

# WIND POWER

## **WIND ENERGY:**

Wind Energy is basically the energy created due to heating of the Earth's surface and rotation of Earth. Uneven heating of different parts of the Earth causes difference in the air pressure, which causes air to flow from high pressure region to low pressure region. This phenomenon is termed as 'wind'. Wind contains tremendous amount of energy and is utilized to generate power on a large scale.

## **HISTORY OF WIND POWER:**

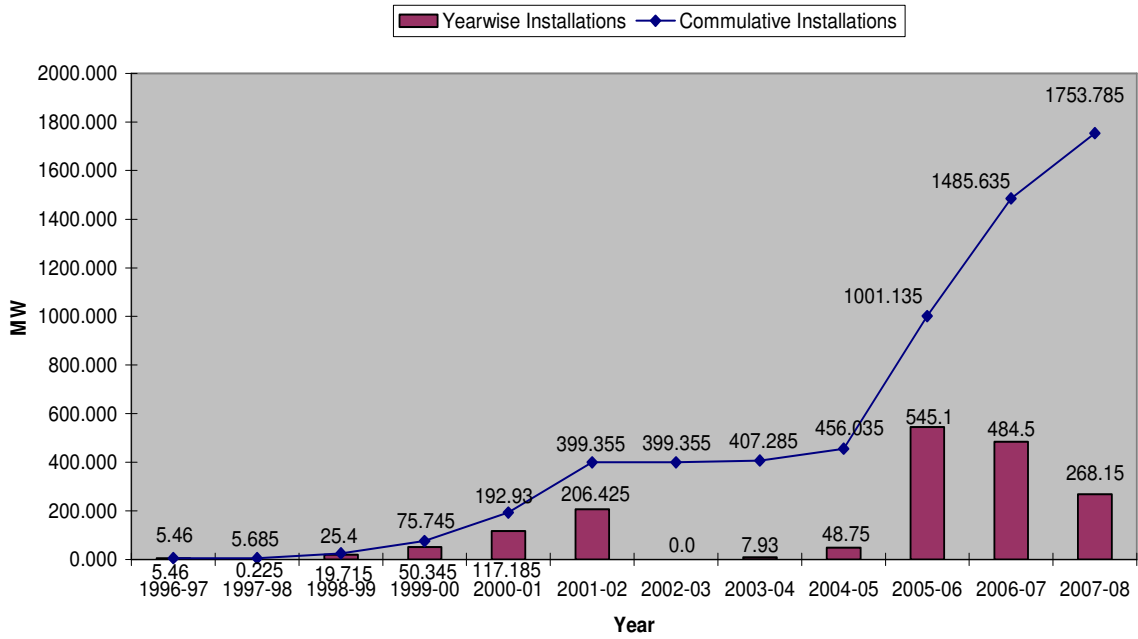
The evaluation of the concept of harnessing wind energy dates back to 4000 B.C., when ancient Egyptians used sails to power their boats in the Nile River. Windmills along with water mills were among the original prime movers that replaced muscle power as a source of energy. These windmills were in use for more than a dozen centuries for grinding grains and pumping water. Nearly 30,000 house windmills capable of producing 100MW and 3000 industrial windmills generating another 100MW were operating in Denmark at the turn of 20<sup>th</sup> century. The application of wind energy for producing electrical energy was introduced later in the 20<sup>th</sup> century. By 1910 several hundred wind turbine generators rated between 5 KW and 25 KW were in operation in Denmark. By 1930s several wind power generators were installed in various parts of the world. But due to the higher cost of installation, the increase in number of systems was very less. By the early 1960s, interest in wind power as a viable and alternative source of power generation somewhat declined because other energy sources were simple and easily available. Wind energy was not found to be cost-effective in comparison with the fossil fuel systems of that age. After the oil crisis in 1970s, wind turbines have been developed on commercial scale and have received more importance after 1980, the second oil crisis. Presently it is one of the major sources for supplementing energy needs of many countries including India.

## **PROGRESS OF WIND POWER IN INDIA:**

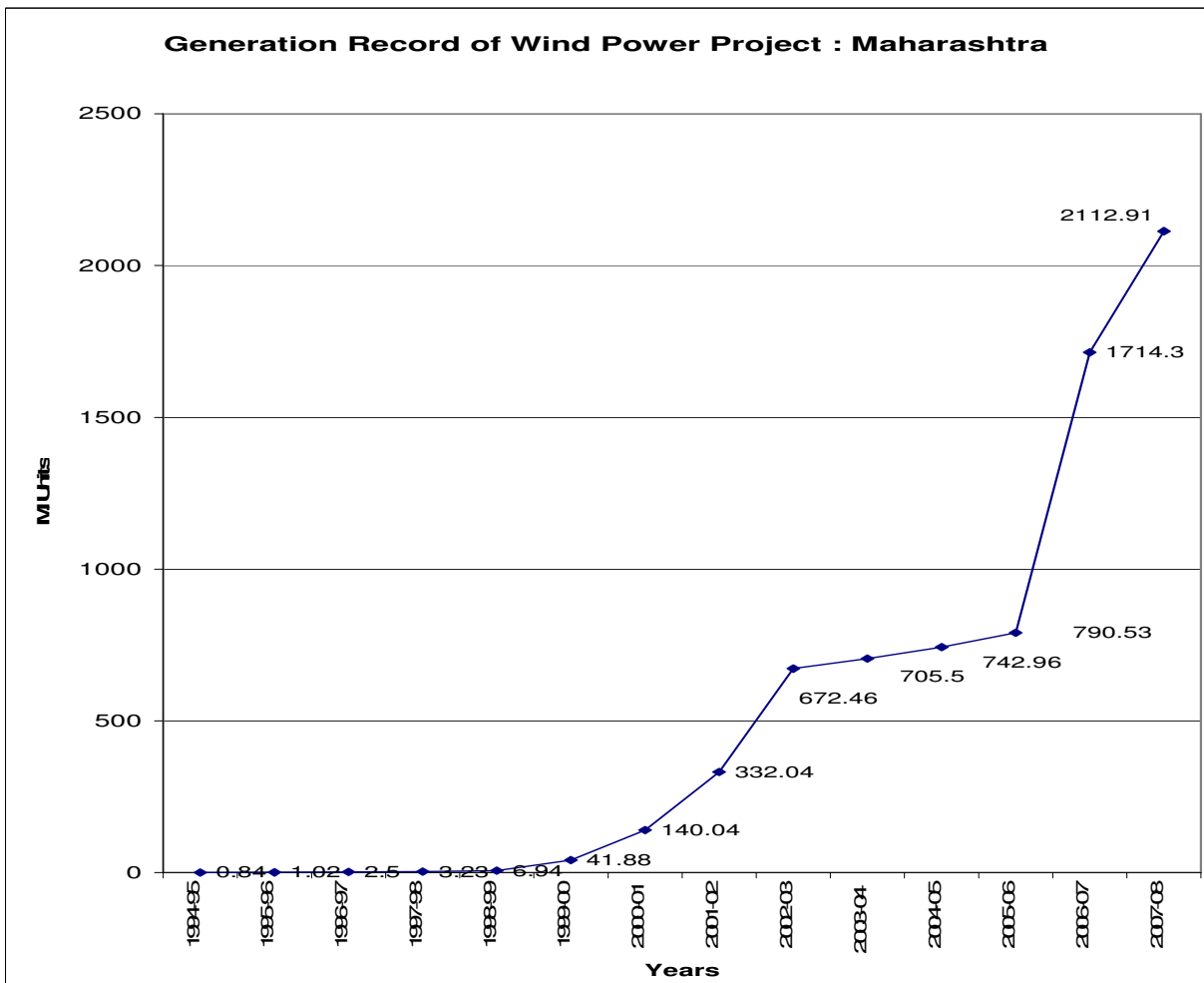
India is now recognized as a leading country in the world for the development and utilization of renewable energy, particularly in wind power development. In fact, power generation from wind has emerged as one of the most successful programs in the renewable energy sector, and has started making meaningful contribution to the overall power requirement in some of the States. With an installed capacity of 2483 MW, India is the 5<sup>th</sup> largest wind-power producing nation in the world. Most of this capacity has come through commercial projects from private investment. Supporting this effort is the world's largest wind resource assessment program. Over eleven billion units of electricity have been fed to various State grids from these projects. New initiatives have been taken in re-assessment and expansion of the wind resource data base; establishment of a centre for Wind Energy Technology; and motivating large private sector corporations, public sector units and power utilities to set up wind power projects. Local manufacturing capacity has been established and wind turbines and wind turbine components are being exported to USA, Europe and several developing countries. Based on the experience gained so far, it is planned to add another 1500MW of wind power capacity during the 10<sup>th</sup> Five Year Plan.

## **WIND POWER PROJECTS IN MAHARASHTRA:**

Wind Energy has paramount importance in the field of Non-Conventional Energy Sources. Naturally, the Ministry of Non-Conventional Energy Sources, New Delhi, has undertaken the Wind Energy program all over the country very intensively via nodal agencies in their respective states. In Maharashtra, this program is implemented through MEDA. 28 Potential sites for wind power projects have been identified in the state of Maharashtra with the help of C-WET Chennai. MEDA has been responsible for an enabling conducive policy framework that has evoked positive response from entrepreneurs and investors to set up commercial wind power projects. Satara District in the State of Maharashtra installed the largest wind power projects in Asia. (298 MW capacity.) With the declaration of attractive and conducive policies on Wind Power Projects, many private sector investors have been inspired to set up their projects in Maharashtra. The year wise projects set up and commissioned by the private sector up to August 2006 are as follows:



Wind power projects had fed **7250 Million** units of electricity in the state grid till March 2008. There year wise generation from wind power project is as follows:



## **FISCAL INCENTIVES FOR WIND POWER PROJECTS FROM CENTRAL GOVERNMENT**

### **1. Direct Taxes**

1. **80% Accelerated Depreciation** on specified Non-Conventional Renewable Energy devices/systems (including wind power equipment) in the first year of installation of the projects.
2. **Ten year income tax holidays** for Wind Power Projects.

### **2. Indirect Taxes**

#### **I. Custom Duty** (Notification No. 21/2002-custom dated 01-03-2002)

<b>S. No.</b>	<b>Description of goods</b>	<b>Rate</b>
1.	Wind operated electricity generators up to 30 KW and Wind operated battery chargers up to 30 KW	5%
2.	Parts of wind operated electricity generators, for the manufacturer or the maintenance of wind operated electricity generators namely Special Bearing, Gear Box, Yaw Components, Wind Turbine Controllers and parts of these.	5%
3.	Blades of wind operated electricity generator	5%
4.	Parts for the manufacturer or the maintenance of the blades for the rotor of wind operated electricity generator	5%
5.	Raw material for the manufacture of the blades for the rotor of wind operated electricity generator	5%

#### **II. Excise Duty Exempted** (Notification No. 6/2002-Central Excise and amendments Thereof) for systems/devices mentioned below:

- a. Wind operated electricity generators, its components and parts thereof.
- b. Water pumping wind mills, wind aero generator and battery charger.

## **INCENTIVES UNDER NEW NON CONVENTIONAL ENERGY POLICY 2008 DECLARED BY GOVERNMENT OF MAHARASHTRA ON 14<sup>TH</sup> October 2008**

1. **Green Energy Fund:** Government of Maharashtra had announced constitution of green energy fund for development of infrastructure facility required for non conventional energy sources in Wind Power Policy dated 26<sup>th</sup> Feb 2004. Use of this green energy fund for development of infrastructure facilities required for non conventional energy sources, is continued in New Non Conventional Energy Policy 2008.
2. **Evacuation Arrangement:** For Evacuation arrangement of wind energy project, 50% amount will be given as a subsidy through Green Energy Fund.
3. **Approach Roads:** 100% expenditure for construction of approach roads for wind energy projects will be met through Green Energy Fund
4. **Electricity Duty:** No Electricity duty shall be leviable for first 10 years from the date of commissioning of the projects for captive consumption and third party sell.
5. **Encouragement to Co-operative Sector :** 11% Share Capital will be provided to Co-operative Sector for setting up of wind power projects as a grant through Green Energy Fund.

## **HIGHLIGHTS OF MERC ORDERS FOR PRIVATE WIND POWER PROJECTS**

1. **Wheeling:** Wheeling charges and wheeling losses are dependent on voltage levels at injection and drawl points. Wheeling charges and wheeling losses are available in MERC order dated 20<sup>th</sup> Nov 2007.
2. **T & D Charges:** Transmission charges and Transmission losses are dependent on voltage levels at injection and drawl points. Transmission charges and Transmission losses are available in MERC order dated 20<sup>th</sup> Nov 2007.
3. **Banking:** Banking of Energy delivered to the grid for self use and/or sale to third party is allowed Surplus energy at the end of the year limited to 10% of net energy delivered by the developer to the grid during the year shall be purchased by the utility at the lowest TOD slab rate for H.T. energy tariff applicable on the 31<sup>st</sup> March of the financial year in which the power was generated.
4. **Buy Back :**
  - a) **Group I** – Projects commissioned before 27/12/99 Rs.2.25 per unit in the base year 94-95. The purchase rate shall be increased at 5% (compounded) every year for the first ten years from the date of commissioning, no increase in rate for the next three years and 5% (compounded) increase in rate every year for the next 7 years.
  - b) **Group II-** Projects commissioned during the period 27/12/1999 to 31/03/2003. Rs.2.25 per unit in the base year 94-95. The purchase rate shall be increased at 5% per year (simple rate). The validity of the EPA shall be only eight years for the date of commissioning.
  - c) **Group III-** Project commissioned after 1/4/2003 during the balance period of tenth plan. Rs. 3.50/kwh for the 1<sup>st</sup> year from the date of commissioning of the projects. The purchase rate shall be increased at 15 paise/unit every year for a period of 13 years from the date of commissioning of the projects. With declaration of this rate for Group III projects, MERC has envisaged 16% RoE with 70:30 debt equity ratios.

### **MERC RPS Order:**

- i) To promote green energy generation in the state the Maharashtra Electricity Regulatory Commission (MERC) has come out with very sound policy called Renewable Portfolio Standards (RPS) and the same was issued on 16.08.2006. This RPS mechanism has accelerated pace of investment in green energy in the state. Through this order, MERC had made mandatory to procure energy from renewable sources in percentage of total consumption of energy to distribution licensees, open access and captive consumers. The year wise percentage is as follows

<b>Year</b>	<b>Percentage</b>
2006-07	3.0
2007-08	4.0
2008-09	5.0
2009-10	6.0

- ii) Maharashtra Electricity Regulatory Commission (MERC) has continued with the earlier rate of purchase of electricity generated from wind power projects till 31<sup>st</sup> March 2010 i.e. Rs. 3.50 per unit and escalation of Rs. 0.15 per unit per year for 13 years which is probably best in the country.

With all above invest friendly policies of Government of India, Government of Maharashtra and MERC order for wind power projects; we quite sure about installing additional 2000 Mega Watts projects by March 2010 through private investment.

### **DIVERSION OF FOREST LAND FOR ESTABLISHMENT OF WIND FARMS:**

Several potential sites of high wind density are situated in forest areas. It is proposed to tap this huge potential of 20,000 MW by allowing wind power projects on following guidelines.

- Areas of national parks and sanctuaries, areas of outstanding natural beauty, national heritage sites, sites of archeological importance, sites of special scientific interest and other important landscapes will not be considered for development of wind farm. Wind farms should be at safe distance (1 km or more) from these sites as these sites have ample tourism potential. The distance of windmills from highways, villages or natural habitations should be minimum 300 meters. No Objection Certificate from local bodies will be mandatory as these machines make lot of noise. The tips of wind turbine should be painted with orange color to avoid bird hits.
- Forest dept will allow installation Wind Mast by paying one time payment of one lakh per mast. It will provide 15m X 15m land for every fifty hector of land for this purpose. The wind mast should be removed after two years only after ascertaining technical parameters.
- Only machines of 500 KW and above will be allowed.
- Forest land will be leased for 30 years initially. It will be first leased in favor of developer and then transferred in the name investor/power producer within period of four years. If developers fail to develop wind farms, land will be revert back to Forest Department without any compensation. A lease rent of Rs. 30,000/- will be charged in addition to compensatory afforestation and net present value.
- Proposal for forest land should include require for land inclusive of the corridors between successive windmills, statutory buildings, earthing pits, transmission lines, roads including repose, breast walls, drains, curvature etc. Alignment of road should be done by recognized firm and got approved by the divisional forest officer concerned. The transmission lines should be aligned with roads as far as possible.
- Details of alternative explored on non forest land, cost benefit analysis of project, employment generated, cost of electricity produced and economic viability should be also given in proposal. Proposal should also include detail technological parameters about mechanical fatigue.
- Around 65% to 70% of leased out area should be utilized for development of medicinal plants. Intervening areas between two wind mill foot prints shall also be planted up by dwarf species of trees at the project cost. Soil and moisture conservation measures like counter trenching shall be taken up on hillocks supporting the windmills.
- As Maharashtra state forest department does not have expertise in wind power projects to scrutinize proposals. Hence all proposals for forest land diversion should be scrutinized by MEDA and with their recommendation shall be forwarded to state forest department.

### **THE CONTROVERSY OF WINDMILLS AFFECTING RAINFALL:**

The occurrence of drought conditions in some of the areas where windmills have been erected has led to the spread of the belief that the windmills have something to do with the decrease in rainfall. With the continuation of drought situation in the areas in close proximity of the wind farms, the public concerns about the role of windmills in rainfall anomalies have increased. Taking cognizance of this situation, the Government of Maharashtra, appointed a committee of six experts under chairmanship of Dr G. B. Pant Director, Indian Institute of Tropical Meteorology, Pune. The committee visited the wind farms at Satara and heard public representations about this issue. The history of wind farm development in the area under consideration has been looked at in detail and the chronological developments studied. All reported environmental impacts of wind energy conversion systems worldwide have been considered. Considering all the data and studying all aspects of this issue, the Committee unanimously concluded that the windmills have no effect on rainfall either at the present time or in the future.

## **UNOFFICIAL TRANSLATION OF APPLICATION PROCEDURE FOR SETTING UP WIND POWER PROJECT IN THE STATE DECLARED BY GOM ON 30<sup>TH</sup> JUNE 2005**

### **Background:**

Govt. of Maharashtra has declared the wind power policy on 26<sup>th</sup> Feb 2004 and also Electricity Act – 2003 is enforced by Central Government from 10<sup>th</sup> June 2003. Under Electricity Act – 2003, the erection of generating project and generation of electricity for captive consumption does not require any permission. MEDA is developing power evacuation arrangements and approach roads through green energy fund. The perfect co-ordination is very necessary for building roads, providing power evacuation arrangement and interconnection with grid of transmission and distribution companies. For the wind power projects proposed by private manufacturer / developer / investor,. The proper coordination is also necessary among MEDA, State Govt., MERC, Transmission and Distribution companies and manufacturer / developer / investor. The exact procedure according to Wind Policy 2004 is required to set for the healthy development of wind power projects, for proper coordination for healthy development of wind power projects, commissioning of the projects in scheduled time, close control over wind power projects, to provide required co-ordination among all concerned, design and erection of comprehensive power evacuation arrangements & approach roads network for long term in the state.

Following procedure is set for setting up the wind power projects under wind power policy 2004.

### **Application Procedure:**

1. Maharashtra Energy Development Agency (MEDA) has the mandate to develop and promote the Non-conventional Sources of Energy in Maharashtra. Therefore under the government of Maharashtra policy, development and promotion of wind power projects shall be done by MEDA in the State.
2. Central Government has declared 28 potential windy sites in Maharashtra till date. The wind power projects can be erected at these sites. New sites will be added to these by Central Government from time to time.
3. In case of the developers carrying out the wind resource study at certain locations which are not covered under point 2 above at their own cost and submits the consolidated wind data of that location to MEDA then MEDA with its recommendation shall send that wind data to Central Govt. for declaring it as suitable site for wind power projects.
4. In order to optimize the generation from wind power projects MEDA shall give priority to the locations where wind speeds and wind power densities are higher.
5. As per the government of Maharashtra decision, development of evacuation will be done either by MEDA or private developer as per estimates of transmission & distribution companies of Maharashtra. 50% cost of developing evacuation arrangement will be given as grant and remaining 50% will be given as interest free loan from green energy fund. MEDA will decide amount to charge as an advance from private developers till green fund is available. This advance will be refunded to private developers after green fund is made available as per government decision.
6. The consent given by MEDA and Transmission & Distribution Company for development of evacuation arrangement shall not be treated as guarantee for commissioning of project.

7. MERC has fixed target of 750 MW till 2007 for wind power project. MEDA will give consent to maximum 25 MW at a time for erection and commissioning of wind power project after manufacturer / developer / investor has informed its readiness for building infrastructure. Manufacturer / developer / investor have to commission these projects within nine months from the date of **infrastructure clearance**.

Target for manufacturer / developer / investor is based upon project he has commissioned till date in Maharashtra.

<b>Installed capacity of wind power projects by manufacturer / developer / investor till date (MW)</b>	<b>The target at a time for erection and commissioning of wind power project (MW)</b>
NIL	Upto 10
Upto 50 MW and above	Upto 25

8. **Security deposit:-** Every manufacturer / developer / investor shall pay a security deposit @ Rs. 15 lakhs / MW with his proposal. Manufacturer / developer / investor have to commission the project of applied capacity subject to applicable target within nine months from the date of infrastructure clearance. After commissioning of the projects in the scheduled time of nine months, this security deposits shall be refunded. Otherwise this security deposits shall be forfeited and shall be transferred to MEDA's development fund.
9. In order to set up wind power projects in the State every manufacturer / developer / investor shall submit the application form in prescribed format with the application fee @ Rs. 3,000/- per MW. The application shall be accompanied with following documents:
- Land details of project (Registered Sale / Purchase deed, 7/12 extract, NA permission )
  - No objection certificate from Geology and Mining Department
  - No objection certificate from Development Commissioner (Industry) for industrial use of land
  - Detailed Project Report
  - Micrositing Plan
  - Technical details of wind electric generators, power curve, type test certificates
  - Copy of the application made to MSEB for grid connectivity
  - No objection certificate from forest department, if applicable.
10. All legal and statutory clearances shall be complied by project owner / developer only. It shall be binding on project owner / developer to obtain the no objection certificates from Public Local Body, Revenue Department, Geology and Mining Department, Pollution Control Board, Forest Department, Civil Aviation, Seaport and Defense authorities.
11. After receipt of the final proposal in the name of investor MEDA shall issue the **infrastructure consent** for setting up the project. The powers for issuing this consent shall be as follows:
- Projects up to and including 10 MW capacity : Director General, MEDA
  - Projects above 10 MW capacity : Chairman, MEDA
12. MEDA shall issue the **infrastructure clearance** for setting up the wind power projects from the capacity fixed for respective manufacturer / developer / investor after carrying out scrutiny of the project proposals. Before that manufacturer / developer / investor has to deposit Rs 5.0 Lakh per MW with MEDA as a processing fee.

13. Wind electric generators which will going to be installed in Maharashtra, shall be approved from National or International institutes as per policy of Ministry of Non Conventional Energy, Government of India. But as per policy of Ministry of Non Conventional Energy, Government of India, minimum capacity of Wind electric generators is restricted to 225 KW. All machinery of wind electric generator and wind electric generator should be new. Manufacturer/ developer must furnish certificate in that regard.
14. Private Developer should commission wind power project by connecting it to grid after receipt of consent from Transmission & Distribution Company. Manufacturer / developer / investor should submit commissioning report to MEDA.
15. In case of any dispute or issue(s) arise between two or more manufacturers, developers or investors then the same shall be resolved by Director General, MEDA and his decision shall have binding on all concerned.
16. MEDA shall have right to disburse the eligible promotional incentives from Central and State Govt.
17. The orders / decisions taken by MERC from time to time shall be applicable and binding for above projects.
18. The **infrastructure clearance** issued by MEDA for setting up Wind Power Project is non transferable. It can not be transferred from one manufacturer / developer / investor to another manufacturer / developer / investor. However it can be transferred to private investor from manufacturer / developer with prior permission from Director General, MEDA.
19. The manufacturer / developer / investor intending to use forest land for Wind Power Projects shall submit the application in prescribed format with all required documents. MEDA after carrying out detailed scrutiny of the proposals shall recommend the cases to forest department as per GR No. FLD/1003/CR 194/F10 dated 21.7.2004.
20. After commissioning the project, the investor at his own will, can sale the project to another investor with all applicable terms and conditions of the projects and with prior permission from Director General, MEDA.
21. With prior permission from Director General, MEDA, investor can shift one or more wind electric generators from existing location to another.

Rights for giving permission for shifting or selling wind electric generators will remain with Director General, MEDA. Investors are required to deposit Rs. 2.00 lakh per wind electric generator for this transaction. But government will issue separate notification for shifting of wind electric generators which are installed under 12<sup>th</sup> March 1998 policy and which are eligible for sales tax benefit.

22. Approach roads are necessary for development of wind power projects. For fast development of wind power projects and achieve target set by MERC in specified time, MEDA will take up development of approach road with the help of approved contractors. 100 % Expenditure on approach road will be met from green energy fund.
23. MEDA will charge Rs 10,000/- per year per MW for projects which are installed before 25<sup>th</sup> August 2004 and Rs 15,000/- per year per MW for project installed thereafter for maintenance and repair of road from financial year 2004-05. Expenditure on maintenance and repair of approach roads will be met through this amount.



**APPLICATION FORMAT FOR PRIVATE SECTOR TO SET UP WIND POWER  
PROJECT IN MAHARASHTRA**

**1. GENERAL DETAILS :**

1.	Name of the Applicant/ Organization	
2.	Registered Office address with telephone, fax, telex, etc.	
3.	Registered works address with telephone, fax, telex, etc.	
4.	Type of the organization (Private/Public Ltd, Partnership Firm Etc.)	
5.	Nature of business and activities of company	
6.	Name of items presently manufactured by the company	
7.	Name and designations of the authorized persons to be contacted for the wind power projects.	

**2. FINANCIAL DETAILS OF THE COMPANY :**  
**(Data based on latest Audited Balance Sheet)**

1.	Share Capital of the Company at the time of formation (As on _____) (a) Authorized : (b) Paid-up :	
2.	Share capital of the company at the time application (As on 31.03.200 ) (a) Authorized – Equity : Preference : (b) Paid-up – Equity : Preference :	
3.	Turnover of the company for the past three years (in ascending order) 3 <sup>rd</sup> previous year – 31.03.02 2 <sup>nd</sup> previous year – 31.03.03 In previous year – 31.03.04	
4.	Gross profit of the company before tax deduction (including TDS) for the past three years 3 <sup>rd</sup> previous year – 31.03.02 2 <sup>nd</sup> previous year – 31.03.03 In previous year – 31.03.04	
5.	Net Profit of the company after tax deduction (Less TDS) for the past three years 3 <sup>rd</sup> previous year – 2 <sup>nd</sup> previous year – In previous year -	
6.	Indicate the proposed turnover for : Current year – Provisional- 31.03.2005 Next 1 <sup>st</sup> Year – Next 2 <sup>nd</sup> Year – Next 3 <sup>rd</sup> Year –	

**3. ELECTRICAL DETAILS OF COMPANY :**

1.	Whether LT/HT Consumer	
2.	Connected Electrical load a) Maximum Connected load b) Maximum Demand	
3.	Annual Consumption ( in Units)	

**4. PROPOSED WIND POWER PROJECT DETAILS:**

1.	Capacity of Wind Power Projects	
2.	No. & Capacity of Wind Electric Generator(s)	
3.	Name of Site (s)	
4.	Whether the WEG's proposed are approved by MNES (give the latest approval No. and date)	
5.	<p>Do you have similar wind power project in India /Abroad</p> <p>If `YES' then submit the following details :</p> <p>Installed capacity :</p> <p>i) No. &amp; Capacity of WEG's :</p> <p>ii) Make of WEG's :</p> <p>iii) Annual total generation for past three years</p> <p>iv)</p> <p>v) Whether you sale the power to third party/to SEB or do wheeling/banking or use for your captive consumption.</p> <p>vi) Your over all opinion / observation / remark about earlier wind farms</p>	
6.	The manner in which you would operate and maintain the wind power project	
7.	Whether you will employ separate technical personnel for this project or use the existing technical personnel of your company.	
8.	What Option do you propose for the power generated from this wind power project (Third Party Sale/Sale to MSEB/Captive consumption)	
9.	Expected date of Commissioning of the project	

**5. LAND DETAILS:**

a)	Have you purchased the land for the proposed wind power project	
b)	If yes, then submit following details	
i)	Total area of the land purchased	
ii)	Survey Nos. and respective areas of land (attach separate sheet if required)	
iii)	Have you carried out contour survey of the land	
iv)	Have you carried out micro sitting plan of the wind power project	
v)	The shortest distance from common HT line from your project to the sub-station of MSEB or the common export point at project site.	

**DECLARATION**

I/We hereby declare that all information furnished above and the documents enclosed with the application are true to the best of my/our knowledge.

I/We hereby also agree to abide by the instructions, terms and conditions laid down by MEDA, MSEB, State and Central Government from time to time.

Yours faithfully,

Place:-

Date :-

**LIST OF WINDY SITES IN MAHARASHTRA DECLARED BY MoNES, GOVERNMENT OF INDIA:**

Sr. No.	Name of Site	Taluka	District	Latitude ° N Deg.	Longitude ° E Min.	Elevation m.a.s.l. Deg.	Avg. Wind Speed kmph Min.	Annual Wind Power Density	Annual Wind Power Density at 20/25 m	Wind Farm W/sq.m at 20/25 m	W/sq.m at 50 m	
1	Alamprabhu Pathar	Hathangale	Kolhapur	16	46	74	22	790	20.5	164	224	
2	Amberi	Khatav	Satara	17	36	74	18	960	23	237	275	Wind Farm
3	Aundhewadi	Sinnar	Nashik	19	46	73	50	876	23.67	295	>295	Wind Farm
4	Bhud	Khanapur	Sangli	17	21	74	42	834	19.73	160	224	Wind Farm
5	Brahmanwel	Sakri	Dhule	21	10	74	11	600	23.1	278	324	Wind Farm
6	Chakla	Nandurbar	Nandurbar	21	19	74	19	380	23.7	242	323	Wind Farm
7	Chalkewadi	Satara	Satara	17	36	73	49	1160	20.2	206	218	Wind Farm
8	Dhalgaon	Kavthemahankal	Sangli	17	8	74	59	810	21.2	216	260	Wind Farm
9	Dongarwadi	Miraj	Sangli	16	55	74	48	820	21.4	179	284	
10	Gawalwadi	Dindori	Nashik	20	6	73	43	740	19	140	278	
11	Gudhepachgani	Shirala	Sangli	17	7	73	59	903	19.8	178	296	Wind Farm
12	Kankora	Aurangabad	Aurangabad	19	59	75	27	920	20.01	127	204	
13	Kas	Jaoli	Satara	17	44	73	49	1240	20.5	194	277	
14	Kavadya Dongar	Parner	Ahmadnagar	19	1	74	32	910	23.2	224	277	Wind Farm
15	Khandke	Ahamadnagar	Ahmadnagar	19	8	74	53	920	19.6	146	250	Wind Farm
16	Kolgaon	Srigonda	Ahmadnagar	18	50	74	43	800	20.5	177	238	
17	Lonavla	Maval	Pune	18	47	73	23	560	15.5	122	285	
18	Mandhardeo	Wai	Satara	18	2	73	53	1280	19.4	153	206	
19	Matrewadi	Patan	Satara	17	12	73	56	898	20.8	211	253	Wind Farm
20	Palsi	Patan	Satara	17	20	73	40	970	18.85	137	254	
21	Panchgani	Mahabaleshwar	Satara	17	65	73	48	1372	18.4	133	205	
22	Panchpatta	Akole	Ahmadnagar	19	42	73	55	1080	20.51	201	236	Wind Farm
23	Raipur	Sakri	Dhule	21	2	74	22	500	18.9	162	214	
24	Rohina	Chakur	Latur	18	27	76	57	676	20.05	149	226	
25	Sautada	Patoda	Beed	18	48	75	20	800	21.2	167	223	
26	Takarmouli	Sakri	Dhule	21	3	73	58	600	20.8	186	224	
27	Thoseghar	Satara	Satara	17	35	73	53	1140	21.7	229	489	Wind Farm
28	Vankusavade	Patan	Satara	17	27	73	50	1100	21.2	231	293	Wind Farm
29	Varekarwadi	Patan	Satara	17	13	73	59	920	21.04	257	216	Wind Farm
30	Vaspeta	Jat	Sangli	17	6	75	22	681	20.34	170	225	
31	Vijaydurga	Deogad	Sindhudurga	16	30	73	20	100	19.6	207	253	Wind Farm

## ORGANISATIONS RELATED WITH DEVELOPMENT OF WIND POWER

1.	Chairman Indian Wind Energy Association PHD House, 4th Floor, Opp. Asian Games Village, Siri Fort Road, New Delhi-110016.
2.	President Renewable Energy Developers Association of Maharashtra, (REDAM), Empire House, 214 Dr. D.N. Road, Ent. A. K. Nayak Marg, Fort, Mumbai-400 001

## INDIAN WEB SITES RELATED WITH WIND POWER:

- A. [www.windpowerindia.com](http://www.windpowerindia.com)
- B. [www.windpower.org](http://www.windpower.org)
- C. [www.inwea.org](http://www.inwea.org)
- D. [www.indianwindpower.com](http://www.indianwindpower.com)
- E. [www.mercindia.com](http://www.mercindia.com) (Maharashtra Electricity Regulatory Commission website)
- F. [www.mnes.nic.in](http://www.mnes.nic.in) (A ministry of non conventional energy, GOI website)
- G. [www.cwet.tn.nic.in](http://www.cwet.tn.nic.in) (Centre for wind energy technology, Chennai web site)
- H. [www.mahaurja.com](http://www.mahaurja.com) (MEDA web site)

## INTERNATIONAL WEB SITES RELATED WITH WIND POWER

- A. [www.windmission.dk](http://www.windmission.dk)
- B. [www.canwea.ca](http://www.canwea.ca)
- C. [www.nrel.gov/wind/](http://www.nrel.gov/wind/) (NREL's National Wind Technology Center, which works with the wind energy)

## WEB SITES OF WIND TURBINE MANUFACTURERS

- A. [www.enerconindia.net](http://www.enerconindia.net)
- B. [www.suzlon.com](http://www.suzlon.com)
- C. [www.vestasrrb.com](http://www.vestasrrb.com)

<b>LIST OF WIND POWER PROJECT DEVELOPERS ACTIVE IN MAHARASHTRA</b>				
<b>Sr. No.</b>	<b>Name of Developers &amp; Address</b>	<b>Telephone Nos</b>	<b>Fax No.</b>	<b>Web site</b>
1	Managing Director Suzlon Energy Ltd., Godrej Millennium Tower, Koregaon Park, Pune - 411 001.	020 - 4022000	020- 4022002	<a href="http://www.suzlon.com">www.suzlon.com</a>
2	Managing Director Enercon (I) Ltd., Kolsite House, Plot No.31 Shah Indl. Estate, Veera Desai Road, Andheri (W), Mumbai.	022- 56924848	022-26370085	<a href="http://www.enerconindia.com">www.enerconindia.com</a>
3	Managing Director Vestas RRB (I) Ltd., No.2, Vembuliammal Koli Street, K.K. Nagar (W), Chennai - 600 078.	044-23641111	044-23642222	<a href="http://www.vestasrrb.com">www.vestasrrb.com</a>
4	Managing Director Windia Power Ltd., 26, Gobind Mahal, 86/B, Netaji Subhash Road, Mumbai - 400 002.			
5	Managing Director Arul Mariamman Textiles Ltd 23, Kamraj Road, Mahallanga Puram, Pollachi, Coimbatore, Dist. Tamilnadu.			
6	Managing Director NEG Micon India Pvt. Ltd., No.298, Old Mahabalipuram Road, Sholinganallur, Chennai - 600 119.	044- 24505100	044- 24505101	