million m^2, enough to supply 60 million households (assuming 2.5 m^2 of heat absorbers each). Offshore wind power development is poised for growth, with bidding underway for at least one 100 MW project and several hundred megawatts planned across a number of other projects.

Figure 9 : CHINA'S NEW INSTALLED RENEWABLE ENERGY CAPACITY IN 2009

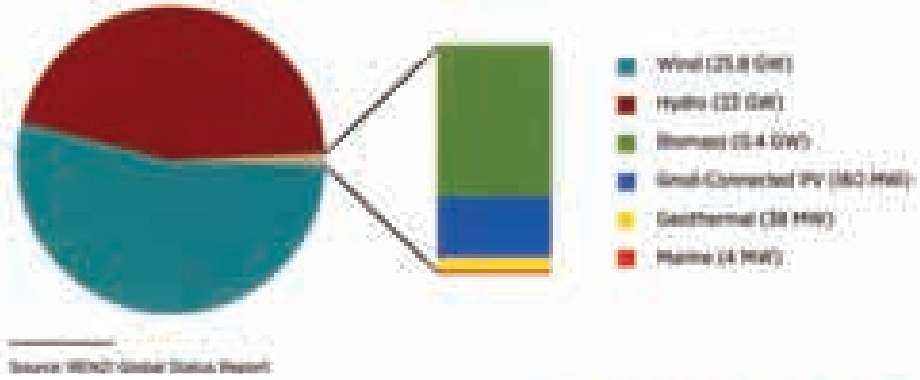


Figure 10 : ADDITIONAL INSTALLED WIND CAPACITY AND TOTAL INSTALLED WIND CAPACITY

Looking to the future, the government's draft plan calls for a total of 500 GW of renewable power capacity by 2020, supposed of; 300 gw of hydro power; 150 GW of wind power; 30 GW of biomass power and 20 GW of solar PV. This would compose almost one-third of China's expected 1600 GW of total power capacity in 2020.

These targets are not yet official, and lower targets (totaling 362 GW) establishing as part of the 2007 Mid and Long -Term Development Plan for Renewable Energy in China' still govern. The portfolio standards set forth in the Mid- and Long-Term Development Plan required utilities with capacity over 5 GW to achieve 8% of capacity and 3% of power generation from non-hydro renewable by 2020.

Many of these market developments can be traced back to the enactment of the landmark 2005 Renewable Energy Law, which took effect in 2006 after the passage of detailed implementation regulations. A provision for renewable portfolio standards (also called 'mandated market share') composed a key element of that law, along with feed-in tariffs for biomass, 'government guided' prices for wind power, an obligation for utilities to purchase all renewable power generated, new financing mechanism and guarantees, and other market-enhancing provisions. A wind power concession program in place from 2003 - 2007 complemented the law, resulting in the creation of 3.4 GW of wind power through annual competitive project bidding.

WIND ENERGY MARKETS

China possess an estimated exploitable onshore wind capacity of 2,380 GW (50 meter high wind measurement tower data), spanning 96% of China's territory. Additionally, china's offshore wind resources total 200 GW. In 2003, China implemented a concession bidding program to bolster its domestic wind industry. To stimulate the development of large-scale, highly concentrated wind power projects, China designated seven 10 GW wind power bases in 2008. In 2009, China introduced a feed-in-tariff for wind power generation from 2006 to 2009, installed wind capacity doubled annually in china (Figure 10), and after eight years of fast-paced development, the onshore wind industry is now firmly established.

China's wind power generation market is shared among the "Big Five" power generation companies and several other major state-owned enterprises. These firms account for 76% of the total investment in wind power development. Other investment comes from local state-owned enterprises, such as the local enterprises of the State Grid Corporation. Private enterprises constitute only a small portion of total investment.

According to the goals set in the Mid- and Long -term Development Plan for Renewable Energy, total wind power capacity will amount to 5 GW in 2010 and 20 GW in 2020. However, in 2009 installed wind power capacity already hit 24 GW, far outpacing the original target. At this rate, China's wind power generating capacity is expected to exceed 100 GW in 2020.

offshore wind power's attractiveness stems from strong policy supported and the desire to access large electricity markets along the coast. The first offshore wind power demonstrations project, the Shanghai Donghai Bridge Offshore wind Farm, began generating power in June 2010. It is the first offshore wind project outside Europe. At the same time, the government launched public bidding for the first round of offshore wind concession projects this may. A new round of bidding for offshore wind concession projects will be completed by November 10, 2010, adding 1 GW of planned capacity along the coastline of Jiangsu Province.

BIOMASS MARKETS

The utilization of biomass in China is characterized by methane gas, biomass power, and bio-fuels. After decades of development, methane gas utilization technology has matured, particularly

Figure 11 : DEVELOPMENT OF THE OFFSHORE WIND MARKET IN CHINA

for household use. In 2003, a central government bond program allocating more than 2.5 billion RMB began promoting the construction of methane gas facilities for rural residence. By 2010, the total of 40 million rural households had access to methene gas, with annual methane gas production of 15.5 billion cubic meters. However, this number accounts for only 30% of the rural households that could potentially benefit from construction of methane gas facilities. By 2015, about 60 million rural household will have access to methane gas with annual production capacity around 23.3 billion cubic meters.

Although biomass power generation technologies, such as woody biomass power, urban waste power, and solid biomass fuel have been developed, their deployment remains immature. To achieve the target of 5 MW installed biomass capacity by 2010 and 30 MW by 2020, a number of problems must be solved, such as diffuse resources, the high cost of raw materials, and the discontinuity of raw material supply.

China is actively promoting R&D in new bio-fuel technologies and conducting pilot project to alleviate oil shortages. In the Eleventh Five-Year Plan period, China approved four ethanol production pilot projects that use aged grain as raw material. Annual production capacity from this type of facility reached 1.02 million tons. Ethanol gasoline pilot projects have been carried out in 27 prefectures. Although bio-fuel production capacity reached 1.65 million tons in 2006, in 2007 China began limiting grain-based ethanol fuel production slowing momentum.

PHOTOVOLTAICS (PV) MARKETS

China is endowed with abundant solar energy across more than two-thirds of the country. Annual radiation exceeds 6 billion joules per square meter (J/m^2), and the surface absorption of solar energy every year is equivalent to approximately 1-7 billion tons of standard coal energy, in the Northwest, Tibet, and Yuman Province, solar energy resources are especially abundant.

Driven by recent strong demand in the international PV market, especially from Germany and other European countries, China's PV production capacity has expanded rapidly. China's production growth comes from manufacturing crystal silicon and solar cells and assembling solar modules. Following several years of strong growth, China is now the world's largest producer of photovoltaic cells.

The development and expansion of China's PV cell industry has benefitted from huge infusions of capital. Since 2005, 17 Chinese enterprises producing PV modules have listed either abroad or domestically in order to raise capital. The additional capacity allowed these firms to increase their production capacity to 4GW in 2009, accounting for about 40% of global output.

Although China might be the world's largest PV market in the future, China's domestic solar market remains immature due to the lack of a feed-in-tariff. However, the government introduced several solar PV subsides to bolster and sustain industry entrants until solar energy costs reach acceptable levels (arguably 1 RMB or 0.15 USD/KWh). The Golden Sun program initiated by the Ministry of finance (MOF), the Ministry of Science & Technology (MOST), and the National Energy Administration (NEA) in 2009 provides capital subsides for solar PV installations through 2011 on a project-by-project basis. Off-grid installations receive 70% subsides while grid-connected installations receive 50% subsides. Additionally, MOF and the Ministry of Housing and Urban-Rural Development (MOHURD) provide subsides of RMB 15/watt ($2.20/watt) for grid-connected solar PV, and RMB 20/watt ($2.90/watt) for building-integrated PV (BIPV). In 2010, the subsidy levels were reduced to RMB 13/watt ($1.90/watt) for grid-connected and RMB 17/watt ($2.50/watt) for building-integrated PV. The provinces of Zhejiang and Jiangsu also established province-wide preferential tariffs for solar.

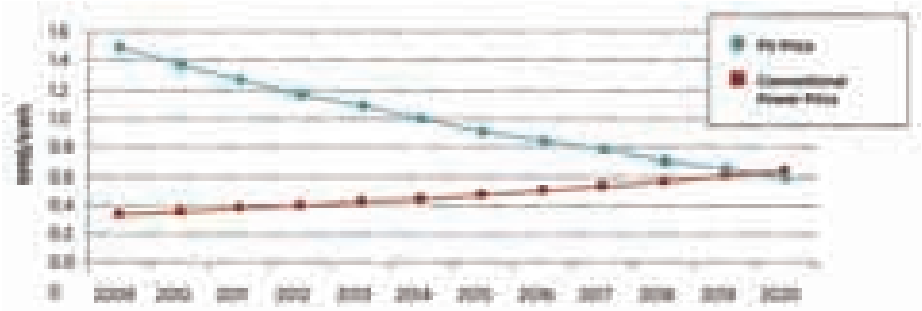
Instead of adopting European-model policy mechanism to develop its solar market, China's solar development strategy is similar to its strategy for the wind market. China uses a concession bidding program to find the lowest, yet reasonable tariff for projects based on varying resource indifferent regions. The second-round solar concession project public bidding was held on Aug. 10, 2010 and should result in the construction of 13 PU projects with a total capacity of 280 MW. Over 70% of the participants were state-owned companies, which submitted bids as low as 0.73 RMB ($0.107)/kWh.

Looking forward, the installed solar capacity in China is projected to be 2 GW by 2015, and it is estimated that grid parity for solar PV will be reached in 2020.

CHINA RENEWABLE ENERGY POLICY

China's historical renewable energy policy development can be divided into three phases. The first phase was from the 1950s to the 1980s, when methane gas and small hydro power was proposed

Figure 12 : CHINA'S ROADMAP TO PV GRID PARITY



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as a solution to energy problems in the countryside; the second phase was from the 1980s when optimisation of the countries' energy structure was the driving force; and the current phase started at the end of the 1990s with the aim of solving China's environmental problems, reducing Co2 emissions, and achieving sustainable development.

In 2005, China issued and implemented the Renewable Energy Law, which it amended in 2009. In comparison to the original Renewable Energy Law, the amendment does not focus on promoting renewable energy, but rather on coordinating and solving the problems that emerge among stakeholders involved in the development of renewable energy. The 2009 amendment strengthened and consolidated a renewable fund created under the MOF as part of the 2005 law. Previously, the fund collect a 0.4 RMB/kWh (0.06 US cents/kWh) surcharge on electric power sales nation wide (with some customer classes exempt). The Ministry applies those funds to the costs of government-supported renewable energy projects and the costs of feed-in tariffs. However, the surcharge has not kept pace with expenditures, so the new revisions allow MOF to supplement the renewable energy fund from general revenues. The government has successively released more than 10 detailed rules, covering grid-connected prices; surcharge sharing; solar PV support; and public biddings for renewable energy projects.

Since local governments actively seek new economic development opportunities, many municipalities look favorably upon the renewable energy industry. Local officials believe rapid growth in the renewable energy industries will quickly boost GDP; promote the creation of a complete industrial chain; and encourage the development of green industry. Nearly 20 provinces, regions, and cities in china have issued stimulus plans for renewable energy, and over 100 cities are proposing to establish renewable energy industry bases, including; Shanghai, Shenzhen, Chengdu, and Suzhou.

At the Copenhagen Climate Conference in 2009, Premier Wen Jiabao committed China to increasing the proportion of non-fossil energy utilization to 50% of China's total energy use, and to focus on accelerating the development of renewable energy. With the beginning of China's Twelfth Five-Year Plan Period, experts predict that China will attach increased importance to developing renewable energy, increasing the proportion of clean energy, and accelerating the transformation of China's energy structure.

China's Policies related to Renewable Energy

POLICY	Basic Principles
2005 Renewable Energy Law and Tentative Management Measures for Renewable Electricity Price and Cost-sharing by NDRC [2006], No. 7	1. Grid enterprises should acquire the full amount of generating capacity from renewable energy projects; 2. Grid enterprises must give reasonable on-grid price (reasonable cost+reasonable profit); 3. The Surcharge to cover disparity from the conventional electricity price is shared by all electricity customers.
Tentative Managements Measures for Allocation of Surcharge of Renewable Electricity by NDRC [2007], No. 44	1. Starting from June 2008, developers received an additional 0.002 RMB for every Kwh generated from renewable sources. In November 2009, the rate was increased to 0.004 RMB/kWh; 2. Currently, four feed-in-tariff levels exist for wind power generation (0.51-0.61 RMB/kWh); 3. The price of biomass power is equal to the price of coal-generated power plus 0.25 RMB/KWh.

CHINA RENEWABLE ENERGY OUTLOOK

Although the pace and scale of renewable energy development in China has surpassed that of many developed countries, some barriers still obstruct the creation of a strong domestic market, with cost being the most significant.

At present, China's generating cost of renewable energy significantly exceeds that of conventional energy. For example, the generating cost of small hydro power is about 1.2 times the cost of coal; 1.5 times for biomass power generation (methane gas); 1.7 times for wind power; and 11-18 times for PV power. High cost inhibits the renewable energy market. At the same time, a small market slows the reduction of the cost of renewable energy, creating a vicious cycle for the renewable energy industry. The industrialization of renewable energy sources will be realistic only when the prices of renewable energy and traditional energy reach parity.

China's current R&D levels still lag behind developed countries, characterized by relatively weak independent R&D and innovation. China lacks both accreditation standards for product quality and standards for connecting renewable energy to the grid. Inconsistency between the planning of renewable energy projects and the planning of transmission leads to difficults in generating power. Furthermore, the raising proportion of renewable energy in china's energy portfolio will strain the grid in regards to peak regulation and frequency modulation. Therefore, more investment in the grid will be needed to accelerate modernization and the creation of a smart grid.

The development of renewable energy in China is still in the initial stages, supported mainly by government policies. However, merely relying on financial subsides is insufficient, and long-term mechanisms will be needed to develop the industry in a sustainable and healthy way. Competition within China's renewable energy market is largely among state-owned power enterprises, with private investors being gradually marginalized. Nevertheless, both the wind power and PV industry were initially funded through private investment, and the encouragement of private capital in the renewable energy sector will push forward the development of renewable energy. Meanwhile, the introduction of market mechanisms and free competition also improves quality while reducing costs.

Courtesy : CREIA

Legal Steps Taken To Protect IWPA Members Rights & Status as on 19/03/2011

At Tamil Nadu Electricity Regulatory Commission (TNERC)

S.No.	Subject of Case Filed	Action Taken From IWPA	Status at TNERC
1	Delayed Payment for the Energy Sold to TNEB	10 of our Members have filed Petition for early payment and interest for delayed payment.	Arguments Concluded. Orders Reserved.
2	TNERC Order No. 1 dated 20.03.2010 - Non implementation of portitions of order like a) Wind Energy Wheeling to L.T. Services b) Adjustment of Banked Units in different slots against request. c) TNEB shall make payment to the generator within 30 days of receipt of the bill for the Wind Energy Sold. Any delayed payment beyond 30 days is liable for interest at the rate of 1% per month.	Petition filed to TNERC on 08.11.2010 for implementation of Order No. 1 dated 20.03.2010.	Not yet listed. APTEL has on 18.03.2011 dismissed. TNEB's appeal against the tariff order. The case will therefore get listed in due course.
3	Appeal against levy of penalties every month for Wind Energy Consumers. From June 2010 based on TNEB FC Circular dated 25.06.2010. Higher Maximum Demand Quota given at beginning of month. End of month Demand Quota Recalculated for billing based on monthly consumption / Wind Energy used. - Always ending in levies of penalty - Request for cancelling circular and have hastle free old procedure.	In TNERC hearing on 19.10.10, difficulty presented with examples by IWPA. TNERC directed TNEB to prove that they have not changed billing procedure during hearing on 29.10.2010.	TNERC issued an interim Order on 29.10.2010 staying the opertion of the FC Circular dated 25.06.2010 pending final judgment. Matter listed on 02.03.2011. After hearing adjourned with a direction tto file sample calculations of members to show the negative effect by such change in calculation.
4	Fixing of TNEB Quota and permitting of Open Access over and above the TNEB Quota based on a TNEB letter dated 17.09.2010 By this many factories will get 'Nil' Quota from TNEB during lean wind season.	Petition filed to TNERC on 08.11.2010. Requested TNERC to direct TNEB not to disturb their quota so far followed.	High Court has already passed a favourable order effectively protecting additionality and principles under the Suo Motto Order for windmills. This petition will therefore be withdrawn the next time it is listed.

Cases in Appellate Tribunal for Electricity (APTEL)

S.No.	Subject of Case Filed	Action Taken From IWPA	Status at APTEL
1	TNEB appeal against TNERC Order No.1 dated 20.03.2009 on wind energy tariff Rs. 3.39 and LT Wheeling; slot to slot adjustment etc.	IWPA Petition as Respondent filed.	Appeal dismissed on 18.03.2011.
2	Payment for unutilized banked units as on 30.04.2009 AT Rs. 3.50 paise.	IWPA Petition filed	Part heard on 08.03.2011. Posted on 05.04.2011 for further arguments.
3	Payment for unutilized banked units as on 31.03.2010	TNERC ordered for payment at 100% of selling rate. IWPA filed petition seeking Rs. 3.50 per unit.	Hearing date not yet fixed

In Supreme Court - Delhi

S.No.	Subject of Case Filed	Action Taken From IWPA	Status at Supreme Court
1	TNERC Order No. 3 dated 15.05.2006 Why different rates for same wind energy supplied to TNEB like Rs. 2.75; Rs. 2.90? Why Time Value of Money used for investment not Considered? Is it not discrimination against constitutional rights?	IWPA following the case for early judgement.	APTEL Orders in favour of IWPA Members. TNEB appeal in Supreme Court is to be posted for hearing.


isn't it time we
looked at the wind as
a serious alternative?
Today, wind energy is the fastest growing source of alternate energy. This makes it ideal in ensuring a sustainable future. At Suzlon, our expertise, experience and unfaltering commitment enables us to deliver profitable wind energy solutions, which add to global power portfolios. We have also helped propel socio-economic and infrastructural development. Partner with us, and let us show the world how efficiently the wind can power a cleaner, greener future.


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'World's 3rd' largest and fastest growing integrated wind turbine manufacturer | Workforce of 14,000 people and a global presence in
21 countries across 5 continents | Established operations in Australia since 2004 with over 700 MW of installed capacity | Suzlon Energy
Australia brings with it a collectively accumulated wind industry experience of over 400 years!

Wind Energy Towards 20% By 2020

1. Introduction

India is heavily dependent on fossil fuels for its energy needs, mainly coal, of which it has significant reserves. However, to fuel a thriving economy and to accomplish a targeted GDP growth rate of 8-9% per year, the country's electricity demand is projected to grow more than double from 2005 to 2020. As per the projections under Integrated Energy Policy Report 2005, if the country is to progress on the path of this sustained GDP growth rate during the next 25 years, it would imply quadrupling of its energy needs over 2003-04 levels. In an attempt to achieve these huge ambitious targets, Central Government has planned Capacity addition of 78,700 MW, 83,000 MW and 100,000 MW during the 11th, 12th and 13th plan respectively. As per the IEA Estimates, India would need 327 GW of power generation capacity by 2020, which amounts to more than doubling its existing capacity base of 160 GW as prevalent during 2010. Wind energy with its installed capacity base of around 11.8 GW forms around 8% of this total capacity base, however, vast wind potential is yet to be harnessed.

Global Wind market has been dominated by Europe, US and Asia accounting 86% of the total installed wind capacity at the end of year 2009. Global cumulative installed capacity of wind power reached 160 GW in 2009. Even during the economic crises Wind record annual capacity addition of 38 GW in 2009. With this capacity addition Wind is generating 1.6% of World's electric demand. Last few years are marked with growing presence of Asian market in Wind Sector with China and India adding huge capacity addition and investment in wind Sector. As per the international study, it is expected that the Asian wind sector will grow with CAGR of 14% in the next five years reaching the total installed capacity of 72GW by the year 2014. As per the Global Wind Energy Council (GWEC) report, India would add wind capacity ranging from 24 GW to 65GW under various scenarios.

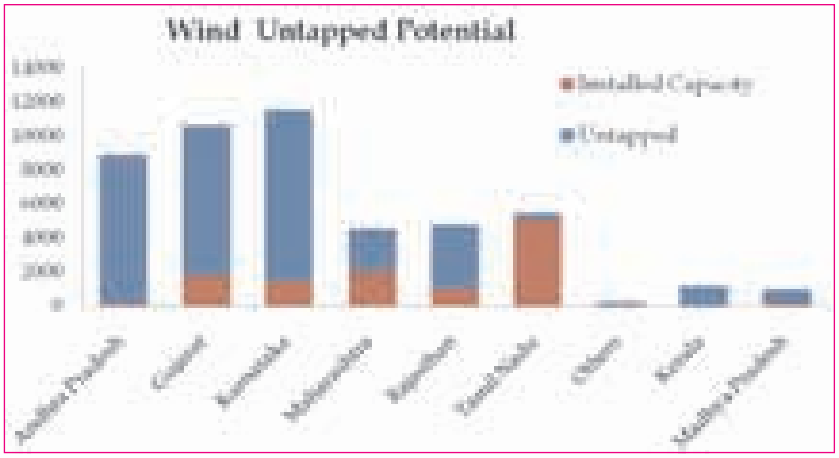
The Indian renewable energy sector has shown impressive growth in the past few years and investments into the sector have increased significantly. Recognising the role of Renewable Energy especially Wind Energy in overall energy mix, the Government of India has announced various promotional policies and incentives schemes from time to time. As a result of this supportive framework and other factors, grid connected wind power capacity has increased from 32 MW in 1990 to 11807 MW in 2010 with a CAGR of over 30%. Today, Overall Renewable share is about 10.90% of the total grid installed capacity in the country, and contributing about 4.13% to the electricity generation mix.

1.1 Historical Growth of Wind Energy in India

Historically, it has been observed that the actual capacity additions in the conventional power sector in India tend to fall short of their plan, however, Renewable sector is exception for this trend. Indian Government in its 10th five year plan had planned to add 3075 MW of energy from renewable sources. However, in reality, renewable sources had overachieved/crossed the target by adding about 6238MW, much more than the planned target. The share of Wind power in the capacity addition was 83% with a capacity addition of 5185 MW during 10th Plan. Due to shorter gestation period, the wind energy emerged as the favourable choice among all renewable technologies. Needless to say that Wind energy would play very decisive role not only in development of Renewable Sector in India in coming future but also play an important role contributing to meet future energy demand.

Wind is commercially and operationally the most viable renewable energy resource and, accordingly, emerging as one of the largest source in Renewable sector. India has a great untapped potential for wind energy. According to official estimates, the country's total onshore wind energy resource potential amounts to 48 GW of installed capacity, but some experts opine that this figure is on the conservative side, and that technological improvements could significantly increase this potential.

Figure 1.1 : Wind untapped potential across States



Source : MNRE data as on 30.06.2010

Further, the potential for Wind Technologies is expected to increase in future with the technological advancement that may allow better harnessing of resources and tapping huge offshore wind potential.

1.2 Wind Energy : Towards 20% by 2020

India, like other developing countries, is suffering with a wide gap between demand and supply. There is also considerable environmental and resource degradation because of a higher dependence on fossil fuels. These factors, along with the country's large endowment of renewable resources, suggest that the development of Renewable Energy (RE) will go a long way in meeting the challenge of providing clean power in India. With a view to addressing India's energy security challenge and to promote ecologically sustainable growth, it is a need of hour to shift from conventional depleting sources of energy to non conventional sources of energy. A good mix of renewable energy in the energy mix can ensure sustainable development while addressing the energy security. The growth of wind energy installations across India is presented in following chart.

With expected annual growth rate of 8-9 % per annum, the demand for electricity would significantly increase. As per long term projection by the CEA's 17th EPS Survey, India's energy requirement would be 1914 BU and peak demand would be 298 GW by the end of 13th Five year plan (i.e. FY2021-22). This would imply that India need to add capacity of around 13 GW every year. To achieve the target of 20% wind penetration by 2020 India would need to install around 3500 -4000 MW of wind turbine generators (WTGs) annually, as against current highest annual wind capacity addition of around 1700 MW. The annual capacity addition target is ambitious yet achievable. However, it depends upon the various factors such as appropriate wind energy technology, conducive policy framework for investment in Wind sector, scope and prospects for IPP business, addressing issues in grid integration and facilitative evacuation arrangements, enabling policy and regulatory framework, tapping of offshore wind potentials, market development, and other issues affecting the penetration of wind technology.

2. Wind Energy : Policy and Regulatory Development and Key Issues

2.1 Wind Development in India- Historical Perspective

With installations of renewable energy based generation capacity of 17,123 MW[1] the contribution of renewable energy capacity has exceeded over 10% of total power generation capacity in India. Out of the total installed capacity, wind energy contributes over 70% with an installed capacity around 12009 MW[2] as on June 30, 2010. The main drivers for growth of Wind energy sector in India during past five years; are conducive policy framework and regulatory initiatives directed towards harnessing of wind energy sources, increasing prices for fossil fuel based generation, growing consumption to sustain economic growth, and recognition of environmental concerns.

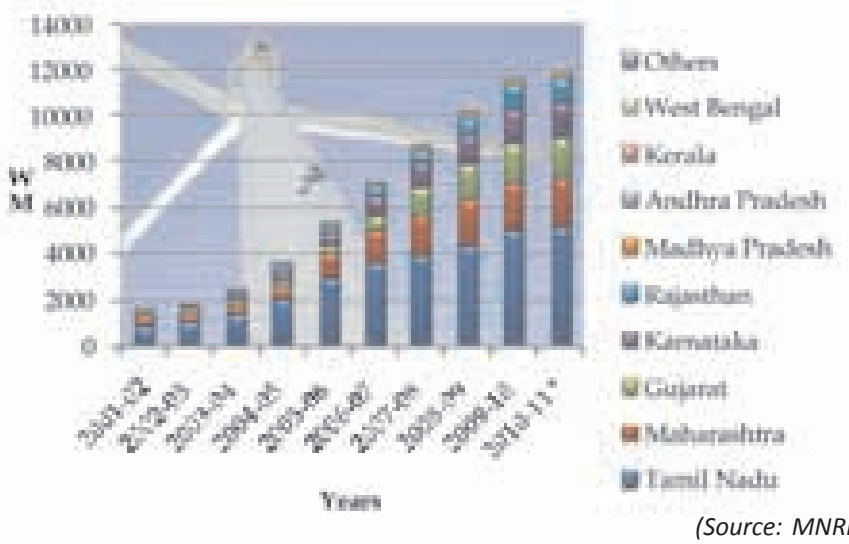
The growth of wind power sector can be grouped into three phases of development :

- ❖ Period before 1994-95 (prior to initiation of MNRE's structured policy programme)
- ❖ Era between 1995 and 2003 (With MNRE policy programme and prior to EA 2003)
- ❖ Period after 2003 (Post enactment of Electricity Act 2003)

2.1.1 Period before 1994-95 (Prior to Initiation of MNRE's structured policy programme)

During the period till 1994, the wind energy sector in India was at its nascent stage of development. The Government set up demonstration projects of 100 kW - 2 MW at different locations. However, the initiatives taken during this phase put the foundation for wind energy development in coming years. The Central Government started mapping of wind potential and till date, 553 wind monitoring stations have established in 25 states and 3 union territories. During this phase, the capacity addition growth was very slow. Till the end of FY 1993-94, the total wind installed capacity was around 115 MW.

Figure 1.2 : Wind Installed Capacity – India



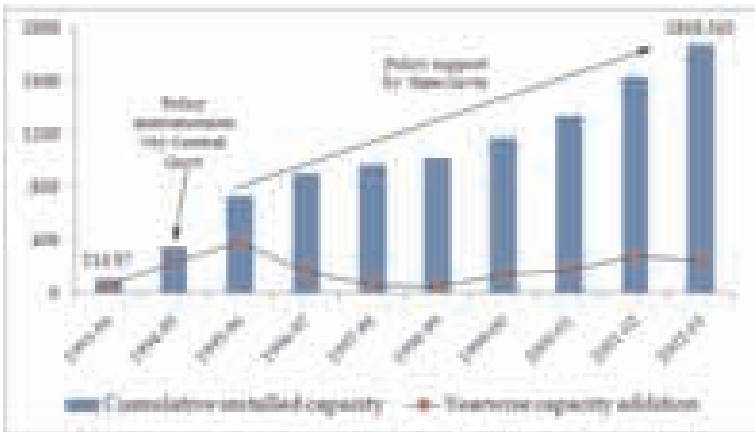
(Source: MNRE)

1. Cumulative achievement of total RE capacity upto 30.06.2010 as per MNRE statistics
2. Cumulative achievement of total wind power capacity upto 30.06.2010 as per MNRE statistics

2.1.2 Period between 1994-95 and 2003 (Prior to enactment of Electricity Act 2003)

During this period, the renewable energy sector in general and the wind power sector in particular, registered significant growth in terms of capacity addition. The installed capacity increased from 115 MW at the beginning of FY 1994-95 to 1868 MW at the end of FY 2002-03. The year-wise growth curve of wind energy has been shown in the following figure:

Figure 2.1: Wind capacity installation during 1994-95 to 2003 (MW)



(Source: Annual Reports, Ministry of New and Renewable Energy)

During this phase, significant wind capacity addition took place in the State of Tamil Nadu which had more than 50% share (990 MW) in the total installed capacity of 1868 MW, at the end of FY 2002-03. Most of the wind turbines installed during this phase was of 225-500 KW capacity. During this phase, the wind turbines manufacturing also started in India. Vestas, NEG, and Enercon set up their manufacturing facility in collaboration with local manufacturers. This era also saw the birth of largest domestic wind turbine manufacturing company, Suzlon Energy Limited.

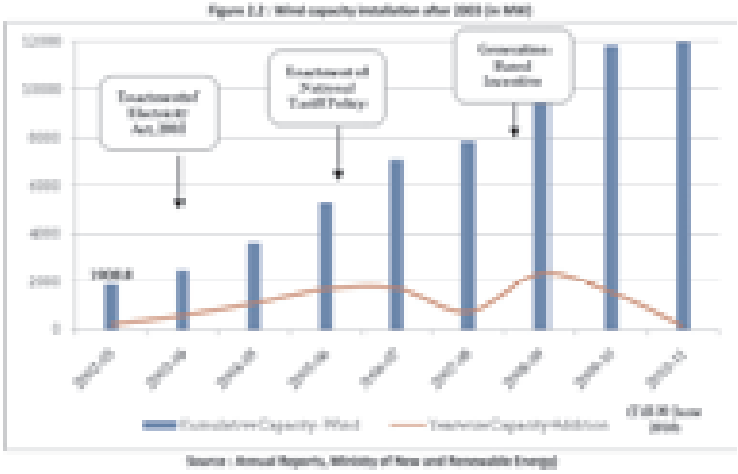
The growth during this phase was driven by the policy support provided by the Central and State Government. The Central Government provided various fiscal and financial policies in the form of capital subsidy, tax holiday, buy-back rate, concessional wheeling charges and banking charges, and accelerated depreciation etc. The State Governments also encouraged wind capacity addition programmes by providing various measures in the form of concessional land allotment, electricity duty exemption, schemes for exemption or deferment of sales tax for the industry etc. The wind resource development and R&D programmes by C-WET laid down the foundation for growth of wind sector in coming years.

2.1.3 Period after 2003 (Post enactment of Electricity Act 2003)

This phase can be termed as golden phase in the development history of wind sector. During the past 7 years, the installed WTG capacity has increased from 1868 MW at the beginning of FY 2003-04 to 12009 MW at the end of June, 2010, registering a compounded annual growth rate (CAGR) of about 30%. The year wise wind capacity addition is shown in the following figure:

During this short span of 7 years, the wind technology has emerged as a matured technology amongst various types of renewable energy technologies. It contributes over 10% of total generation capacity while its share amongst various renewable energy based installations constitutes over 70%. The legal clarity and certainty of regulatory principles together with conducive policy framework has ensured continued developer interests in wind sector, which has ultimately resulted into significant growth in harnessing wind energy across various States. Electricity Act 2003 has specific provisions for promotion of electricity generation from renewable energy sources and role of regulatory institutions in facilitating growth of RE capacity addition has been described in following paragraphs.

2.2 Policy framework for growth of Wind Sector



2.2.1 Central Government Policies for Wind Sector:

India's renewable energy development has been fuelled by effective national and State Government policy support for both foreign and local investment in renewable energy technologies (RETs). Wind development in India began in the 1990s with various

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benefits in terms of fiscal and financial incentives announced by the Central Government. Incentives offered by the Central Government for wind power are in the form of tax benefits - direct and indirect. Direct tax benefits include accelerated depreciation and income tax holidays, while indirect tax benefits include exemption from excise duty and reduced custom duties. In addition, the Indian government has set up the Indian Renewable Energy Development Agency (IREDA), to provide concessional loans for renewable energy projects; and the Centre for Wind Energy Technology (C-WET) which undertakes R&D, training, certification, and testing and resource assessment for the sector.

The fiscal and financial incentives schemes available to a wind energy generator under current tax regime includes,

- **Accelerated Depreciation :** Under section 32 of the Income Tax Act, investors can avail advantage of 'Accelerated Depreciation' of up to 80 per cent of the project cost, if the project is commissioned before September 30 of the same financial year; or 40 per cent if the project is commissioned before March 31 of the same financial year.
- **Income Tax Holiday :** Under section 80-IA, wind power project developers are exempted from income tax on all earnings generated from the project for period of 10 consecutive assessment years during the first 15 years of the project life. The book profit from such undertaking, however attract Minimum Alternate Tax @18 per cent (excluding surcharge and education cess) of book profit.

Apart from the direct tax incentives under Income Tax Act 1961, several other incentives available to a wind power project developer include,

- Concessional Custom Duty on specified items
- Exemption in Excise Duty on specified devices/systems
- Exemption in Central Sales Tax and General Sales Tax on sale of renewable energy components
- Generation Based Incentive @ 50 paisa/kWh (over and above feed-in-tariff specified by the State Electricity Regulatory Commission) to the developers who do not intend to avail accelerated depreciation benefit.

2.2.2 MNRE Incentive: Generation Based Incentive (GBI)

Ministry of New and Renewable Energy (MNRE) has announced on 17th December 2009 approval for Generation based Incentive Scheme for wind Power Project. As per the Scheme, a generation based incentive of Rs.0.50/kWh for a period of ten years to the eligible project promoters for Grid interactive Wind Power projects will be given. IREDA will disburse the Generation based incentives to the generator on half-yearly basis through e-payment. This incentive will be over and above the applicable tariff approved by respective State Electricity Regulatory Commissions.

Figure 2.3 : Salient Features of Generation based incentive scheme

Incentive

- Incentive of Rs. 0.50 /unit fed into the grid
- Available for a period of not less than 4 years and a maximum period of 10 years.
- Cap on incentive of Rs. 62 Lakhs per MW
- Cap on total disbursement in a year of Rs. 15.50 Lakhs/MW
- Scheme applicable to a maximum capacity limited to 4000 MW during 11th plan period
- Co-existent with Accelerated Depreciation till 2012, or till DTC

Eligibility

- Wind turbines commissioned after notification of GBI scheme by MNRE and on or before 31.03.2012.
- Wind generators who do not avail accelerated depreciation benefit.
- Grid connected wind generators set up for sale at tariff set by SERC/ Govt, also including captive wind power projects
- Excluding Merchant Power Plants and Plants for third party sale

Financial Outlay

- Financial Outlay of Rs. 380 Crore estimated during 11th plan

According to the latest statistics by IREDA, updated as on October 2010, a total number of 30 wind projects with capacity of 260.9 MW have been registered under the current GBI scheme. The State-wise details of the same are shown in the table below. Out of the wind energy predominant States, the highest number of wind projects registered under the scheme is from Tamil Nadu with a capacity of 102.3 MW.

Table 2.1: State-wise data of wind Projects registered under GBI scheme

State	GBI	
	No of Projects	Capacity (MW)
Tamil Nadu	18	102.3
Rajasthan	7	17.8
Karnataka	1	82.4
Gujarat	3	53.6
Andhra Pradesh	1	4.8
Maharashtra	0	0.0
Total	30	260.9

Source : IREDA

However, it would also be worthwhile to note that during the same period, i.e., from notification of the new GBI scheme till October 2010, a total of 170 projects with installed capacity 276 MW was registered with IREDA for availing the benefit under accelerated depreciation route. This continued interest shown towards accelerated depreciation scheme and a comparatively weak response to the GBI scheme signals the need for a review of the GBI scheme so that necessary modifications if required could be made for achieving the desired objective of the scheme.

2.3 Legal and Regulatory framework

2.3.1 Electricity Act 2003

The enactment of Electricity Act 2003 has ushered in radical changes in legal and regulatory framework for the renewable energy sector. The Act provides for policy formulation by the Government of India and mandates State Electricity Regulatory Commissions to take steps to promote renewable and non-conventional sources of energy within their area of jurisdiction. In fact, Section 3 of EA 2003 clearly mandates that formulation of National Electricity Policy, National Tariff Policy and Plan thereof for development of power systems shall be based on optimal utilization of all resources including renewable sources of energy.

Figure 2.4: Renewable Energy related provisions under Electricity Act 2003

Section 3 : Policy Formulation

3.(1) The Central Government shall, from time to time, prepare the national electricity policy and tariff policy, in consultation with the State Governments and the Authority for development of the power system based on optimal utilisation of resources such as coal, natural gas, nuclear substances or materials, hydro and renewable sources of energy.

Section 61 : Tariff Principles

The Appropriate Commission shall, subject to the provisions of this Act, specify the terms and conditions for the determination of tariff, and in doing so, shall be guided by the following, namely:-

"...

(h) The promotion of co-generation and generation of electricity from renewable sources of energy;"

Section 86 : Promotional measures for Renewable energy

(1) The State Commission shall discharge the following functions, namely: -

"(e) promote co-generation and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee;"

National Tariff Policy and National Electricity Policy framed subsequent to the Act also stipulates several conditions in respect of promotion and harnessing of renewable energy sources and mechanism for promoting use of renewable energy, time for implementation etc.

2.3.2 Feed in Tariff / Preferential tariff

State Electricity Regulatory Commissions (SERCs) under the guidance of the Electricity Act 2003 and subsequent National Tariff Policy (NTP) and National Energy Policy (NEP) have issued long term Feed-in Tariffs (FIT) orders to ensure financial obligations of RE developers. FIT mechanism is the world's most successful policy mechanism for stimulating the rapid development of renewable energy. The electricity utilities are obligated to buy renewable electricity at the rates by the government or regulator. The feed-in tariff mechanism was first introduced by USA in 1978. Government of India introduced the feed-in tariff mechanism in 1995 when Ministry of New and Renewable Energy (Then, Ministry of Non-conventional Energy Sources) specified the uniform feed-in tariff of Rs 2.25 per unit with an escalation of 5% per annum for all types of RE sources.

National Tariff Policy enacted under Section 3 of Electricity Act, 2003, provided for preferential tariff determination by the State Electricity Regulatory Commissions for different types renewable energy sources, after taking into account the potential of RE sources, impact on retail tariff etc. In the due course of time, the State Electricity Regulatory Commissions have determined the generic tariff for wind energy sources on normative basis. Out of 25 SERCs and Joint Commission around 18 SERCs have issues generic Tariff wind energy technology.

A compilation of Wind Power capacity addition across State prior to issuance of Preferential Wind Tariff Order and Post issuance of Wind Tariff Order is presented in the following Table.

Table 2.2 : Wind Power capacity addition post issuance of tariff orders in respective States

State	Month/Year of Tariff Order	Installed capacity prior to issuance of Tariff Order	Installed capacity in FY 2010 -11*	Capacity added post Tariff order
		MW	MW	MW
Tamil Nadu	May, 2006	2914.85 (Y 2005)	5072.72	2157.87
Maharashtra	November, 2003	402.30 (Y 2002)	2107.85	1705.55
Gujarat	August, 2006	352.60 (Y 2005)	1834.11	1481.51
Karnataka	January, 2005	209.80 (Y 2004)	1516.95	1307.15
Rajasthan	September, 2006	358.07 (Y 2005)	1095.87	737.80
Madhya Pradesh	June, 2004	23.20 (Y 2003)	231.19	207.99
Other States	June, 2003$	105.70 (Y 2002)	170.55	64.85
Total		4366.52	12029.24	7662.72

*-as on June 30, 2010

$-Period of enactment of EA-2003 considered for other States

It is evident from above table that, preferential regulated tariff regime has clearly had favourable impact on the Wind Energy capacity addition in the country during past five to six year, since enactment of Electricity Act 2003 and notification of Tariff Policy during 2006. Overall 7662 MW of Wind Energy Capacity addition has taken place post issuance of Feed-in Tariff Orders by various SERCs across country.

Central Electricity Regulatory Commission has notified CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulation 2009 which stipulates principles for determination of preferential tariff for renewable energy technology. Specifying the capital cost norms with indexation mechanism and fixing levellised tariff upfront for the entire duration of tariff period of 13 years are main features of the methodology adopted in the regulations by CERC. Further, CERC has classified wind power projects into four categories of wind zones and corresponding CUF based on annual mean power density measured at 50 meter hub height.

2.3.3 Renewable Purchase Obligation (RPO) mechanism

While Section 61 (h) is important from the perspective of the determination of preferential tariffs, probably the most important Section in the Act from renewable perspective is Section 86 (1) (e). With careful reading, this sub-section could be easily divided into three parts:

- Suitable measures for Connectivity to the grid
- Sale of electricity to any person
- Specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee;

As of date, most SERCs have put significant emphasis on the last part of this important sub-Section i.e. specify percentage of electricity to be procured by the distribution licensees from the renewable sources of energy while virtually ignoring the first two parts. Key aspects to be addressed as part of RPO regulations include:

- Premise for specification of Percentage Specification
- Eligible Entities for applicability of Percentage
- Applicable control period
- Enforcement mechanism

Various States have issued RPO Orders or Regulations specifying percentage for mandatory renewable energy procurement obligation. A summary of RPO regulatory framework across States is presented below,

Table 2-3 : Summary of RPO specified by SERCs

S. No.	States	RE Source/ Eligible Entity	Minimum percentage for RE procurement across States						
			Reference	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
1	Andhra Pradesh	All	O.P. No. 16 of 2008	5%	5%	5%	5%	5%	5%
2	Chhattisgarh	Biomass	25/CSERC/2008 dtd. July 14, 2008	5%	5%	5%			
		Small Hydro		3%	3%	3%			
		Others		2%	2%	2%			
3	Delhi	NDPL		1%	1%	1%			
		BYPL		1%	1%	1%			
		BRPL		1%	1%	1%			
		NDMC		1%	1%	1%			
4	Gujarat	All	No. 5 of 2005 & No. 3 of 2010	2%		5%	6%	7%	
5	Haryana	All		5%1	2%2	1%3			
6	Karnataka	BESCOM, MESCOM & CESC	No. S/03/1 dtd. January 23, 2008	10%	10%	10%			
		GESCOM, HESCOM & Hukeri Society		7%	7%	7%			

S. No.	States	RE Source/ Eligible Entity	Minimum percentage for RE procurement across States						
			Reference	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
7	Kerala	SHP	No. 1/1/KSERC-2006/ XV	2%					
		Wind		2%					
		Others		1%					
8	Madhya Pradesh	Non-Solar	MPERC - 2261 dtd. October 22, 2008 MPERC – 3042 dt. Nov 9, 2010	10%	10%	0.8%	2.1%	3.4%	4.7%
		Solar				-	0.4%	0.6%	0.8%
		Total		10%	10%	0.8%	2.5%	4%	5.5%
9	Maharashtra	All	MERC/ Legal/2010/483	5%	6%	6%	7%	8%	9%
10	Punjab	All	Order dtd. 13.12.2007	1%	2%	3%	4%		
11	Rajasthan	Wind	Notification dtd. 23032007	5.00%	6.00%	6.75%	7.50%		
		Biomass		1.25%	1.45%	1.75%	2.00%		
		Total		6.25%	7.45%	8.50%	9.50%		
12	Tamil Nadu	All	Order dtd 20.03.2009	10%	13%	14%			
13	Uttar Pradesh	All	CNCE Regulations dtd. 22.03.2010	7.50%	8.0%	8.0%	8.0%	8.0%	8.0%
14	Uttarakhand	All	Notification dtd. 06.07.2010	5%	8%	4%	4.75%	5.50%	
15	West Bengal	WBSEB	Notification dtd. 25.03.2008	4.80%	6.80%	8.30%	10.00%		
		CESC		4.00%	6.00%	8.00%	10.00%		
		DPL		2.50%	4.00%	7.00%	10.00%		
		DPSC		2.00%	4.00%	7.00%	10.00%		
16	Orissa	Non Solar	Notification dtd. 20.08.2008 and Case no. 59/2010 dt. Sep 30, 2010	3.50%	4.00%	1%	1.2%	1.4%	1.6%
		Cogen				3.5%	3.7%	3.95%	4.2%
		Solar				-	0.1%	0.15%	0.2%
		Total				4.5%	5.0%	5.5%	6.0%
17	Himachal Pradesh	All	Notification dtd.18062007 & 26.05.2010	20%	20%	10.1%	11.1%	12.1%	

3 Order dtd. May 15, 2007
4 Order dtd. November 6, 2009
5 Order dtd. April 16, 2010

Source: SERCs RPO Regulations

Renewable Energy Certificate (REC) Mechanism

Ministry of New and Renewable Energy, Forum of Regulators and the Central Electricity Regulatory Commission, keeping into consideration the recommendations of NAPCC, have evolved framework for implementation of REC Mechanism in India. CERC has notified Regulation on REC in fulfilment of its mandate to promote renewable sources of energy and development of market in electricity. REC is a market based instrument to promote renewable energy and facilitate RPO/RPS portfolio by inter-state exchange of REC. The framework of REC is expected to give further push to RE capacity addition. The REC mechanism seeks to address the mismatch between availability of RE sources and the requirement of the obligated enmities to meet their RPO through a national level market.

National Load Despatch Centre (NLDC) has been notified as a Central Agency for registration of RE generators participating in the scheme. Under the REC mechanism RE generator has to sale electricity component to host distribution utility at weighted average power purchase and remaining component as environmental attribute as REC component through power exchange. The Central Agency would issue the REC to RE generators which will be equivalent MWh of electricity injected into the grid by the RE generators. Central Agency has issued detailed procedure for registration and also guidelines for Sate Agency for Accreditation of RE project. REC would be exchanged only in power exchanged approved by the CERC within the band of floor price and forbearance price to be specified by the CERC. At present, the floor and forbearance price for FY 2010-11 has been determined as under:

Item Description	Non solar REC (Rs/MWh)	Solar REC (Rs/MWh)
Forbearance Price	3,900	17,000
Floor Price	1,500	12,000

In order to ensure the compliance of the requirement under REC mechanism by the participants, CERC has also suggested the appointment of compliance auditors at national level. Power exchange has also finalised rules and bylaws required to exchange REC. Along with adopting the CERC regulations, the State Regulatory Commissions are expected to notify their Regulations for enabling fulfilment of RPO obligations by purchasing of RECs. As on December 2010, around 12 State Electricity Regulatory Commissions (SERCs) have amended their Renewable Purchase Obligation Regulations, recognising Renewable Energy Certificates as valid instruments to fulfil the RPO by the Obligated Entities and 15 SERCs have notified State Agency for accreditation of the RE projects.

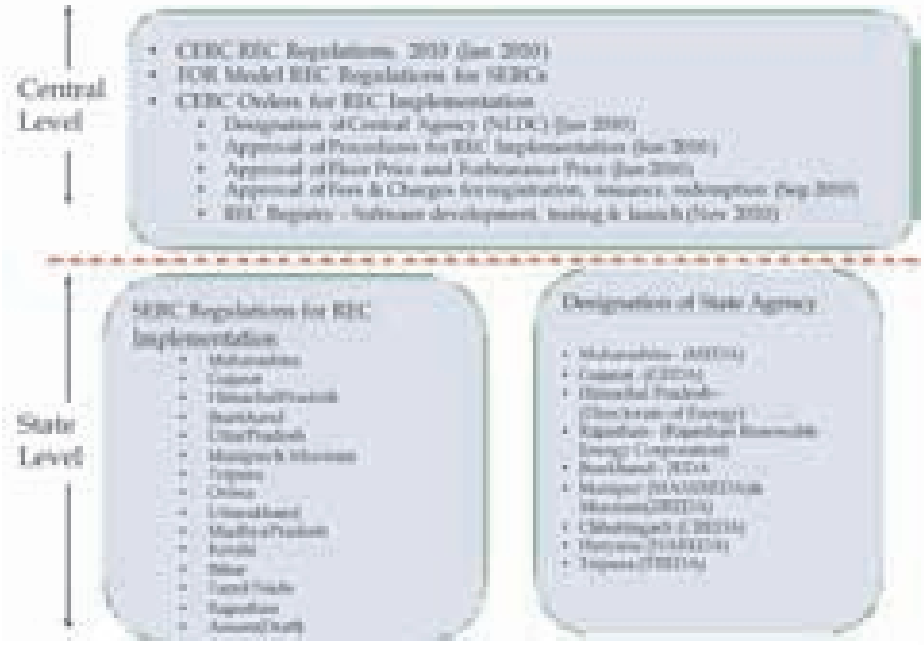
Hon'ble Union Minister of Power, Shri. Sushil Kumar Shinde, on November 18, 2010, had launched the Renewable Energy Certificate Mechanism allowing the entities engaged in renewable energy generation to participate in mechanism. In the coming months developers response to REC mechanism would unfold forward market in renewable energy specially wind energy. Commencement of REC mechanism will open up new issues in financing project participating under REC mechanism in near future. These issues will be discussed during the summit.

Key Issues of concern in implementation of REC mechanism

Tradable RECs have been used extensively as a successful market based policy instrument to promote renewable power in many countries, such as Australia, Japan, US, Netherlands, Denmark and UK. However, these schemes vary in detail and hence existing REC mechanism need to be evolved based on the success of such electronic certificates experience in other counties.

It is interesting to see how the financial institutions respond to REC mechanism as different market model may evolve with implementation of REC. Variation under Price discovery mechanism is the major concern in REC mechanism. Long term certainty in price discovery mechanism with support of floor price would boost confidence in stakeholders to participate in such a new mechanism. In coming future price discovery of RECs in the power exchange may define the certainty of the REC market.

Figure 2.4 : Status of Implementation of REC Mechanism as on December 2010



Source : SERC and NLDC

The commencement of REC mechanism would help State to set aggressive target. Under REC mechanism price of REC component is dynamic and would be decided in the Power exchange within a pre–specified range of floor and forbearance price. As against this the fix component, the electricity component, is an average power purchase cost (APPC) of the host utility. There are certain attempts to call bidding for the electricity component by assuming APPC as a ceiling price. Such move would increase the risk level for RE developer and may affect the financial viability of the project.

2.4 Key Considerations in Regulatory Issues

Many SERCs have adopted normative tariff approach for determination of a generic tariff for project commissioned during the pre–specified control period without considering the location, technology, and size of the wind turbine generators. These norms vary significantly across States. Capacity Utilisation factor (CUF) for wind technology varies from site to site. As against these, some SERCs have specified a common CUF for all wind projects within the states without considering the site specific issues.

In many States, preferential tariffs once determined has remained un-changed over Control Period of over two to three years, despite significant changes in the market conditions and change in underlying parameters. This many act as barrier in investment in the wind due to continuously changing market conditions.

CERC has issued RE tariff Regulations 2009 to specify norms for Renewable energy Projects in which CERC has tried to address the above mentioned issues by specifying zone wise tariff and linking capital cost with indexation formula. It is important to adopt these norms by SERCs to bring uniformity and greater confidence in all stakeholders.

RPO percentage has been specified for different control periods. Further, different approaches have been adopted while specifying RE procurement obligation in terms of RE source specific targets or licensee specific target percentage etc.

Continued on Page....32

Renewable energy consultants

GL Garrad Hassan

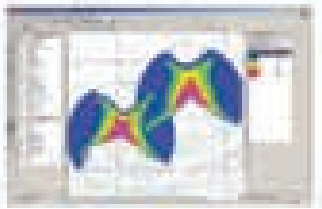
25 YEARS THINKING INSIDE THE BOX

WindFarmer

Wind farm design software

Optimal layout design requires experience and understanding. WindFarmer is the result of a 25 year thought process, related to the practical delivery of the wind farm development services offered by GL Garrad Hassan. Users benefit from validated models, unrivalled transparency of information and local support so that you too can have the understanding to make design decisions.

windfarmer@gl-garradhassan.com



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RPO Regulations are forward looking and require advance actions by licensees to fulfil their mandatory obligations stipulated under RPS Regulations. Only few of State Utilities have fulfilled the RPO criteria. In the past, due to absence of adequate enforcement mechanism many utilities have not complied with RPO targets stipulated under the Regulations. However, it is envisaged that the new amendment regulations initiated by SERCs to include RPO and REC mechanism, which has stipulated for appropriate enforcement mechanism for non-compliance or shortfall in compliance, will address this limitation of earlier RPO Regulations/Orders in many States.

After announcement of NAPCC and operationalisation of REC mechanism SERCs can specify aggressive targets which not only depends upon the RE potentials within the State but can take into consideration procurement of RE sources available in other States by way of REC mechanism. Such an aggressive step is essential not only to fulfil objective of NAPCC but also to view renewable energy resource from national perspective.

Issues for Discussion

— What are the Issues & Limitations with the current policy framework? What changes need to be brought to the current policy framework?

— Which are the areas of inconsistencies between State level regulatory regime and central regulatory/policy regime?

— How has such inconsistencies or shortcomings affected growth of IPPs of the wind energy sector?

— What are the key learnings from the regulatory framework in States like Tamil Nadu, Gujarat, Rajasthan, Maharashtra, Karnataka and Andhra Pradesh?

— What are the new policies required for giving the additional boost to ensure accelerated growth of wind sector?

— What are key enablers to make REC mechanism work as Market Model? – enforcement mechanism, long term RPO trajectory, long term visibility of floor price & forbearance price, average pooled purchase cost?

------- To be continued in the next issue

- Paper prepared and presented at the 2nd International Wind Conference at New Delhi on 15th March 2011 by ABPS Infrastructure Advisory Private Limited, Mumbai

Sugesstions invited from IWPA for 12th Five Year Plan – Copy of Our Letter

Dated 7.3.2011

To,

Sri Arun Maira
Member, Planning Commission
Yojana Bhavan, Parliament Street
New Delhi 110001

Dear Sir,

Approach Paper to 12th Plan Suggestions on 12 National Challenges
Wind Power Generation – The Eco-Friendly Way of Generating Electricity

We thank you for your e-mail dated 11th February 2011 on the above subject. We give below our inputs in the area of wind energy. The wind energy is covered in the following 4 out of the 12 Challenges before the country.

1. Enhancing capacity for growth
2. Enhancing skill and faster generation of employment
3. Managing the environment
4. Securing the energy future for India

Wind Energy is a clean, green and sustainable and affordable energy. It needs to be encouraged in the context of escalating prices of petroleum and coal draining India of precious exchange. This means that Wind Energy installations have to go up to 20% (50000 MW) of total power by the year 2020, from the 5 % (13000 MW of now). That is to say that we have to install a capacity of 37000 MW in next 9 years. In other words we have to escalate to adding a capacity of 5000 MW to reach this target from the present additions of 2000 MW per year. Wind Energy installations come up in rural areas mostly at tail end increasing stability and voltage of grid. Rural Employment for youth increased by 5 persons per MW and provides electricity and roads for rural areas enhancing skill and faster development.

To go 250 % of the present capacity additions more private investments have to be attracted and the following are suggestions by Indian Wind Power Association consequent to our International Conference "Wind Energy 20 by 2020" in February 2011 at New Delhi.

1. Accelerated Depreciation should stay as well 80 IA benefits. Up to and beyond 2020. 80 IA – 10 years tax holiday in a block of 15 years for the profits derived from the wind energy to continue. Under DTC - the Central Government agreed to retain Accelerated Depreciation. But 80 IA will go. Government as a policy matter should not withdraw the Accelerated Depreciation and 80 IA and both should continue up to 2020 and beyond.
2. Policy Incentive like Generation Based Incentive (GBI), which is 50 paise/per unit with a ceiling of Rs. 62 .00 lacs/MW may be increased to Rs. 1.00 without any ceiling.
3. REC is also another form of incentive for Independent Power Producers (IPPs). The RECs are very much restrictive and are not available for self consumption. RECs should be available for self consumption also. The 3 year restriction to break away from Power Purchase Agreement (PPA) to go/or reduced to 6 months.
4. Immediate allotment from Clean Energy Fund money to Powergrid Corporation of India and needy State Electricity Boards for sub stations and laying out the Wind Energy Evacuation transmission lines from generating centers to Load Centers. For example for 1000 MW now under installation in Tamilnadu 400 KVA substation and transmission lines not laid. Though there is power cut in Tamilnadu, when wind blow from May 2011, all wind energy can not be evacuated to needy consumers.
5. TUF Scheme (Technology Up-gradation Fund as for Textiles), provided subvention of 5 % on interest for upgrading the textile mills. Similarly interest subvention of 2 to 4 % to Banks from Clean Energy Fund should be provided for investors in Renewable Energy/Bank financing new wind mills.
6. Priority Sector Status should be given to Renewable Energy financing like for agriculture and SME.
7. MAT should be avoided for RE investments.

Removal of Hurdles :

The Ministry of New and Renewable Energy, Planning Commission, and Ministry of Environment and Forests and Ministry of Finance should understand that the Wind mill installation for the world is not only non-polluting and sustainable; it is also eco and nature friendly.

It works with the nature and does not affect the wildlife. While drawing the energy from wind it works like honey bee taking the nectar from the flowers without harming the flowers and helping in cross pollination. When energy loaded winds strike the blades of the wind mill, wind slide on the blade transferring energy to the blade and leave as gentle breeze. Wind energy is a green energy and in no way harm the atmosphere, forest areas or wild life, does not pollute air and water nor emits any gas.

Ministry of Environment and Forests should understand that the generation of wind energy in forest areas should be treated as eco-friendly activity and no special permission should be required to be obtained in the forest area for putting up the wind mills. No fees should be levied on developers, who try to have wind generation facilities and all the barriers should be done away with.

In allocation of land for putting up the wind mills and transmission lines, the high court of Bombay and such other judicial bodies should also come to understand the eco-friendly nature of Wind Energy and remove the present hurdles put forth by the Forest Department and revenue Department for wind power generation.

All the above measures should help in capital flow for the faster increase in the Renewable Energy in India.

Yours faithfully,
For Indian Wind Power Association

Sd./-

K. Kasthoorirangaian
Chairman

SIEMENS

Fault analysis and Condition Monitoring

Bo Bohannose/ February 2011

BEGINNING OF THE WIND BUSINESS

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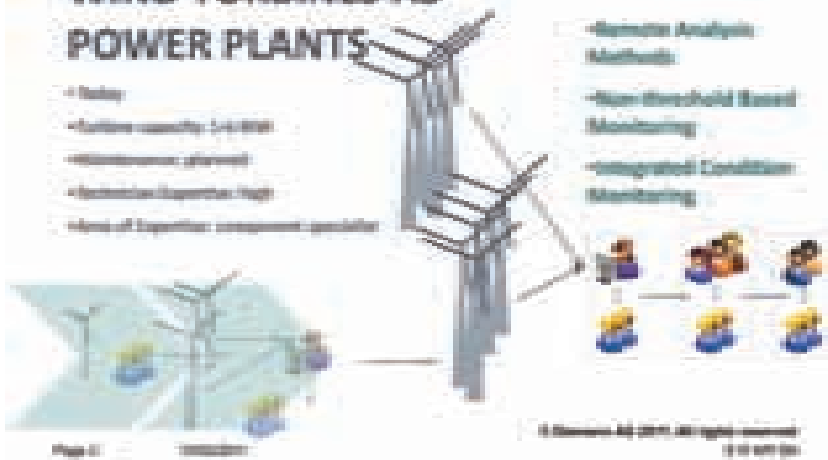
WIND TURBINES AS POWER PLANTS



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WIND TURBINE DEVELOPMENT

→ Fault Analysis and Condition Monitoring for Wind Turbines was introduced

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Remote analysis Methods

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Remote analysis Methods

- Analysis of faults that has occurred

"Give me six hours to chop down a tree and I will spend the first four sharpening the axe."

- Analysis of conditions that has not yet led to a fault
  - Two different approaches
    1. Product or area knowledge
    2. Statistical or mathematical approach
  - Mainly based on statistical data

Prevention

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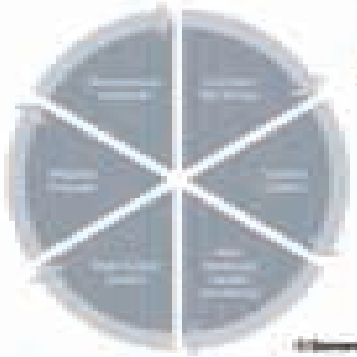
Condition Monitoring

Today approach = High level of integration with the rest of the control systems



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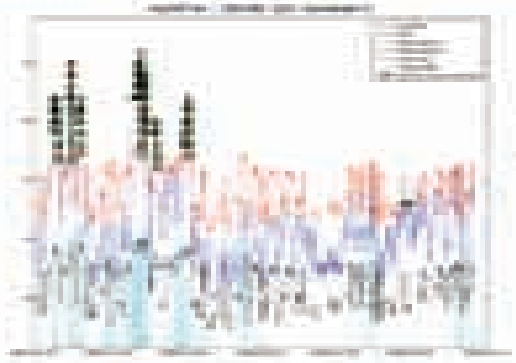
Remote analysis Methods –



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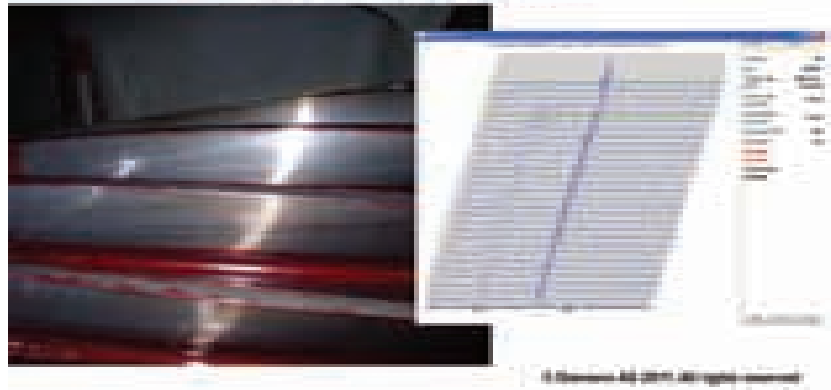
Condition Monitoring

Example of tooth damage on HS shaft



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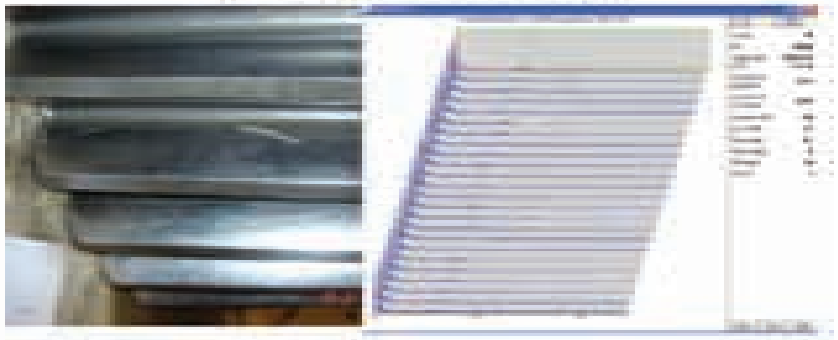
Condition Monitoring

Example of tooth damage on planet wheel



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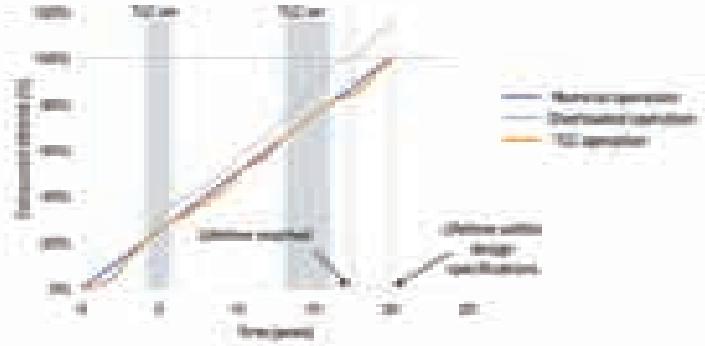
TLC® - Turbine Load Control



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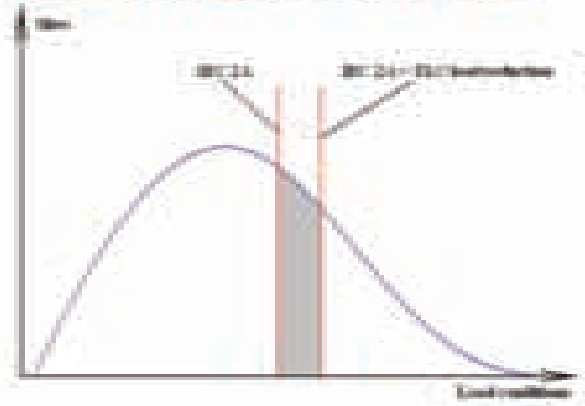

SIEMENS

Grid and power quality

Grid operators start to require wind farms to behave like conventional power plants with respect to:

- PF capability (Power Factor)
- LVRT capability (Low Voltage Ride Through)
- Frequency control

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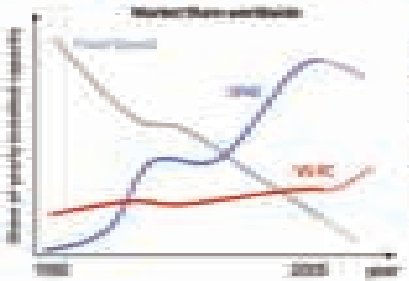
Grid and power quality



Market analysis

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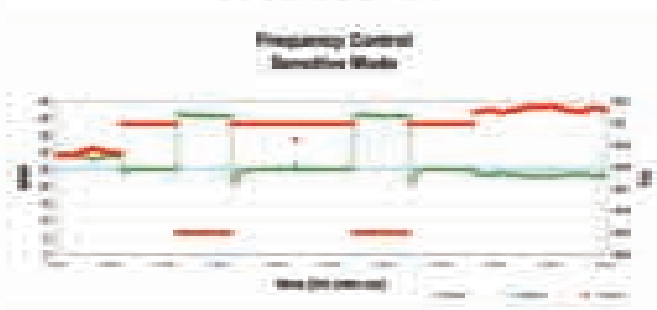
Grid and power quality

Frequency Control Test



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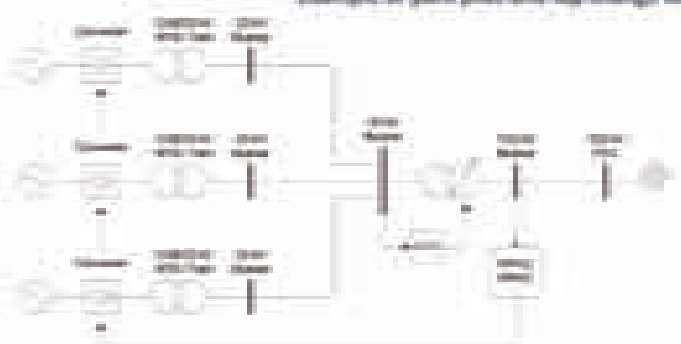
Grid and power quality

Example of park pilot and tap change control



SIEMENS

Requirements for today's large scale wind power plant operation

- Remote analysis capabilities
- Preventive monitoring methods
  - Condition Monitoring (TCM)
  - Main component lifetime monitoring (TLC*)
  - Run threshold based monitoring
- Grid Control

High Court Order On TNEB Quota

(1) Respondents are directed to issue suitable amended memo/circular to the field formation to amend the Memo dated 17.9.2010 to read as follows:-

Para I (ii) contained in Memo dated 17.9.2010 shall be deleted. In that place the following shall be inserted (i.e.) para 2(i) of the Memo dated 11.2.2011:-

"(i) The base energy will be the average of any three consecutive months during the base period, as per the choice of the consumer and to the advantage to the HT consumers."

Further Para I(v)(ii) of Memo dated 17.9.2010 shall be deleted and in that place the following shall be inserted (i.e.) para 2(ii) of the Memo dated 11.2.2011:-

"(ii) The base demand will be the demand recorded in any month during the base period, as opted by the consumer, limited to the sanctioned demand."

The revised memo/circular should be issued forthwith on receipt of a copy of this order.

(2) The Electricity Board shall also keep in mind the direction issued by the first respondent in Suo-moto Proceedings No.1 of 2009, more particularly para 16(13) and (16), which reads as follows:-

"16. After taking into account the submissions made by both the parties, the Commission directs as follows:-

(1) to (12) xxx

(13) From 1.11.2008, all captive users, whether thermal or wind, shall declare on the first day of every month, the energy proposed for captive use for the following month, which shall be considered as B and F for the purpose of energy quota and demand quota respectively in terms of the memo of TNEB dated 17.11.2008; the energy so declared shall roughly be the monthly average generation;"

(14) and (15) xxx

(16) "If a consumer opts out of wheeling agreement and becomes an ordinary consumer, A and E referred in the memo dated 17.11.2008 shall be deemed to be the base energy and base demand."

and it will be implemented as may be applicable to the individual HT consumers as amended in para 4.4 of the order dated 7.9.2010 issued by Tamil Nadu Electricity Regulatory Commission.

In view of the above, the respondent authorities are not entitled to demand the penalty insofar as the base energy and base demand is concerned on the basis of the memo/circular dated 17.9.2010 as the same is modified and clarified by the subsequent memo dated 11.2.2011.

(5) In view of the direction issued by this Court with regard to clarification to be issued, all demands raised with regard to base demand and base energy which is challenged in the individual writ petitions on and after 17.9.2010 are set aside. The penalty for exceeding base energy and base demand which is demanded in the bills are set aside and the respondents are directed to work out the claim, if any, in accordance with the revised circular to be issued.

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We thank our customers, state and central government agencies, Electricity Board officials, suppliers, local communities and other stakeholders who have made achieving this remarkable target possible. We now plan to expand our operations and unveil a slew of new products designed by our experienced R&D team - expanding our extensive portfolio of wind turbines.

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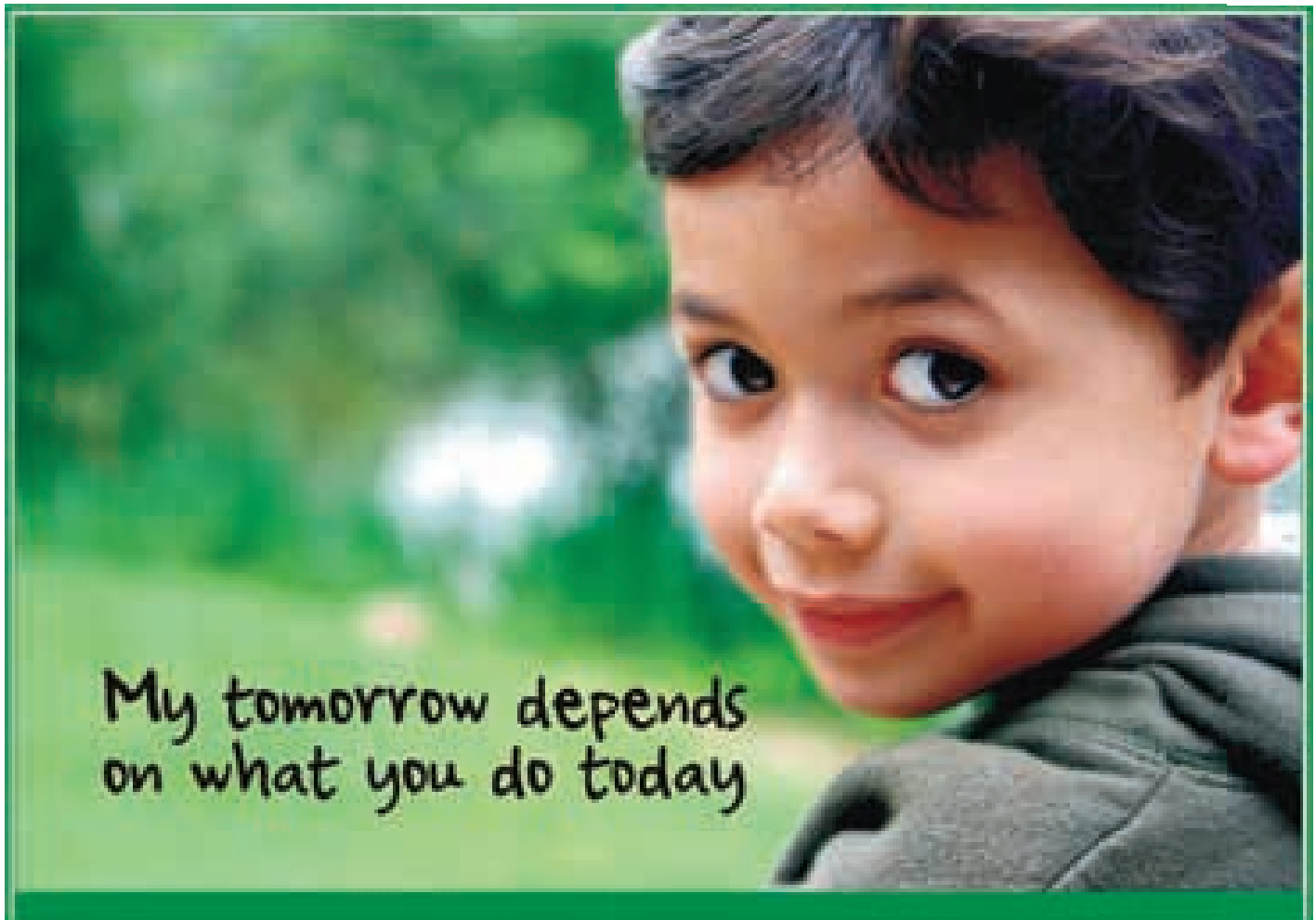

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