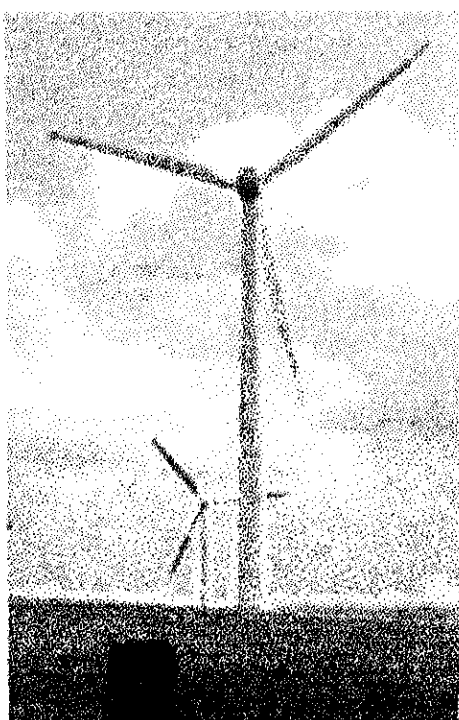


Wind Farm -

An Opportunity for Investment in Gujarat



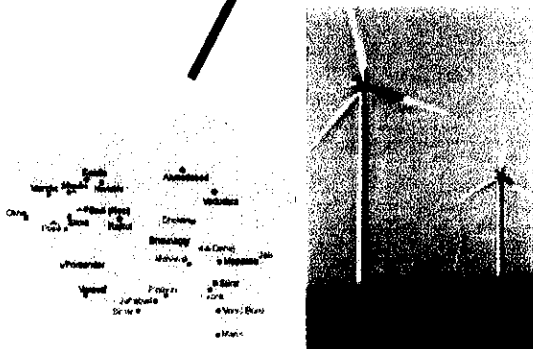
Project and Technology Division

INDEXTo

**Block 15, 2nd Floor
Udyog Bhavan, Sector 11
Gandhinagar - 3510017**

GUJARAT

A Natural Gateway



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WIND FARM

(For Power Generation)

Introduction

The unequal heating of the land and water by the sun causes winds on the surface of earth. The difference in temperature gradient induces the circulation of air from one zone to another and thereby creates Wind Energy. This Wind is one of the popular and viable renewable energy for use.

Utilizing Wind is one of the most 'environment friendly' methods of producing electricity. They have no adverse effects on the global environment unlike the conventional methods of oil or coal fired power plants.

Interestingly country like Denmark is no longer to rely just on wind power to bring down its CO₂ emissions, but instead buy unused CO₂ from other countries too.

Why Wind Farm

Advantages of power generation from wind energy may be stated as below:

- The capital cost is comparable with conventional power plants. For an **1MW** wind farm, the capital cost ranges between 4.5 crores to 5.5 crores, depending on site and the wind electric generator selected for installation.
- Construction time is less.
- Fuel cost is zero.
- O & M cost is very low.
- Capacity addition can be in modular form.
- There is no adverse effect on global environment. The whole system is pollution free and environment friendly.
- Extensive support provided by State and Union Governments.

Market Demand

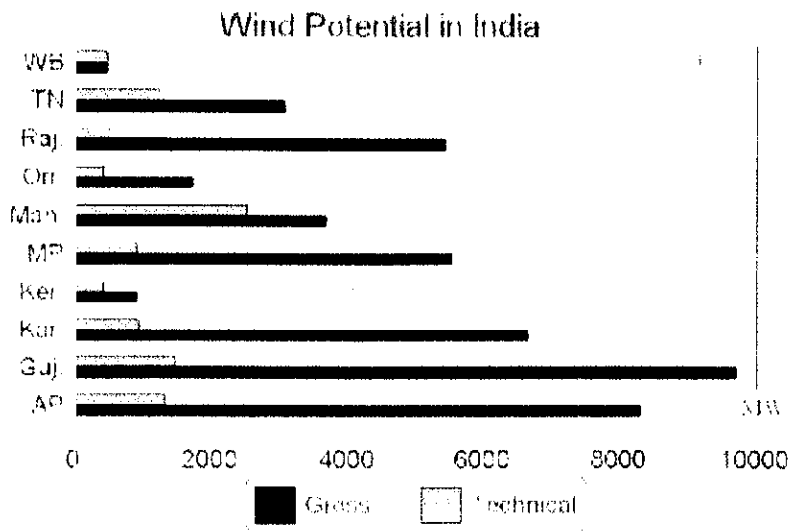
The potential for the wind power generation in India is about 20,000 MW. Of this, about 1869 MW has been tapped in the country. India is poised to become one of the world's largest wind turbine users. India has witnessed several private ventures in the area of wind power generation during the past decade.

The State of Gujarat is blessed with a long coastline of 1600 kms. where the wind speeds are adequate for conversion into electrical energy. Under the incentive scheme of 1993, a Wind farm capacity of 149.55 MW by private sector has been established during the period from 1993 to March 1998.

It can be said that Gujarat has got the highest potentiality for setting up the Wind Farm in the country, even though the intensity of wind in the state is at medium and low level in comparison to that of other states in the south.

Given the potential of wind power generation in the State, the first demonstration Wind farm project was set up by the Agency in 1986 at the Okha coast followed by few more demonstration Wind farms with an aggregate capacity of 16.295 MW. The satisfactory performance and operation of these demonstration Wind farms, led to an incentive scheme in 1993, declared by the State Government for private sector participation in the Wind power generation. Under the Wind Power Generation Policy - 2002, during the year 2002-03, a Wind farm capacity of 6.20 MW has been installed and commissioned.

Figure shows the comparative potentiality of Wind Farm at Gujarat.



Suggested Capacity with required Technology Availability

Machine capacity - Earlier the trend was to install low capacity 225/250 KW machines. The recent trend is to install machines upto 1MW. Machine Type - Windmills are available without gearbox, which have synchronous generator linked with inverter controls. The introduction of gearless machine has avoided the gearbox transmission loss. Synchronous generator and inverter control system have optimised the generation. The machines have quick response to wind-change, resulting in improved power generation.

Suggested Project Size and Cost

Economics of a Typical Wind Farm

Parameter	Economics
Installed capacity	1MW
Investment	Rs. 4 crores
Expected generation	25 lakhs kwh/ annum
Power buy back rate of the utility annual escalation	@ Rs 2.60 kwh
Operation & Maintenance cost per annum (including insurance coverage)	Rs. 0.60 lakhs
Pay back period	5-6 years
FIRR	30%
Levelised cost of generation	Rs 2.00 per kwh

The capital cost of wind power projects range between Rs. 5 to 5.5 crores per MW. This gives a levelised cost of energy generation in the range of Rs. 2.00 to Rs. 2.50 KWh, taking into consideration the fiscal benefits extended by the Government.

Leading Technology Suppliers

- | | |
|---|---|
| <p>1. NEG-MICON India (Pvt.) Ltd.
4/262, Old Mahabalipuram Road
Kandanchavadi,
Chennai- 600 096.
Tel : 91-44-4480183/6269387
Fax :91-44-4925619.</p> | <p>3. GE Wind Energy India,
210, Kesava BandraKurala Complex
Bandra East
Mumbai - 400051.
Tel.:91-022-6540797/ 0798
Fax.: 91-022-6540800, 6541255.</p> |
| <p>2. Elecon Engineering Company Ltd.,
P.O. Box No. 6
Anand Sojibra Road
Vallabh Vidyanagar,
Gujarat - 388 120.
Tel : 91-02692-36469/36513
Fax : 91-02692-36457/36542</p> | <p>4. Suzlon Energy Limited
Suzlon House
Near Shree Krishna Centre
Navrangpura
Ahmedabad 3890 009
Tel : 6466315, 6449551, 6407141
Fax : 6565540</p> |

Government Policy

Gujarat - Wind Power Generation Policy - 2002

Policy for wind power development in the Gujarat State has been declared vides Govt. Resolution No.EDA-10.2001-3054-B (Part-II) dated 20.06.2002. The major points of the policy are as below: -

Wheeling:	4% of energy
Banking:	6 months
Buy Back:	Rs.2.60/kWh with escalation of 5 paise per year for 10 years.
Third Party Sale:	Not allowed.

From Central Government

- Income Tax Holiday
- Accelerated Depreciation
- Concessional Custom Duty/Duty Free Import
- Capital/Interest Subsidy

Selection of Site/Suggested Location

The best locations for positioning a wind turbine include close to a large body of water such as a lake or ocean, or on the top of hills or mountain ridges. Obstructions like trees, buildings, and uneven terrain all serve to reduce wind speed. Before the installation of any wind turbine system, make sure sufficient space exists on site to place the turbine, tower, wires and control equipment. It is also wise to obtain at least a year's worth of wind speed/direction data from an anemometer or the local weather office to evaluate the viability of wind power at the location.

GEDA, the Nodal Agency for the purpose of implementation has already identified location, suitable for setting up wind farm in the State. As many as 50 sites in the State have been declared potential for setting up of Wind farm, on the basis of the long term data of Wind speed, collected and analysed under the aegis of the Ministry of Non-Conventional Sources of Energy.

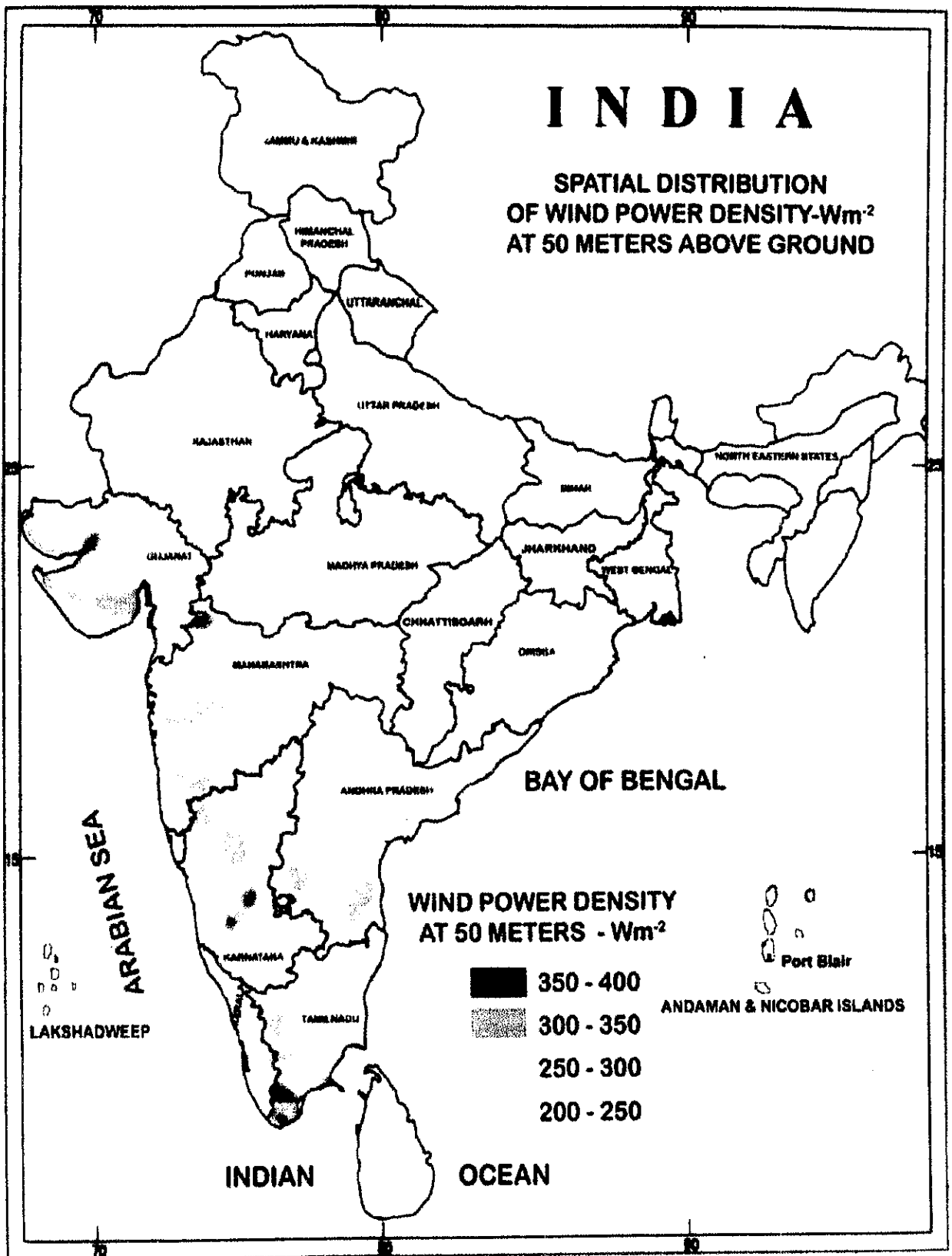
Observation and Conclusion

Under the prevailing State Government Policy, Project is attractive mainly for captive consumption. This is further attractive for existing Textile Units to set up Wind Farm under Technology Up gradation Fund.

However, in order to promote wind energy sector in Gujarat, State Government may consider the increased buyback rate for GEB at par with other State i.e @ Rs 3.50 per KWh. In addition to that Government may also consider for Third party Sale of power generation from Wind farm through the State Grid.

Possibility of development of Wind farm Park may be mooted in various areas in the coastline of Gujarat in the similar line to that of Maharashtra (At Satara).

In the State like Gujarat promotion of Non-Conventional Energy like Wind farm is very much essential, especially when the unit cost of power in the state is the highest in the country.



Introduction

The unequal heating of the land and water by the sun causes winds on the surface of earth. The difference in temperature gradient induces the circulation of air from one zone to another and thereby creates Wind Energy. This Wind is one of the popular and viable renewable energy for use. Wind turbines are the mechanical devices used to harness this energy from the wind. Like solar modules, they are also reliable, produce no pollution, and have minimal operating costs.

Windmills convert the kinetic energy of moving air mass into mechanical motion that can be used directly to run machines (eg. Pumps) or to generate electricity.

Large-scale wind farms are fast becoming cost competitive with conventional power sources. In many cases, wind energy is an ideal power solution.



Power generation from wind has emerged as one of the most successful programmes in the renewable energy sector, and has started making meaningful contributions to the overall power requirements of some States in our country too.

Over the last decade significant progress has been made in harnessing wind for power generation in different parts of the world, particularly in the USA, Europe and in India.

In India after the creation of a separate Ministry in 1992, special emphasis was given in the Eighth Plan to generate power from renewables. The total installed capacity of power from renewables today stands at nearly 1869 MW with contribution from wind power of nearly 1000 MW.

Wind Power installations worldwide have crossed 31000 MW by the end 2002 producing about 50 billion KWh of energy annually.

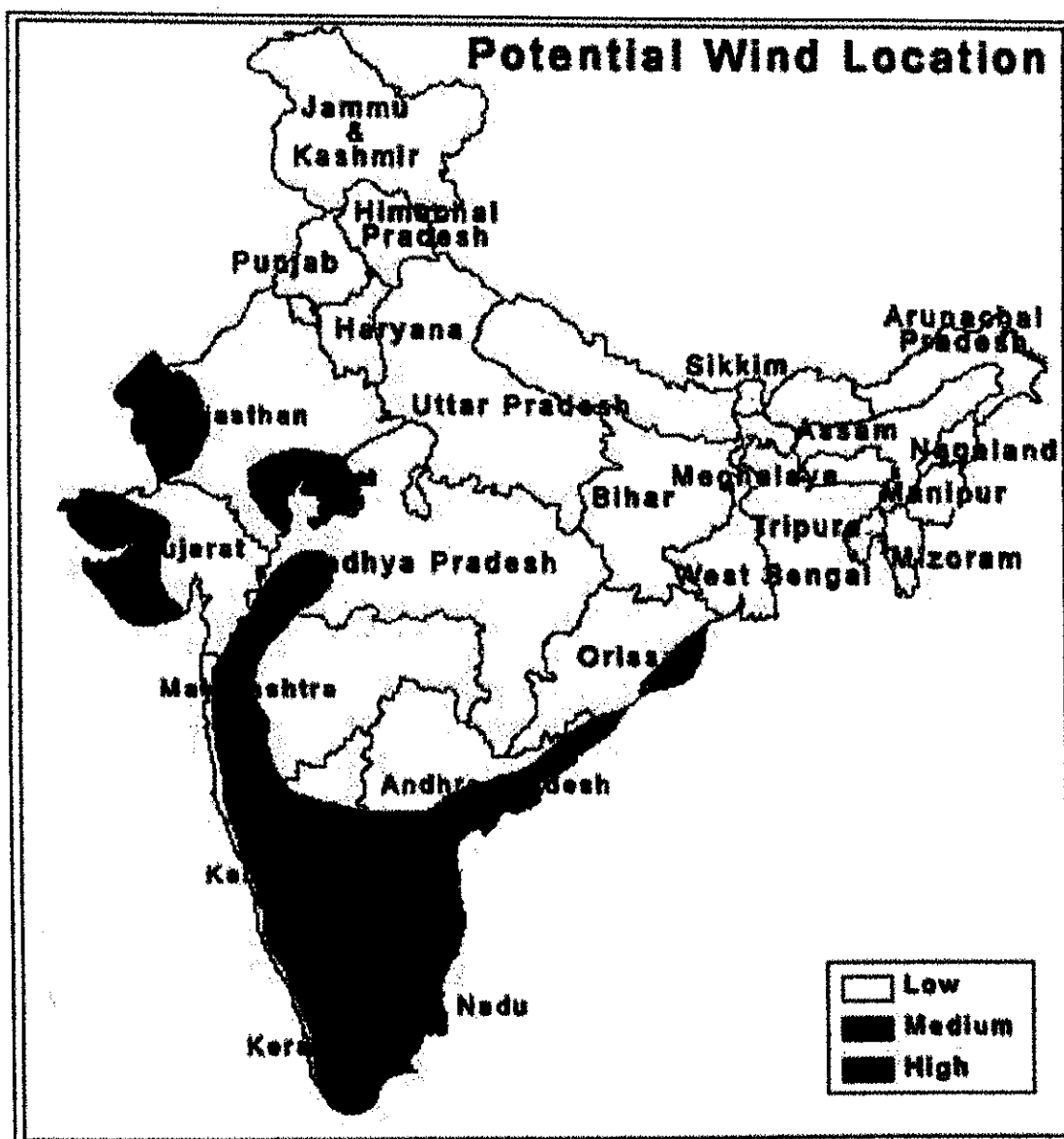
India, today fifth largest wind power producing nation in the world after Germany, USA, Spain and Denmark_ as shown below:

Leading Countries In Wind Power Installations:

COUNTRY	Germany	USA	Spain	Denmark	India	Netherlands	UK	Italy	China	Sweden
Installed Capacity (MW)	4442	2445	1812	1738	*1869	433	362	277	262	220

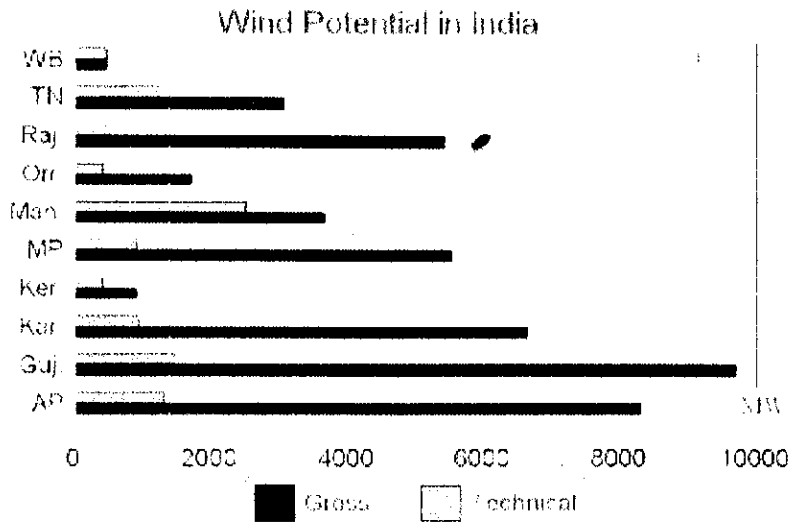
*As on Dec.2002

A record 6868 MW of new wind power capacity was installed world wide in 2002, increasing generating capacity 28% higher than previous year. Investments on wind power Technology was worth \$ 7.3 billion during 2002.



Potentiality of Wind farm

Following Table also shows State Wise Potentiality of Wind Farm Projects in India as estimated by Ministry of Non- Conventional Energy, Govt. of India



It can be said that **Gujarat** has got the highest potentiality for setting up the Wind Farm in the country, even though the intensity of wind in the state is at medium and low level in comparison to that of other states in the south. During the 9th Five-Year Plan, the additional capacity envisaged is over 40 000 MW. It is expected that about 300 MW of power will be from wind. The currently estimated investment for commercially proven wind energy technology will be Rs. 9567 million.

In another estimate, the potential for the wind power generation in India is about 20,000 MW. Of this, about 1869 MW has been tapped in the country. India is poised to become one of the world's largest wind turbine users. India has witnessed several private ventures in the area of wind power generation during the past decade. Several state governments are encouraging wind power generation, by offering attractive buy-back rates.

In the "State of the World 1998" report by the World watch Institute, *India has been projected as the new wind superpower*, it also noted that renewable energy production in the world is expanding rapidly. Wind generation is the fastest growing energy source in this decade and is expanding at 25% per year. With declining trend of cost and increase in the scale of wind turbine manufacturing, wind promises to become a major power source globally in the first few decades of the new millennium.

Importance of Wind Farm:

'Wind Turbines' is one of the most 'environment friendly' methods of producing electricity. They have no adverse effects on the global environment unlike the conventional methods of oil or coal fired power plants.

Interestingly, country like Denmark is no longer to rely on wind power to bring down its Co₂ emissions, but instead buy unused Co₂ from other countries.

India's energy production, in specific, **in the state of Gujarat**, depends heavily on coal for thermal power generation. It depends on wood and crop residues for household energy needs. This dependence will soon deplete its natural resources and add to the environmental problems of **Air Pollution and Deforestation**. For this reason India chose to study the Unconventional methods of energy generation and has successfully implemented its pilot project in Tirupati (in southern India) where the most renowned holy temple of India is situated. India is the only country in the world to have a separate Ministry in the Government for 'Non-conventional Energy Generation'. They have implemented this method in Gujarat (West India), Andhra Pradesh and Tamil Nadu

In union budget 2003-04, Government of India announces Rs. 200 million funds for further R& D in solar wind Turbine and Hydrogen fuel.

Advantages of power generation from wind energy may, therefore, be summarized as under:

- The capital cost is comparable with conventional power plants. For a wind farm, the capital cost ranges between 4.5 crores to 5.5 crores, depending on site and the wind electric generator selected for installation
- Construction time is less
- Fuel cost is zero
- & M cost is very low
- Capacity addition can be in modular form
- There is no adverse effect on global environment. The whole system is pollution free and environment friendly

Today, it has become one of the attractive areas for investment because – >

- It is one of the most environment friendly, clean and safe energy resources.
- It has lowest gestation period as compared to conventional energy.
- Equipment erection and commissioning involve only a few months.
- No fuel consumption, hence no operating cost.
- Very low maintenance cost.

Suggested Capacity and Technology:

Machine capacity - Earlier the trend was to install low capacity 225/250 KW machines. The recent trend is to install machines upto 1MW. Machine Type - Windmills are available without gearbox, which have synchronous generator linked with inverter controls. The introduction of gearless machine has avoided the gearbox transmission loss. Synchronous generator and inverter control system have optimized the generation. The machines have quick response to wind-change, resulting in improved power generation. However capacity of wind farm generation depends on availability of wind, which creates efficiency from 10% (January) to 70% (July) with average of 30%.

MNES Approved Manufacturers

S. No.	Indian Manufacturers with Addresses	Model	Capacity	Third Party Certification (ISO - 9000)
1.	Chiranjeevi Wind Energy Ltd 23, Kamaraj Road, Mahalingapuram, Pollachi - 642 002.(T.N.). Tel.: 91-4259-224438/225482 Fax.: 91-4259-224437	W2920 W4200	250 KW 600 KW	No
2.	NEG-MICON India (Pvt.) Ltd., 4/262, Old Mahabalipuram Road, Kandanchavadi, Chennai- 600 096. Tel.: 91-44-4480183/6269387 Fax.:91-44-4925619.	M1500 NM750-175/44 NM600-150/48 NM750-200/48 NM900/ 950	750 KW 750 KW 900 KW 950 KW	Yes
3.	Elecon Engineering Company Ltd., P.O. Box No:6 Anand Sojibra Road Vallabh Vidyanagar, Gujarat - 388 120. Tel : 91-02692-36469/36513 Fax : 91-02692-36457/36542	T400-34	400 KW 600 KW	No
4.	Enercon (India) Ltd., KOL site House, Plot No:31, Shah Indl.Est., Veera Desai Road, Andheri West, Mumbai - 400 053. Tel.: 91-22-6364848/6314876 Fax.: 91-022-6315153.	E-30, E-40	230 KW 600 KW	Yes
5.	GE Wind Energy INDIA, 210, Kesava BandraKurala Complex, Bandra East, Mumbai - 400051. Tel.:91-022-6540797/ 0798 Fax.: 91-022-6540800, 6541255.	-	600 KW 750 KW 900 KW	Yes
6.	Pioneer Wincon Ltd., 16, SP Developed Plot, Industrial Estate, Guindy, Chennai - 600 032. Tel.: 91-44-2334621, 2326596. Fax.: 91-44-2346626	W-250/29	250 KW 755 KW	Yes
7.	Suzlon Energy Ltd., 5th Floor Godrej Millenium Building	N3127, N3335	270 KW 350 KW 1 MW	Yes

	9 Koreagaon Park Pune - 400001. Tel : 020- 4015760 - 64 Fax : 020- 4015759		1.25 MW	
8.	TTG CONSOLIDATES LTD., TTG House, 36, College Road, Chennai - 600 008. Tel. : 91-44-8273204/8272590. Fax.: 91-44-8262416.	250T	250 Kw	Yes
9.	Vestas RRB INDIA LTD., 189, Sukhdev Vihar New Delhi- 110 025. Tel.: 91-11-6327711/6327722 Fax.:91-11-6835160/6327733	V-27 V-39 V-52	225 KW 500 KW 850 KW	Yes
10.	LM Glasfiber (India) Ltd. Plot 61,62 Kasaba Indl Area, Hoskote - 562 114 Tel.: 91-80-7971532 / 1700 / 1701 Fax.: 91-80-7971320.	Manufacturer of Blades for Wind Electric Generators		

Manufacturers Of Wind Energy Generators (Wegs)

The wind turbines installed so far in the country are predominantly of the fixed pitch 'stall' regulated design and pitch-regulated design. However, the recent trend is towards better aerodynamic design, use of lighter and larger blades, higher towers, direct drive and variable speed gearless operation using advanced power electronics. Technology excellence is on the way either to total elimination of reactive power consumption or to reduce the reactive power consumption. This is an important development considering the typically weak local grid networks. The unit size of machines has gone up from 55–100KW in the first few projects to 400–750 KW in the recent projects.

The list of machine manufacturers and capacity of machine is given as follows:-

Manufacturers Of Wind Generators/Wind Turbine Equipment

Name	Foreign Collaborator	Model	Capacity
Arul Mariamman Taxtiles Ltd.	Wind World Denmark	W2920 W4200	250KW 600KW
Asian Wind Turbine Pvt. Ltd	NEG-Micon Denmark	M1500 NM750-. 175/44 NM-600-150/48 NM-750-200/48	600KW 750KW 600KW 750KW
Bharat Heavy Electricals Ltd	Nordex, Denmark	N29/250	250KW
Das Lagerway Wind Turbines Ltd.	Lagerwey, Netherlands	LW30	250KW
Elecon Engineering Company Ltd.	Turbowinds n.v. Belgium	T400-34	400KW
Enercon India Ltd.	Enercon GmbH, Germany	E-30 E-40	230KW 600KW
Kirloskar Electric Co. Ltd.	Wind Energy Group, UK	MS3-400L	400KW
NEPC India Ltd.			225KW 250KW 400KW
Pioneer Wincon Ltd.	Wincon, Denmark	W-250/29	250KW
REPL Engineering Ltd.	Bonus, Denmark	MKII	320KW
Suzlon Energy Ltd.	Sudwind Energie Systeme, Germany	N3 127 N3335	270KW 350KW
Tacke Wind Energy India (Pvt) Ltd.	Tacke Windenergie GmbH, Germany	TW600e	600KW
TTG Industries Ltd.	Husumer, Schiffswerft, Germany	250T	250KW
Vestas RRB	Vestas, Denmark	V-27 V-39	225KW 500KW
Windia Power Ltd.	Nedwind, Netherlands	NW30 NW40 NW44 NW46/3	250KW 500KW 550KW

Manufacturers of Wind Energy Technology
List Of Weg Manufacturers Issued By Centre For Wind Energy Technology (C-Wet)
(Circular Dated 01/03/2002)

Sr. No	Indian Manufacturers	Foreign Collaborator	Model Rotor Diameter (m)	Capacity (kW)	Type Certificate	Manufacturing System Certificate (ISO Certificate)
1.	Das Lagerwey Wind Turbines Ltd. Chennai, Tamil Nadu	Lagerwey, Netherlands	LW 30/250 30 m LW 50/750 50.5 m	250 kW 750 kW	Available Available	No
2.	Elecon Engineering Company Ltd. Vidyanagar, Gujarat	Turbowinds N.V. Belgium	T400-34 34 m T600-48 48 m	400 kW 600 kW	Available Available	No
3.	Enercon (India) Ltd., Andheri (West), Mumbai	Enercon GmbH, Germany	E30 30m E40 53.7 m	230 kW 600 kW	Available Available	Yes
4.	NEG Micon (India) Pvt. Ltd. 4/262, Old Mahabalipuram Rd., Kandanchawadi, Chennai – 600 096 Tamil Nadu Tel : +91-44-4926278, 4929562, 4480183 Fax : +91-44-4925619 Email : sai@india.neg-micon.com	NEG-Micon, Denmark	NM 750- 175/44 44 m NM 48/750 48.2 m NM 52/900 52 m	750 kW 750 kW 900 kW	Available Available Available	Yes
5.	Pioneer Wincon Ltd., Chennai, Tamil Nadu	Wincon West Wind, Denmark	W 250/29 29m W 755/48 48 m	250 kW 600 kW	Available Available	Yes
6.	Suzlon Energy Ltd., Ahmedabad, Gujarat	Non	N 3330 33.4 m N 3335 33.4 m	300 kW 350 kW	Available	Yes
9.	Vestas RRB India Ltd., 189, Sukhdev Vihar, New Delhi – 110 025 Tel : +91-11-6327711, 6327722 Email : pawanshakthi@vestasrrb.com	Vestas, Denmark	V-27 27 m V 39/500/42 42 m V 39/500/47 47 m	225 kW 500 kW 500 kW	Available Available Available	Yes

Manufacturers For Wind Machines In India

Sr. No	Indian Manufactures with address	Foreign collaborator	Model	Capacity
1.	Vestas RRB No2., Vembuliamman Koil Street Virugambakkam, Madras- 600092	Vestas Denmark	V-27 V-39	225KW 500KW
2.	NEPC India Ltd. No. 36, Wallajah Road Opp. Kalaivanar Arangam, Madras-600002.	Micon Denmark / Tacke Windtechnik Germany	M700 M600 M750 TW600e	225KW 250KW 400KW 600kW
3.	Enercon(India) Ltd. 44/1.Mehra Estate LBS Marg, Vikhroli, Mumbai-400079	Enercon GmbH Germany	E/30	230KW
4.	Suzlon Energy Ltd, B1, Sahajanand, Swastic Char Rasta, C.G.Road, Ahmedabad-380 009.	Sudwind Energiesysteme GmbH, Germany.	N3127 N3335	270KW 350kW
5.	Bharat Heavy Electricals Ltd. Ranipet-632406 Tamil Nadu, India	Nordex Black Durre Denmark	N29/250	250KW
5.	Asian Wind Turbines (Pvt) Ltd., 4/262, Old Mahabalipuram Road, Kandanchavadi, Chennai – 600 096	NEG Micon, Denmark	M1500 M1800	150/ 600kW
7.	TTG Industries Ltd. TTG House, 36 College Road Madras-600008	Husumer Schiffswerft Germany	250T	250KW
8.	Arul Mariamman Textiles Ltd. (AMTL) 23, Kamaraya Road Mahalingapuram Pollachi-642002	Wind World Denmark	W4200 W3700 W2920	600kW 500 kW 250 kW
9.	Pioneer Wincon Ltd., 774, Anna Nagar, Madurai-625020	Wincon Denmark	W250/29	250KW
10.	Windia Power Ltd., 26, Gobind Mahal, 86/B, Netaji Subhash Road Mumbai-400002	Nedwind Netherlands	NW44 NW40 NW30	550KW 500KW 250KW
11.	Das Lagerwey Wind Turbines Ltd. Developed plot No.35 (SP) Guindy Ind. Estate Madras-600032.	Lagerwey Netherlands	LW18 LW30	80kW 250kW
12.	Kirloskar Electric Co. Ltd. P.B. 5555, Malleswaram West, Bangalore – 560055.	Wind Energy Group UK	MS3/400L	400kW
13.	REPL Engineering Ltd., Cookvel Building, Plot No. D-6, St. No. 20, MIDC-Marol, Andheri (East), Mumbai-400093	Bonus Denmark	MK11 MK11	300kW 320kW 600kW
14.	Elecon Engg. Company Ltd. Vallabh, Vidyanagar, Gujarat - 388120	Turbowinds , Belgium	T400-34	400kW

Selection of Site:

The best locations for positioning a wind turbine include close to a large body of water such as a lake or ocean, or on the top of hills or mountain ridges. Obstructions like trees, buildings, and uneven terrain all serve to reduce wind speed. Before the installation of any wind turbine system, make sure sufficient space exists on site to place the turbine, tower, wires and control equipment. It is also wise to obtain at least a year's worth of wind speed / direction data from an anemometer or the local weather office to evaluate the viability of wind power at the location.

Typically, the wind turbine is used at a remote site to charge up batteries, or in a grid-tied application to supplement utility power. Some wind turbine projects require special zoning applications from the local authorities or may be subject to aesthetic and noise limitations from nearby neighbors. Newer turbines is not expected to generate any TV or radio interference due to their fiberglass or plastic blades and feature much quieter and vibration-free operation than has been historically available. Wind turbines are commonly found near cottages, on sailboats, on farms for water pumping, and near utility power-plants.

Generation PV can help in selecting a turbine, sizing the battery bank, and picking the appropriate controller and inverter. A tower kits from the manufacturer of the wind turbines can also be used.

The unequal heating of the land and water by the sun causes winds on the surface of earth. The differences in temperature gradient induce the circulation of air from one zone to another. Windmills convert the kinetic energy of moving air mass into mechanical motion, that can be used directly to run machines (eg., Pumps) or to generate electricity.

There is an enormous potential for offshore wind farms too. They have the advantage of higher wind speeds, although access is clearly more difficult. Offshore wind energy is an extremely promising application of wind power, particularly in countries with high population density, and thus difficulties in finding suitable sites on land. Construction costs are much higher at sea, but energy production is also much higher. The world's first offshore wind farm is located North of the island of Lolland in the Southern part of Denmark. The world's second offshore wind farm is located between the Jutland peninsula and the small island of Tunø in Denmark. However, in our country offshore wind farm is yet to be popularized.

GEDA has identified over 50 ideal location for setting up Wind farm in the State of Gujarat

Key Issues:

MNES has issued necessary guideline for wind power projects for issuance of necessary clearances. As per these, the State Electricity Board/ State Nodal Agencies are responsible for clearance of Wind Power Projects for issuing No-Objection Certificate after carrying out appraisal of the wind power projects in accordance with the guidelines along with the specific requirements as under:.

(a) DPR

For projects upto 1 MW Capacity submission of application giving details of the projects as per the required format is required. For project the above 1MW capacity a detail project report prepared by an independent consultant is a pre-requisite.

(b) Type Approval and Quality System Certification

The NOC is to be issued only to those projects, which involve installation of duly tested and certified, and quality equipment. Submission and quality system certification (ISO 9000) of manufacturing and installation is a pre-requisite for Indian Manufacturers.

(c) Grid Parameter

It should be ensured that the projects generate power for accordance with a duly laid down a grid parameter. The guidelines provide for penalty to be levied by SEBs if the projects fail to achieve minimum monthly average power factor 0.85 at the metering point. Suitable charge is also levied for a reactive power to discourage drawl reactive power from the grid and to avoid free wheeling of the machine.

(d) Project cost

The estimated capital cost of Wind Power Projects is around Rs. 3.0 to 4.0 crores per MW (US \$ 1000-1200 / kW). O&M costs range from 1-1.5 US cents/KWh. Generation costs are 7-9 US cents. All the costs are experiencing a downward trend with advances in technology.

(e) Land requirement

The land requirement of the one machine is roughly around five acres. Thus the requirement of land comes to around 15-20 acres per MW.

(f) Ministry Environment & Forestry:

Acquisition of land for the purpose of wind energy Extr. Gazette-18 Jan.10 2003.

For wind farm in India certificate from only Govt Agency Centre from Wind Energy Technology (C-WET) is mandatory

The other requirements for establishment of a wind farm for optimal exploitation of the wind are:

- i. High wind resource at particular site
- ii. Adequate land availability.
- iii. Suitable terrain and good soil condition
- iv. Proper approach to site
- v. Suitable power grid nearby
- vi. Techno-economic selection of WEGs
- vii. Scientifically prepared layout

Stages for Implementing Project

- i. Selection of Site
- ii. Preparation of Plan and Lay out
- iii. Acquisition of land
- iv. All Government clearances
- v. Assist in getting finance
- vi. Supply, installation and commissioning of the Project
- vii. Operation of the wind farm
- viii. Offers unique comprehensive "Operation and Maintenance" package which including spares, consumables and any breakdown maintenance at a fixed O&M price.

The government has introduced a package of incentives, which includes tax concessions such as 100% accelerated depreciation, tax holidays for power generation projects, soft loans, customs and excise duty relief's, liberalized foreign investment procedures, etc.

Financial support by IREDA

The Indian Renewable Energy Development Agency (IREDA) Ltd. has been playing a significant role in promoting wind power projects through its well-designed funding programme. Ministry of Rural development Fund, through NABARD may also be utilized for setting up Wind Farm Project. Schemes offered by IREDA for development of wind power in India are given as below:

Schemes Offered By IREDA For Development Of Wind Power In India

For Wind Farm Developers

S. No.	Financing Scheme	* Interest Rate(exclusive of interest tax)	Loan Repayment Period including Moratorium Period (Years)	Moratorium Period (Max.) (Years)	Minimum Promoter's Contribution
1.	i) Development of wind farms on lease basis	13.75%	10	1	25%
	ii) Development of wind farms on ownership basis	13.50%	10	1	25%
	iii) Development of wind farm/ estates with minimum station capacity of 10 MW by Cooperative Sector/ Public Sector/Joint Sector/Private sector Companies on built, own, operate, lease, transfer basis subject to following conditions: *Applicant having minimum net worth of Rs.100 crores *Applicant having AAA (or equivalent) rating.	12.75%	10	1	25%
	iv) New Technology above 750 kW machines	12.50%	10	1	25%
2.	Equipment Financing (up to 1 MW per party per financial year)	14.50 %	10	1	20%
3.	Development of wind farms by Machine suppliers/ manufacturers up to 5 MW/party/per year on built, operate, own, lease, transfer basis.	13.00 %	10	1	25%
For State Electricity Board/Utility					
1.	Grid Interconnection Facility Scheme for Evacuation of Electricity	14.00%	10	1	25 %
For Renewable Energy Users					
1.	Transmission/ distribution facility scheme (where borrower uses not less than 50% of his electricity requirement from renewable energy)	14.00 %	10	1	25 %

* Interest rates has been further reduced by another 1 to 1.75%

Source:

Indian Renewable Energy Development Agency Ltd

New Delhi – 110 003, India

Other Supporting Agencies:

Centre for Wind Energy Technology (C-WET)

The Centre for Wind Energy Technology (C-WET) is formed as an autonomous body by the Ministry of Non-Conventional Energy Sources with the assistance from Danish Government for taking up different issues pertaining to the development of the wind energy in the country on sustainable basis. The main objective of the Institute is to conduct research and development work for indigenous technology, preparation of standard for certification of wind turbines, award of certificate for wind turbines and also undertake consultancy activity

Wind Energy Development Secretariat (WEDS)

The Wind Energy Development Secretariat (WEDS) at Winrock International India (WII) offers diverse services including technical support, site evaluation and financial engineering to facilitate implementation of commercially viable high performance wind energy project in India. Operating through unique partnership with research institutions, equipment suppliers, donors and financial institutions, WEDS aims at achieving large-scale development of 'state-of-the-art' grid-connected and off-grid wind energy projects

Indian Wind Turbine Manufacturers Association (IWTMA)

The All India Wind Turbine Manufacturers Association has been formed in the country with wind turbine manufacturers as main members. The function of the association is to discuss various issues that may require support from different organizations and government and also to take up such issues with the appropriate authority for immediate action so that the wind energy can grow in a healthy way with the penetration of new technology in the country.

Some of the barriers in Wind Power Development:

The main bottlenecks for large-scale development of wind power include the following:

- Distortions in energy market
- Stiff competition from subsidized conventional energy and its universal applicability
- Technological constraint for limited level of grid penetration (20% maximum)
- High capital investment and marginal commercial viability
- Lack of infrastructure for effective power evacuation
- Lack of awareness
- Lack of adequate capital at affordable cost
- Limited access to financial resources and high cost of finance
- Lack of adequate policy and institutional framework
- Lack of trained manpower

Government supports

A favorable fiscal/policy environment exists in India for development of Wind Power. In the last 10 years, wind power development in India has been promoted through R&D, demonstration projects/programmes supported by Government subsidies and fiscal incentives.

A package of incentives is available for promotion of wind farms. This includes tax concessions such as accelerated depreciation, tax holiday, soft loans, customs and excise duty relief's, liberalized foreign investment procedures etc. The income tax, import and excise duty regimes are constantly being reviewed to allow induction, development and deployment of the latest technologies in the Country. Non-conventional energy power policies announced by States with potential for Wind Power Development are as below:

From State Governments

- Energy buyback, power wheeling and banking facilities
- Sales Tax concession benefits *
- Electricity Tax exemption
- Demand cut concession offered to industrial consumers who establish power generating units from renewable energy sources
- Capital Subsidy *

** Not available in Gujarat*

From Central Government

- Income Tax Holiday
- Accelerated Depreciation
- Concessional Custom Duty/Duty Free Import
- Capital/Interest Subsidy

Economics of A Typical Wind Farm

Parameter	Economics
Installed capacity	1MW
Investment	Rs. 4 crores
Expected generation	25 lakh kwh
Power buy back rate of the utility annual escalation	@ Rs 2.80 kwh
Operation & Maintenance cost per annum (including insurance coverage)	Rs. 0.60 lakhs
Pay back period	5-6 years
FIRR	29%
Levelised cost of generation	Rs 2.20/ kwh

The capital cost of wind power projects range between Rs. 4 to 5 crore per MW. This gives a levelised cost of energy generation in the range of Rs. 2.00 to Rs. 2.50 KWh, taking into consideration the fiscal benefits extended by the Government.

Estimated Project Cost And Profitability Analysis

ESTIMATED PROJECT COST

	Rs in Lakhs	
	Cost	Loan amount
1. LAND	25.00	17.50
2. BUILDING(EXT)	10.00	7.00
3. Equipment	482.00	337.40
5. ELECTRIFICATION	20.00	14.00
6. CONTINGENCIES	20.00	14.00
7. OTHER ASSETS	1.00	0.00
8. P & P EXPENSES	10.00	7.00
12. W/C MARGIN	7.19	0.00
Total	575.19	396.90

MEANS OF FINANCE

Rs in lakh

1.CAPITAL(EQUITY)	107.79
2.INT.FREE DEPO.	45.00
3.SUBSIDY	20.00
4. LOAN	396.90
5. DEPOSITS INT. BEARING	5.50
TOTAL	575.19

D.E.R.	2.33 :1
PROMOTER'S CONTRI.	26.56 %
DEPO. TO CAPITAL	3.60 %

PROFITIBILITY ANALYSIS

(1 MW power plant)

Expected energy generation is 28 lacs KWh per annum i.e. worth Rs. 72.80 lack @ of Rs. 2.60 per unit. POWER PLANT ON INDIVIDUAL BASIS

YEARS	I	II	III	IV	V	VI	VII	VIII	IX
Production in Unit lacs KWH	28	28	28	28	28	28	28	28	28
4% Distribution and transmission charges	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12
Energy generated	26.88	26.88	26.88	26.88	26.88	26.88	26.88	26.88	26.88
Income from energy generated Rs 2.60 paisa	69.89	71.23	72.57	73.92	75.26	76.61	77.95	79.30	80.64
Insurance	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12
Operation and Maintenance Charges 2% of project cost5% rise every year	11.00	12.10	12.65	13.20	13.75	14.30	14.85	15.40	15.95
Interest 10%	40.00	40.00	35.00	31.00	26.00	22.00	17.00	13.00	8.50
Installment	--	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
Total	17.77	98.22	93.77	90.32	85.87	82.42	77.97	74.52	70.57
Net profit/ loss	14.99	-26.99	-21.2	-16.4	-10.61	-5.81	-0.02	4.78	10.07

Calculation for captive consumption									
YEARS	I	II	III	IV	V	VI	VII	VIII	IX
Production in Unit lacs KWH	28	28	28	28	28	28	28	28	28
4% wheeling charges minus	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12
Energy generated	26.88	26.88	26.88	26.88	26.88	26.88	26.88	26.88	26.88
4% Transmission loss	25.81	25.81	25.81	25.81	25.81	25.81	25.81	25.81	25.81
Income from wind generated @ Rs 7.00	180.67	180.67	180.67	180.67	180.67	180.67	180.67	180.67	180.67
Insurance	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12
Op. & Ma. Charges 2% of project cost 5% rise every year	11.00	12.10	12.65	13.20	13.75	14.30	14.85	15.40	15.95
Interest 10%	40.00	40.00	35.00	31.00	26.00	22.00	17.00	13.00	8.50
Installment	--	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
Total	52.12	97.12	93.77	90.32	85.87	82.42	77.97	74.52	70.57
Net profit/loss	128.55	83.55	86.9	90.35	94.8	98.25	102.7	106.15	110.1
Depreciation 80% of the fix investment of Rs 5 crore	Op Dep	400.00	271.45	187.9	101.00	10.65	--	--	--
	-Profit	128.55	83.55	86.9	90.35	94.8	--	--	--
	Cl Dep	271.45	187.9	101.0	10.65	-----	--	--	--
Income tax	-	-	-	-	84.15	98.25	102.7	106.15	110.1
Relief	100%	100%	100%	100%	100%	30%	30%	30%	30%
Refund in tax	--	--	--	--	84.15	29.48	30.81	31.85	33.03
Taxable income	--	--	--	--	--	68.77	71.89	74.3	77.07

(1) Depreciation is calculated @ 80% as per provision of I T section 32 IA

(2) I T Relief is calculated as per the section 295 IT act 1963(43 of 1961)

N.B.. The profit may increase further if it is taken under TUF scheme by any Textile unit.

Remark:- Project is very much advantageous if it is for Captive consumption and becomes further attractive if it is done by existing Textile unit.

**Policies Introduced / Incentives Declared by the State Governments for
Private Sector Wind Power Projects - State Incentives**

Items	Andhra Pradesh	Gujarat	Karnataka	Kerala	Madhya Pradesh	Maharashtra	Rajasthan	Tamil Nadu	West Bengal
Wheeling	Rs.0.50 per kWh as network charges & 28.4% of energy as system loss	4% of energy	20% of energy	5% of energy	2% of energy	2% of energy	2% of energy	5% of energy	2% of energy
Banking	12 Months	6 Months	2% per month for 12 Months	6 Months	-	12 Months	12 Months	5% (2 months; balance on 31 st March to lapse)	6 Months
Buy-back	Rs.2.25 per kWh (5% escalation, 1994-95)	Rs.2.60 per kWh (escalation of 5 paise per year for 10yrs)	Rs.2.25 per kWh (5% escalation, 1994-95)	Rs.2.80 per kWh (5% escalation, 2000-01)	Rs.2.25 per kWh (no escalation)	Rs.2.25 per kWh (5% escalation, 1994-95)	Rs.2.89 per kWh (5% escalation, 1999 - 2000)	Rs.2.70 per kWh (no escalat-ion)	To be decided on case to case basis
Third Party Sale	Not Allowed	Not allowed	Allowed	Not allowed	Allowed	Allowed	Allowed	Allowed	Not allowed
Capital Subsidy	20% (max Rs.25 lakhs)	-	-	-	Same as for Other industries	30% (max Rs.20 lakhs)	-	-	-
Other Incentives	Industry Status	Exemption of E.D. & demand cut to the extent 30% of installed capacity	No electricity Duty for 5 yrs	Industry Status, Exemption from entry tax & octroi	-	-	No electricity Duty for 5 yrs	-	-
Penalty on kVArh consumption	10 paise per kVArh	Nil	40 paise per kVArh	Nil	27 paise per kVArh	25 paise per kVArh	Nil	50paise per kVArh upto 10% of active power exported & Re.1 per kVArh for more than 10% of active power exp.	

Incentives and Support from Government of India

Reduction of Import duties (As per Customs Notification No. 21/2002 item no. 224, conditions no. 3 dated 1st March 2003)

A. Indirect Taxes

i.

Sl.	Item	Duty rates		
CUSTOM DUTY		Basic	Addl.	Spl. addl
Wind Energy (notification No. 21/2002 item No. 224, condition No. 35, dated 1-3-2003)				
i)	Wind operated electricity generators upto 30 kW and wind operated battery chargers upto 30 kW	5% For actual users	0%	4%
ii)	Parts of wind operated electricity generators for manufacturer of wind operated electricity generators, namely:	”	”	”
iii)	Blades for rotor of wind operated electricity generators for the manufacturers or the manufacturers of wind operated electricity generators.	”	”	”
iv)	Parts for the manufacturer or the maintenance of blades for rotor of wind operated electricity generation	”	”	”
v)	Raw materials for manufacturer of blades for rotor of wind operated electricity generators	”	”	”
Chapter No. 85 item No. 85.02				
8502.31	Wind operated electric generators	25%	Nil	4%
8503.00	Parts of Wind electric generators	25%	Nil	4%
Excise Duty		Basic duty rate		
Specified Non- Conventional devices/system (Notification No.6/2003 item No. 237, list 9)		Nil		

NOTIFICATION-INCOME TAX

S. O. 1046 (E)- In exercise of the powers conferred by section 295 of the income-tax act 1963 (43 of 1961), the central Board of Direct Taxes hereby makes the following rules further to amend the income tax Rules, 1962, namely:-

1. (1) These rules may be called the income-tax (Twenty Fourth amendment) Rules, 2002
- (2) They shall come into force from the 1st day of April, 2003

Under Income Tax Rules following concessions are available to non-conventional energy sector:

Section 32

1. Rates of depreciation will be 80% on specified renewable energy based devices / projects under, section 32 IA
2. Industrial undertakings set up any part of India for the generation or generation and distribution of power at any time during the period beginning on the 1st day of April 1993 and ending on 31st day of March 2006. 100% deduction from profit and gains for first five years and thereafter 30% of the profits and gains. This benefit can be availed for any 10 consecutive assessment year in which that industrial undertaking begins generation or generation and distribution of power.
3. Income by way of dividends, interest or long term capital gains of infrastructure capital fund or infrastructure capital company from investment by way of shares of long term finance in any enterprise wholly engaged in the business of developing, maintaining and operating any infrastructure facility and which has been approved by the Central Government on an application made by it in accordance with the rules made in this behalf and which satisfies the prescribed conditions.
4. For the purpose of this clause among other things infrastructure facility means a project for generation and distribution of Electricity or any other form of power where such project starts generating power on or after the 1st April 1993.

Gujarat - Wind Power Generation Policy - 2002

Policy for wind power development in the Gujarat State has been declared vides Govt. Resolution No.EDA-10.2001-3054-B (Part-II) dated 20.06.2002. The major points of the policy are as below:

Wheeling:	4% of energy
Banking:	6 months
Buy Back:	Rs.2.60/kWh with escalation of 5 paise per year for 10 years.
Third Party Sale:	Not allowed.

Key Elements – Under this Policy

1. This policy will remain in operation for a period of five (5) years. The eligible period should however be twenty years or the life span of the wind energy generator whichever is earlier.
2. No cash incentives or Sales Tax incentives are available primarily
3. Industrial units may be allowed to wheel-power to their own manufacturing units (maximum upto two units) within the State at a wheeling price to be paid by them. Wind energy generating units may also be allowed at their option to sell electricity to the Gujarat Electricity Board at a fixed price to be paid per unit. It should be made obligatory for them to give the option and the option once exercised should not be changed.

Non-industrial non-manufacturing units and developers may also be allowed to set up wind generating units where they will have to sell electricity to the Board and may not be permitted to wheel power to any unit other of their own or to a third party.

4. The beneficiary may set up a wind farm on its own land / or private leased land within the eligible sites or leased land of the Gujarat Energy Development Agency. Unless the developer has purchased the land since the land has already been acquired by GEDA
5. The Gujarat Electricity Board may purchase electricity generated by such wind energy generating units at Rs 2.60 per unit. An increase of 5 paise is to be provided every year for 10 years. After the 10th year, the rate will be negotiable. The industrial undertaking setting up wind energy generators while opting for wheeling the electricity to their manufacturing units may be allowed to do so at a wheeling charge of 4%. Third party sale of electricity is not permitted under this policy. The surplus energy generated could be banked for a period of 6 months with GEB/ AEC/ SEC/licensee for a maximum period of 6 months. The electricity generated from the windfarm would be metered on a monthly basis jointly by GEDA/GEB at sending sub-station located at the wind farm site at 66 KV.
6. Exemption from Payment of Electricity Duty and exemption from demand cut to the extent of 30% of the installed capacity of the windfarm is allowed.
7. Wind energy generators, which are type tested and approved by the international testing houses recognized by the Ministry of Non Conventional Energy Sources, should be made eligible.

8. The Gujarat Energy Development Agency, Baroda will function as Nodal Agency for the purpose of implementation of Wind Power Generation Policy 2002.

Following is the list of Wind farm unit in Gujarat and their capacity. Majority of this projects are used for captive consumption.

PRIVATE WINDFARM INSTALLED IN GUJARAT

Sr. No.	Name of the Company	Installed Capacity MW	Sr. No.	Name of the Company	Installed Capacity MW
Site Lamba			Site Navadra		
1.	Gujarat Gas Co Ltd	1.000	1.	Arvind Mills Ltd	6.200
2.	Madhusudhan Inds Ltd	1.000	2.	Gopi Synthetics Ltd	0.450
3.	Ciba-Atul Ltd	2.500	3.	Anil Starch Prods. Ltd	0.675
4.	Elecon Engg Ltd	0.850	4.	Anik Steels Ltd	0.900
5.	Emtici Engg Ltd	0.250	5.	Crown Television Ltd	0.225
6.	Power Build Ltd	0.550	6.	Omkar Textile Mills Ltd	0.225
7.	Eimco Elecon India Ltd	1.050	7.	Jalan Ispat & Castings Ltd	1.000
8.	GSL India Ltd	2.325	8.	Trumac Engg Co. Ltd	1.920
9.	Maneklal Harilal Mills Ltd	1.000	9.	Amol Dicalite Ltd	0.225
10.	Amol Dicalite Ltd	0.250	10.	Rajahansh Metals Ltd	0.640
11.	Kalpataru Power Trans. Ltd	0.250	11.	Apar Ltd	2.000
12.	Rughavir Synthetic Ltd	0.500	12.	Choksi Tube Ltd	1.840
13.	Antifriction Bearing Ltd	1.350	13.	Ashwin Vanaspati Inds.Ltd	0.225
14.	Mipco Seamless Rings Ltd	0.750	14.	Elecon Engg.Co.Ltd.	2.400
15.	Indian Gum Inds Ltd	0.750		Sub Total	18.925
16.	Indo-Nippo Chemical Co Ltd	0.950	Site Bhogat		
17.	Amol Dicalite Ltd	0.225	1.	Arun Udyog Ltd	0.320
18.	LD Textile Ltd	2.050	2.	Vadilal Inds. Ltd	0.640
19.	Valecha Engg	0.850	3.	Gujarat Machinery Mfrs.Ltd	0.800
20.	Navneet Publication(I) Ltd	0.800	4.	Sintex Inds.	0.960
21.	ABS Inds Ltd	2.400	5.	Dhariwal Tobacco Prod.Ltd-1	0.900
22.	Ahmedabad Steel Craft Ltd	0.225	6.	Dhariwal Tobacco Prod.Ltd-2	4.050
23.	Sandesh Ltd	0.750	7.	Ashok Transformer P.Ltd.	0.350
24.	Niranjan Mills	0.500	8.	Gujarat Mitra Pvt Ltd	0.350
25.	Electrical Control Gears (I) L	0.250	9.	Devpran Inds. Ltd.	0.180
26.	Alpha Packing Pvt Ltd	0.225	10.	Rider Electronics Ltd	0.180
27.	Synthetics & Polymers Ind. Ltd	0.225	11.	Klenzian Biotech Devices	0.180
28.	Hindustan Inks & Resins Ltd	0.500	12.	Sintex Inds.-II	1.280
29.	Mistu Intermediates Ltd	0.500	13.	Ellora Time Pvt Ltd	1.050
Sr. No.	Name of the Company	Installed Capacity MW	Sr. No.	Name of the Company	Installed Capacity MW
30.	Kinariwala RJK Inds	0.225	14.	Ajanta Trans.Clock.Mfg.Co	1.400
31.	Rolcon Engineers Co Ltd	0.450	15.	Ajanta Watch Ltd	0.350
32.	Krishnonics Ltd	0.225	16.	Dhariwal Tobacco Prod.Ltd-3	3.500

33.	SAG Windpower	0.450	17.	Bhawati Spherocast Ltd	0.350
34.	Shamco Plastics Pvt Ltd	0.200	18.	Ajanta Trans.Clock.Mfg.Co-3	1.050
35.	Alok Trdg.& Invest.Pvt.Ltd	0.200	19.	Ellora Time Pvt Ltd-2	1.750
36.	Arunoday Mills	0.300	20.	Jivraj Tea Co. Ltd	0.350
37.	Vishal-Deep Spinning Mills	0.300	21.	Dhariwal Tobacco Prod.Ltd-4	3.600
38.	Gujarat Petro synthesis Ltd	0.960		Sub Total	23.590
39.	Vadilal Inds Ltd	1.280		<i>Site Okha-Madhi</i>	
40.	Gujarat Machinery Mfrs.Ltd.	1.000	1.	Gujarat Gas Ltd	2.000
41.	Ajanta Transistor Clock Co	2.800		Site Vadekhan	
	Sub Total	32.215	1.	IPCL	5.625
	<i>Site Dhank</i>			<i>Site Pransla</i>	
1.	Nirma Ltd	5.950	1.	Pandesara Dyes & Int.P.Ltd.	0.200
2.	Suzion Fibers Ltd Unit-1	0.225	2.	Sodium Metals P. Ltd	0.800
3.	Suzion Fibers Ltd Unit-2	0.225	3.	Rubamin Pvt Ltd	0.600
4.	Prashant India Ltd	1.000	4.	Vipan Inds. Ltd.	0.200
5.	Elecon Engg. Co. Ltd	1.200	5.	Himalaya Machinery P.Ltd.	0.200
6.	Elecon Engg. Co. Ltd	3.300	6.	Colour Synthetics India Ltd	0.200
7.	Excel Inds.	2.700	7.	ABS Inds. Ltd(Nandesari)	2.000
8.	Gujarat Telephone Cables L.	3.000	8.	ABS Inds. Ltd(Poicha)	0.400
9.	Vishal Malleables Ltd	2.000	9.	Sabarmati Papes Ltd	0.600
10.	ABS Inds. Ltd	1.800	10.	Baroda Electric Meters Ltd	0.300
11.	Electrotherm India Ltd	0.500	11.	Peass Indl. Engg. Ltd.	0.300
12.	Harsha Engineers P.Ltd.	0.250	12.	VVN Mfg. & Invest. Ltd	0.300
13.	Transformers & Rectifiers I.L.	0.250	13.	Emico Elecon India Ltd	0.600
14.	IPCL	4.740	14.	Rohi Paper & Pulp Ltd	0.300
15.	Kanoria Chem.& Inds.Ltd.	2.000	15.	Pedilite Ind. Ltd	0.690
16.	Sterling Engineers Ltd	0.250	16.	Elecon Engg. Co. Ltd	0.300
17.	Ellora Time Pvt Ltd	1.000		Sub Total	7.990
18.	Ajanta Transistor Clock.Mfg.Co	1.000		<i>Site Risalka</i>	
19.	ABS Inds. Ltd	1.800	1.	Konart Engineering	0.200
20.	Elecon Engg. Co. Ltd.	0.600	2.	Patodia Textiles Inds. Ltd	0.800
	Sub Total	33.790	3.	Bhukhanwala Diamond Tools L.	0.200
	<i>Site Mervadar</i>		4.	Himalaya Machinery Ltd-II	0.280
1.	Banco Aluminium Ltd	0.400	5.	Himalaya Machinery Ltd-II	0.140
2.	Banco Products Ltd	0.800		Sub Total	1.620
3.	Motorol India Ltd	0.400		<i>Site Kalyanpur</i>	
4.	Pearl Energy & Infra Ltd	1.080	1.	Indo-Nippon Chemicals Co Ltd	0.900
5.	Rainbow Papers Ltd	0.630	2.	Electric Control Gears India L.	0.450
6.	Rajhans Foods Ltd	0.360	3.	Kalpataru Power Transmission L	0.450
7.	Nirmals Tubes & Containers L.	0.090	4.	Narmada Hybrid Seeds Co Ltd	0.225
8.	Nirmals Tubes & Containers L.	0.090	5.	Vijay Jyot Seats Ltd	0.450
9.	Reliable Dyechem P. Ltd	0.180	6.	Hepolin Ltd	0.450
10.	Neela Infrastructures Ltd	0.360	7.	Vimal Oil & Food Ltd	0.225
11.	Shree Extrusions Ltd	0.360	8.	Zandu Pharma.Works Ltd	0.450
12.	Urja Engineers Pvt Ltd	0.090	9.	NEPC Agro Foods Ltd	0.225
13.	Komal Automiser Pvt Ltd	0.180	10.	Bhagwati Spherocast Ltd	0.225
14.	IPCL	4.950		Sub Total	4.050
15.	Pandesara Dyes & Ind. Ltd.	2.430		<i>Site Patelka</i>	
16.	Color Synth Ind. Ltd.	0.720	1.	Madhusudhan Inds.	2.500

17.	Vipan Industries	1.080	2.	Syntex Inds. Ltd.	1.350
18.	Vinay Printing Press	0.180	3.	Jaybharat Fabrics Mills Ltd	0.225
19.	Shree Yogi Steel Pvt Ltd	0.540	4.	Hipolin Ltd	0.225
20.	Hipolin Ltd	0.540		Sub Total	4.300
	Sub Total	15.460			

GRAND TOTAL : 149.565 MW

Source: Gujarat Energy Development Agency (GEDA), Suraj Palza, Part-II, Sayaji Gunj, Vadodara – 390005
Tel: 0265-363123, 362058, 361409, Fax: 0265-363120, Email: geda@ad1.vsnl.net.in

GEDA, the Nodal Agency for the purpose of implementation has already identified location, suitable for setting up wind farm in the State as shown in the list.

List Of Suitable Sites & Available Wind in Gujarat (Identified location by GEDA)

State Sr. No.	Station	Latitude °N		Longitude °E		Annual Wind Speed (KMPH)		Annual Mean Wind Power Density (W/m ²)	
1	ADESAR	23	33	70	57	15.60	18.60	93	156
2	AMPRAPAR (GIR)	21	11	70	25	19.67	21.29	147	186
3	AMPRAPAR (SETH)	21	44	70	03	19.17	20.20	151	176
4	BAMANBORE II	22	26	71	30	20.30	21.50	171	199
5	BAYATH	22	56	69	11	17.65	20.06	118	179
6	BHANDARIYA	22	06	69	43	19.50	20.40	162	180
7	DHANK 1	21	48	70	08	24.40	25.50	312	353
8	DHANK 2	21	48	70	07	25.10	25.50	327	344
9	GODLADHAR	22	03	71	20	19.45	22.50	144	216
10	GALA	22	19	70	05	19.76	21.06	175	205
11	HARIPAR	22	16	69	38	20.06	21.19	160	186
12	HARSHAD	21	50	69	22	20.00	21.40	164	193
13	JAFRABAD	20	54	71	24	17.50	19.90	137	176
14	JAMANVADA	23	35	68	36	18.60	20.70	149	202
15	KALYANPUR	22	03	69	24	22.10	23.70	208	253
16	KERA	23	04	69	36	19.42	20.41	135	156
17	KUKMA	23	11	69	47	19.20	20.60	150	184
18	LAMBA	21	54	69	19	20.00	21.10	164	191
19	LIMBARA	22	32	70	59	19.10	20.10	166	190
20	MAHIDAD	22	13	79	08	21.50	22.10	178	190
21	MESARIA	22	28	71	06	18.78	19.91	131	154
22	MOTI SINDHOLI	23	11	68	43	17.50	20.40	118	180
23	MUNDRA	22	47	69	43	19.50	21.30	168	217
24	NANI KUNDAL	21	55	71	28	20.00	21.90	163	209
25	NAVADRA	21	57	69	16	20.80	22.40	183	226
26	NAVI BANDER	21	26	69	47	19.50	20.50	153	176
27	OKHA	22	27	69	03	19.40	20.60	150	191
28	OKHAMADHI	22	06	69	06	19.00	20.20	129	159
29	POLADIYA+	23	06	69	12	20.36	22.00	174	215
30	RATABHE+	22	56	71	02	17.50	19.40	123	154
31	SANODAR	21	35	72	11	22.46	24.19	197	254
32	SINAI	23	03	70	04	20.78	21.84	183	207
33	SURAJBARI	23	14	70	39	19.50	22.00	184	268
34	SUVARDA	22	23	70	07	20.20	21.50	166	196
* 25 metre mast + Relocated Stations @ State Projects									

Advantage of Wind Farm over other Industries:

- a. No cost involvement

Like: Raw Materials, Transportation, Taxation etc.

- b. Minimum labour input
- c. No demand supply problem
- d. Both Raw material (wind) and Demand (power) are abundant
- e. Close monitoring not required
- f. Minimized theft robbery or any accident problem.
- g. Minimum operating and maintenance expanses
- h. 24 hours operating is possible
- i. Skilled staff is not required for day to day work
- j. Clean and environment friendly production
- k. Assured return and as per calculation
- l. No threat from International competition
- m. Fixed deposit like investment
- n. Always growing demand

Observation and Conclusion:

- a. Based on various State Government policy and support prime cost for power generation per KWh from Wind farm comes to around Rs 1.90 to 1.95. This means that the selling price is expected to be at least Rs 3.00 per KWh considering wheeling charge, Sales tax, and others.*
- b. Uniform purchase policy needs to be adopted by all states*
- c. Grid net work should be developed and planned to avoid distribution and transmission losses*
- d. Minimum viable project size should be 1 MW*
- e. Encouragement may be made for captive consumption to make more viable proposition*
- f. Liberal support may be extended to Co-operative sector*
- g. Possibility of Off-Shore Wind Mill Project (as is available in developed countries) may be mooted*
- h. Purchase Tariff needs to be different during different season.*
- i. Possible development of new tourist spot/ place of film shooting etc. with wind farm project may be examined.*
- j. Idea of creating Wind Farm Park in coastal line area of Gujarat may be mooted. This will in turn develop the area for tourist spot and /or cause a social and economical development of the local people below poverty line.*
- k. A suitable site creation of logistic data and mechanism may be worked out through non-govt. organization/ Pvt. Developers.*
- l. To encourage foreign investment in this sector.*
- m. Higher Wind Potential area needs to be privatized for fastest growth in this sector.*
- n. Bank/financial Institute may be allowed to take infrastructure bond (wind farm) and in turn offer soft loan to investors.*

- o. Statutory purchase policy may be evolved e. g. In Germany industry has to purchase energy from wind farm statutory 10% of their requirement*
- p. Nodal agency like GEDA may be empowered to get easy clearance both from state and union govt.*
- q. Possibility of the useful fund from Ministry of Rural Sector through Nabard may be worked out suitably.*
- r. Ireda is the only financial institute providing financial assistance to wind farm on easy terms and condition. However, they should also reduce rate of interest with the prevailing changed ROI.*
- s. A need to encourage Top 50 companies of Gujarat to go for wind farm in big way.*
- t. Existing Process Houses at Surat and Ahmedabad may be encouraged to take advantage of TUF Scheme for setting up Wind farm in Gujarat with subsidized rate of interest.*
- u. State Government should consider third party sell of power generation and / or possible increase of buyback rate for GEB in the tune of Rs 3.50 per KWh and at par with that of other State like Maharastra and Tamil Nadu.*
- v. Promotion of Wind farm possibly one of the major step to uplift below poverty level people in the coastline area of Gujarat.*
- w. Finally, by any means, promotion of Wind Farm specially for captive consumption is very much essential, since the cost of power in the state is the highest in the country.(Annexure III)*

Overall, Gujarat has an enormous potential for setting up new Wind Farm Projects, in specific, for captive consumption. Most Potential Areas are Mandvi and Kutch of Gujarat.

Project and Technology Division

iNDEXTb

INDUSTRIAL EXTENSION BUREAU

(A GOVT. OF GUJARAT ORGANISATION)

BLOCK NO. 18, 2 nd FLOOR, UDYOG BHAVAN, GH-4, SECTOR-11,

GANDHINAGAR-382 017, GUJARAT, INDIA

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WEBSITE : <http://www.gujaratindustry.gov.in> , www.indextb.com

CALCULATION OF I.R.R

YEAR	CAPITAL ASSETS	ADDITION IN C.A.	TOTAL OUTFLOW	TOTAL INFLOW	NET INFLOW
0	557.49	0.00	557.49		-557.49
1		13.65	13.65	229.18	215.53
2		0.98	0.98	230.30	229.33
3		0.98	0.98	233.93	232.95
4		0.98	0.98	239.35	238.38
5		0.00	0.00	246.64	246.64
6		0.00	0.00	254.83	254.83
7		0.00	0.00	264.04	264.04
8		0.00	0.00	250.77	250.77
9		0.00	0.00	250.77	250.77
10		0.00	0.00	295.22	295.22
INTERNAL RATE OF RETURN=				40.34 %	

SENSITIVITY ANALYSIS for 1 MW Project

SALES VALUE	CAPACITY UTILISED	NO OF SHIFTS	REPAY. PERIOD	MORATO. PERIOD
270.00	95.00	3.00	10.00	12.00
742.50	95.00	3.00	10.00	24.00
750.00	95.00	3.00	10.00	24.00
675.00	95.00	3.00	10.00	24.00

D.E.R	PROMPT. CONTRI.	D.S.C.R	B.E.P
2.33	26.56	1.86	50.66
1.51	39.76	1.47	69.62
1.50	39.92	1.24	77.97
1.57	38.76	1.79	58.25

I.R.R	N.P TO SALES	G.P TO SALES
40.34	42.23	63.03
20.61	0.66	0.99
18.06	0.31	0.46
23.82	1.16	1.73

CAPTIVE POWER POLICY

**Energy & Petrochemicals Department
Government of Gujarat**

Resolution No.CPP 1197/2253/PP Cell

Sachivalaya, Gandhinagar.

Dated the 9th November, 1998.

Policy for Supply of Surplus Electrical

Power to Group Companies & GEB/Licensees, Wheeling of Power, etc. by Captive Power Projects.

RESOLUTION	
Read : Power Policy of the State of Gujarat announced in December, 1995. State Government had announced its Power Policy in December, 1995. Government of Gujarat hereby declares the policy for supply of surplus electrical power to group companies and Gujarat Electricity Board (hereinafter referred to as G3B)/Licensees, Wheeling of Power, etc. by Captive Power Projects.	
2	This policy comes into force at once.
3	Setting up of captive power plant and supply of surplus electrical power to group companies
▶	Any industrial undertaking intending to set up captive power plant requires previous consent of GEB under section 44(1) of the Electricity (Supply) Act, 1948, subject to compliance of the conditions laid down therein. GEB would give such consent/s and permit to supply surplus electrical power from such captive power plants to its group companies. Sanction of the State Government as required under section 28 of the Indian Electricity Act, 1910, subject to compliance of the conditions for the same, would be granted for power supply to group companies as defined hereunder
▶	<p>Group Companies</p> <p>For the purpose of this resolution, the Companies shall be deemed to be under the same group if any one of the following conditions are satisfied</p> <p>i) Not less than 26% of the voting power in respect of the both the Companies are exerciseable by same individual or body corporate.</p> <p>ii) Either a power receiving company or a power supplying company (from the captive power plant) when continues to hold atleast 26% of issued share capital in the other company.</p>
▶	<p>Tariff for supply to the group company</p> <p>Section 28 of the Indian Electricity Act, 1910, empowers the State Government to prescribe terms and condition s relating to Electricity Supply and Tariff for such supply. In exercise of the said power, ;it is resolved that a company supplying electrical energy to any group company would recover energy charges from its group companies in proportion to energy consumed on pro-rata cost sharing and on no profit no loss basis. The price and method of charging shall not be violative of any of the provisions of the Indian Electricity Act, 1910 and the Electricity (Supply) Act, 1948 or of any of the guidelines issued by the Central or State Government, or any statutory authorities. However, the Electricity Duty and Tax on Sale of Electricity would bed payable in respect of power wheeled/supplied on the rate at which power is supplied by GEB/Licensee to group companies. In this respect, Agreement shall have to be</p>

	executed between the parties.
►	<p>Payment of Electricity Duty and Tax on Sale of Electricity</p> <p>The electrical energy supplied/ wheeled to different recipient units of group companies from the captive power plant of a supplying company would be subjected to payment of Electricity Duty as per schedule I of the Bombay Electricity Duty Act, 1958 and Tax on Sale of Electricity as per the provisions of Gujarat Tax on Sale of Electricity Act, 1985, as amended from time to time.</p>
4	<p>Wheeling of Power</p> <p>Wheeling of electrical power from captive power plant of an industrial Company to the other industrial units within the same company or to any/all industrial units of its group companies will be allowed on the following terms</p>
►	<p>Wheeling terms</p> <p>(i) Recipient unit shall have to maintain minimum contract demand equivalent to power to be wheeled. Any excess drawl of power beyond contract demand shall be charged as per Board's/Licensee's applicable tariff.</p> <p>(ii) No night hour tariff concession shall be admissible for power consumed/drawn from the grid during night period.</p> <p>(iii) System losses shall be considered as 10% for power delivered at EHV and 15% in case of power delivered at HV and the same would be deducted from the account of recipient unit.</p> <p>(iv) Cost of new sub-stations, augmenting existing sub-stations/transmission lines/strengthening of existing lines etc. wherever needed for power evacuation from the captive power plant for wheeling purposes shall be borne by the owner of the captive power plant.</p> <p>(v) Minimum quantity of power to be wheeled shall not be less than 5% of the installed capacity of the captive power plant or 5 MW, whichever is more, among the group companies taken all together, subject to the condition that supplying company consumes at least 50% of the generated power. If quantum of wheeled power is less than 5 MW, wheeling charges payable, will be calculated on normative basis as if 5 MW power has been wheeled.</p> <p>(vi)</p> <p>(a) Industries which are situated in compact and contiguous areas and do not require the support of GEB/Licensee system for wheeling purposes shall be allowed to meet one another's requirements from the CPP without any minimum limit as specified herein above subject to conditions laid down under sanction granted under section 28 of the Indian Electricity Act, 1910.</p> <p>(b) The wheeling account shall be settled at the end of every calendar month in the following manner</p> <p>--For the period between 0.00 hours to 22.00 hours - Slot-I.</p> <p>--For the period between 22.00 hours to 6.00 hours next day - Slot.II.</p> <p>Energy wheeled should be accounted separately for each Slot without giving credit in the other Slot. Any excess units supplied, resulting in net supply to Gujarat Electricity Board are to be treated as unintended flow and are not to be accounted for.</p>

	<p>(b) The wheeling account shall be settled at the end of every calendar month in the following manner</p> <p>--For the period between 0.00 hours to 22.00 hours - Slot-I.</p> <p>--For the period between 22.00 hours to 6.00 hours next day - Slot.II.</p> <p>Energy wheeled should be accounted separately for each Slot without giving credit in the other Slot. Any excess units supplied, resulting in net supply to Gujarat Electricity Board are to be treated as unintended flow and are not to be accounted for.</p> <p>(vii) In case where captive power plants deliver energy in excess of the energy consumed by the recipient unit/s (after accounting for the system loss), GEB/Licensee shall not be liable to make payments towards such excess energy supplied being inadvertent flow when GEB/Licensee does not require the same.</p> <p>(viii) Wheeling of power shall not be allowed when system frequency is 51Hz and above.</p> <p>(ix) Load restrictions measures shall not be applied on recipient units for the power wheeled from the captive power plants.</p> <p>(x) Normal wheeling of power shall be at power factor as near to unity as possible (within band of 0.95 lag and lead). At the same time whenever Gujarat Electricity Board has asked for supply of Net Power into Gujarat Electricity Board's system from captive power plant, adequate amount of reactive power will have to be supplied by captive power plant i.e. at power factor of 0.8 lag or lower.</p>
	<p>► Wheeling charges</p> <p>Recipient unit shall pay to GEB/Licensees wheeling ;charges at the rate of 13.5 paise per Kwh and at 21 paise per Kwh for power delivered at E-V and HV respectively. These charges shall be valid for the financial Year 1998-99 and shall be subject to revision from time to time. The wheeling charges shall be worked out for every year on the basis of Power Grid Corporation of India Ltd.'s method adopted for calculation of wheeling of central sector's power to GEB/Western Region.</p>
5	<p>Purchase of Surplus Power</p> <p>GEB, may its option and depending upon the system requirement, purchase surplus power from the captive power plant. The rate for purchase of such surplus power would depend on the fuel being used and would be on fuel cost basis, 'where fuel cost will be decided by GEB on normative basis for each quarter for each type of fuel and gross calorific value. This normative prices would be decided on the basis of national Oil Companies.' Prices for fuels meant for power generation & Fixed cost payment of 30 paise and 20 per unit will be given for peak and off-peak hours respectively.</p> <p>The fuel utilisation rates depending on fuel would be calculated based on SHR of 1900 Kca/Kwh for liquid/gaseous fuel and SHR of 2400 KCal/Kwh for solid fuel with auxiliary consumption of 3% and 9% respectively.</p> <p>The technical arrangement/evacuation system needed to supply surplus power would be worked out between Captive power plant unit and GEB/Licensee mutually and the same will be implemented ordinarily by or through the Company putting up Captive Power Plants as per GEB's specifications</p>

6	Banking Banking of electrical power with GEB/Licensee would not be permitted
7	Standby Generating Sets Permission for installation of standby generating sets to work as additional source of power would be permitted up to 2 (two) times the consumer's contract demand/contracted load with GEB/Licensee or demand equivalent to capacity of its own regular source of power supply. Additional source of power means generating capacity available in addition to its own regular source of power or that availed from GEB/Licensee.
8	Contract Demand The industries on commissioning of captive power plants will be allowed to reduce their existing contract demand upto a level of 25% of their original contract demand (e.g. if the contract demand is 1000 KVA it can be reduced to any level upto 250 KVA depending upon the need of the consumer) when they intend to have parallel operation with the Grid. However, no contract demand would be necessary would be insisted upon if the industry with the captive power plant intends to operate on stand alone basis. In case of new connections, the contract demand for parallel operation may be fixed as per the requirement of the consumer Drawl of power from the State Grid by the industrial unit would be subjected to applicable tariff of GEB/Licensee.
9	Fees and Charges a) While granting the consent for installation of Captive Power Plant, the fees shall be charged as decided by GEB/Licensee. b) Parallel operation charges shall be charged at the rate fixed by GEB/Licensee with the approval of the Govt.
10	All the adhoc arrangements allowed for wheeling and reduction of contract demand shall be regularised in accordance with the provisions contained in this resolution.
11	The Electricity Duty payable by industrial undertaking(s) on self generated consumption as contemplated under Bombay Electricity Duty Act, 1958, will be as per the rates specified ;under Schedule-II of the said Act as amended from time to time. Revised rates of Electricity Duty will be applicable to all cases of Captive Generation /Consumption after completion of period of exemption as per the provisions of Bombay Electricity Duty Act, 1958.
12	The State Govt. may review this policy in future in the light of actual experience gained so as to effectively fulfil the objectives of State Power Policy, 1995.
13	The Government Resolution Energy & Petrochemicals Dept.'s No.CPP-1197/Gol-65/PP Cell dated 22.12.1997 is hereby withdrawn.
14	This issues with the concurrence of the Industries & Mines Dept. And Finance Dept. Dated 9th September, 1998. By order and ;in the name of Governor of Gujarat, (Sanjay Gupta) Joint Secretary to Govt. of Gujarat Energy & Petrochemicals Department

Comparative Energy Cost in Various States

Name of the State	(in paise)			
	Gujarat	Maharashtra	Rajasthan	Tamil Nadu
Domestic (1-10) K W	564-699	208-452	295-274	269
Commercial (5-10) K W	844-886	426-671	555-564	428
Small Industry (5-10) K W	607-634	312-350	391	208-386
Medium Industry 50 KW	665	365	453-443	406-416
Large Industry 250 KW	695-747	441-420	442-432	409-420

Source: CMIE May, 2003

Wind Power Generation Policy – 2002

Government of Gujarat
Energy & Petrochemicals Deptt.
Govt. Resolution No. EDA-10-2001-3054-B (Part-II)
Sachivalaya, Gandhinagar
Dated the 20th June, 2002.

Resolution

Gujarat has the longest coastline in the country and the potential for wind energy in the State has been estimated at around 5000 MW on the coastline of Saurashtra and Kutch. The Gujarat Energy Development Agency in collaboration with the Indian Institute of Meteorology, Bangalore has identified several excellent sites for wind power generation in the State. The Govt. of India has also announced guidelines for Wind Energy. The formulation of a sustainable Wind Power Generation Policy was therefore under the active consideration of the State Government. After due consideration, the State Govt. has decided to declare Wind Power Generation Policy, 2002. The salient features of the policy are as under:

1. **TITLE:**

This scheme shall be known as the **Wind Power Generation Policy, 2002.**

2. **Operative period**

This policy will come into force with the date of issue of this Govt. Resolution. This policy will remain in operation for a period of five (5) years. It would be necessary to clarify that the **operative period** would mean that the beneficiaries who set up wind energy generating units during the said period of five (5) years and units installed during this operative period of the policy would become eligible for the benefits which would be declared in the policy. The eligible period should however be twenty years or the life span of the wind energy generator, whichever is earlier i.e: units would be eligible for the benefits available in the policy such as selling / wheeling / banking of electricity / exemption from electricity duty / demand cut etc. wherever applicable for the entire eligible period.

3. **Eligibility**

Under this policy no cash incentives or Sales Tax incentives are available primarily due to constraints of resources. It is therefore, proposed to widen the eligibility criteria for setting up such wind energy generators. The beneficiaries are classified in two parts as under:

(i) Any registered industrial undertaking engaged in manufacture or production of goods within the State

Such industrial units may be allowed to wheel power to their own manufacturing units (maximum upto two units) within the State at a wheeling price to be paid by them. This would encourage the industrial undertakings to set up such wind generators since they would be availing the benefits of relatively cheaper electricity. Such wind energy generating units may also be allowed at their option to sell electricity to the Gujarat Electricity Board at a fixed price to be paid per unit. It should be made obligatory for them to give the option and the option once exercised should not be changed.

(ii) Non-industrial non-manufacturing units

Non-industrial non-manufacturing units and developers may also be allowed to set up wind energy generating units where they will have to sell electricity to the Board and may not be permitted to wheel power to any unit either of their own or to a third party. Under the developer approach, permission may be granted to developers to set up wind energy generating units in advance to be transferred to the interested investors subsequently to ensure effective planning / energy generation and optimum use of the land.

4. Eligible Sites

The beneficiary may set up a wind farm on its own land / or private leased land within the eligible sites or leased land of the Gujarat Energy Development Agency.

5. Sale of Energy

As regards the purchase price of energy generated by windfarms it is proposed that in the case of industrial undertaking at their option and in case of non-industrial units, the Gujarat Electricity Board may purchase electricity generated by such wind energy generating units at Rs. 2.60 per unit. An increase of 5 paise is to be provided every year for 10 years. After the 10th year, the rate will be negotiable. In the case of industrial undertakings, the option of wheeling electricity is made available to them instead of selling it to the Gujarat Electricity Board.

6. **Plant and Machinery**

So far as plant and machinery is concerned, only those wind energy generators, which are type tested and approved by the international testing houses recognized by the Ministry of Non Conventional Energy Sources should be made eligible. In future, when the guidelines for such equipments are decided either by the Central Electricity Regulatory Commission or the Gujarat electricity Regulatory Commission, it would be necessary to follow those guidelines.

Second-hand generators either indigenous or imported would not be made eligible under this scheme. Wind Turbine technology world wide has considerably improved. The scheme aims at improved technology.

7. **Land**

Unless the developer has purchased the land, since the land has already been acquired by GEDA, the Co-ordination Committee for allotment of land would consist of the following members. The Collector of the respective district/s has been nominated in this Committee so as to have effective co-ordination.

1)	ACS / PS / Secretary (EPD)	..	Chairman
2)	Director (IREP) / J.S / D.S (EPD)	..	Member
3)	Chief Electrical Inspector	..	Member
4)	General Manager (Comm), GEB	..	Member
5)	Collector of the district	..	Member
6)	Director, GEDA	..	Member Secy.

8. **Wheeling of Electricity**

The industrial undertakings setting up wind energy generators while opting for wheeling the electricity to their manufacturing units may be allowed to do so at a wheeling charge of 4%.

9. **Third party sale of electricity**

Third party sale of electricity is not permitted under this policy.

10. **Banking of electricity**

The surplus energy generated could be banked for a period of 6 months with GEB / AEC / SEC / licensee for a maximum period of 6 months.

11. **Exemption from Payment of Electricity Duty and from Demand Cut**

Exemption from payment of electricity duty and exemption from demand cut to the extent of .30% of the installed capacity of the windfarm is allowed.

12. **Metering of electricity**

The electricity generated from the windfarm would be metered on a monthly basis jointly by GEDA / GEB at the sending sub-station located at the windfarm site at 66KV.

This issues with the concurrence of Finance Department notes dt. 26.4.2002 and 19-6-2002 on this department file of even number.

By order and in the name of the Governor of Gujarat.

Sd/-
(G.T. CHAVDA)
Under Secretary to Govt. of Gujarat
Energy & Petrochemicals Department

Government of Gujarat
Energy & Petrochemicals Deptt.
Govt. Resolution No. EDA-10-2001-3054-B (Part-II)
Sachivalaya, Gandhinagar
Dated the 30th August, 2002.

Read: Govt. Resolution No. EDA-10-2001-3054-B (Part-II) dated 20.06.2002

ADDENDUM

The following word / paragraph may be added in the Government Resolution of even number dated 20.06.2002.

In the third line of the clause No. 6 (Plant and Machinery) "or" may be added after the word "houses".

The Gujarat Energy Development Agency, Baroda will function as "Nodal Agency" for the propose of implementation of Wind Power Generation Policy 2002.

By order and in the name of the Governor of Gujarat.

Sd/-
(G.T. CHAVDA)
Under Secretary to Govt. of Gujarat
Energy & Petrochemicals Department

Wind Power Generation Policy – 2002.

Government of Gujarat,
Energy & Petrochemicals Department,
Govt. Resolution No. EDA-10-2001-3054-B(Part-II),
Sachivalaya, Gandhinagar.
Dated the 30th August, 2002.

Read:- Govt. Resolution No. EDA-10-2001-3054-B(Part-II) dated 20.6.2002.

ADDENDUM

The following word/paragraph may be added in the Government Resolution of even number dated 20.6.2002.

In the third line of the clause No. 6 (Plant and Machinery) "or " may be added after the word "houses"

The Gujarat Energy Development Agency, Baroda will function as "Nodal Agency" for the propose of implementation of Wind Power Generation Policy 2002.

By order and in the name of the Governor of Gujarat.


(G.T. Chavda)

Under Secretary to Government
Energy & Petrochemicals Department

Copy to :

- The Secretary to the Governor of Gujarat, Raj Bhavan, Gandhinagar.
- The Principal Secretary to the Hon. Chief Minister, Sachivalaya, Gandhinagar.
- The Private Secretary to the Hon. Minister of Energy, Sachivalaya, Gandhinagar.
- The Principal Secretary, Finance Department, Sachivalaya, Gandhinagar.
- The Principal Secretary, Revenue Department, Sachivalaya, Gandhinagar.
- The Principal Secretary, Industries & Mines Deptt., Sachivalaya, Gandhinagar.
- The Industries Commissioner, Udyog Bhavan, Gandhinagar.
- All the District Collector, Gujarat State.
- The Chief Electrical Inspector, Udyog Bhavan, Gandhinagar.
- The Director, Gujarat Energy Development Agency, Baroda.
- The General Manager (Comm.), Gujarat Electricity Board, Baroda.
- The General Manager (Comm.), Ahmedabad Electricity Co. Ltd., Ahmedabad
- The Chief Executive, Surat Electricity Co. Ltd., Surat.
- All Department's of Sachivalaya.
- All Branches of Energy & Petrochemicals Department.
- The Select file.
- The Personal file.