

# pavan



A news bulletin from Centre for Wind Energy Technology, Chennai

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## Editorial

There is a big debate about wind resource data of India and what could have made it even better. To put to rest some of the issues that come up time and again we must look at the genesis of the wind resource assessment program. The question of long term data comes up because we are looking at wind energy as an investment option. An investor will naturally look at long term conformed returns. No sooner an area is declared wind farmable, there will be a scramble to buy land and install wind turbines. It is common sense that wind measurements are very sensitive to presence of disturbances and wind turbines in close vicinity can be a big source of disturbance. Therefore all opportunities of introducing newer 'financial instruments' to take care of 'long term uncertainties' of intentional or unintentional over predictions suffer a set back from marketing department itself. Comments have also been made about use of calibrated instruments. I reproduce below what Dr. Lockhart from Meteorological Standards Institute, USA and Mr. Baily from AWS Scientific have to say about this aspect.

The use of individually calibrated anemometers may not provide more accurate data than the use of a consensus mean transfer function. If significant differences between calibration result and the consensus transfer function are found at the 8 m/s speed of a 10 Hz rate of rotation, the cause should be investigated, it will most likely be found in the calibration method or facility. The calibration of new anemometers, apart from identifying outliers can only quantify where within a very small range (0% to 0.5%) of product variability a particular anemometer lies. It is unlikely that the uncertainty of a calibration facility is small enough to provide important accuracy improvement. It is sound practice, however, to use calibrated sensors in applications where accuracy of the sensor may be questioned for legal or regulatory conformance. Calibration is an effective quality assurance procedure for both new and used anemometers.

Note that it will be essential to use calibrated anemometer largely to satisfy the insurance guy or to settle a legal wrangle. When the national wind monitoring program was formulated, insurance angle was the last thing on the scientist's mind. But C-WET can actually make available calibration certificates on demand. But being a twenty year old program, one should not expect it to meet all futuristic goals. One should, however, not loose focus on the cake in the process of getting access to icing. There are simple ways of addressing such issues by a more thorough analysis and proper coordination between marketing and resource assessment groups within the company. There are many examples of using a simple frequency distribution-power curve combination to predict energy outputs without taking into account any physics associated with such calculations. Sometimes even this would not be done. This often causes serious disparities in anticipated and derived outputs.

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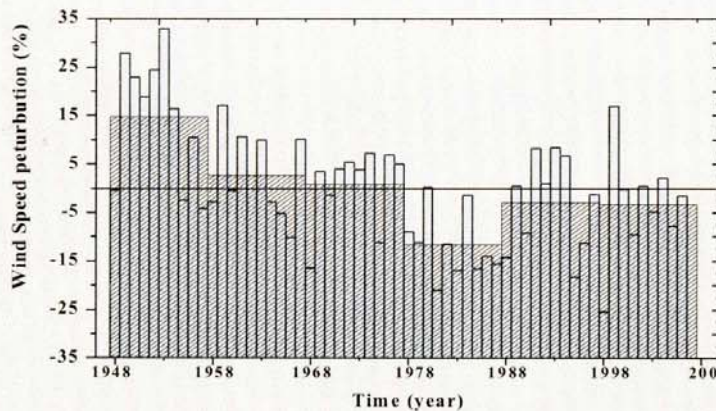
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Let us look at some long term data NCEP/NCAR for a location in peninsular India. There are no discernable six year cycles some pundits are giving. We were unable to see any such phenomenon. One should, if one wishes to play along with the insurance angle, or provide long term guarantees, safest way of handling is to carryout the micro-siting exercises with due care and then be more conservative in giving projections. Financial Engineering stretched beyond a point many times results in disasters.

Long term wind characteristics over Jogimatti region (14o10'N, 76o24'E, 800 mb height level) using NCEP/NCAR Reanalysis.

**M.P.Ramesh,**  
Executive Director

## News

### Upcoming International Training course

## Third International Training Programme on Wind Turbine Technology and Applications on 7<sup>th</sup> to 16<sup>th</sup> March 2007

at  
M/s. Yashwantrao Chavan Academy of Development Administration,  
Raj Bhavan Complex, Baner Road, Pune 411 007

Sponsored by  
Ministry of New & Renewable Energy  
Government of India, New Delhi

### The course topics

The course content for the training is a carefully thought out syllabus with specific subject experts giving lectures and would go through specific case studies such that at the end of the day considerable useful knowledge transfer is perceived. The training addresses the following aspects:

- Introduction to wind Resources
- Wind Energy Technologies
- Integration of Wind Energy with grid
- Wind Energy Prediction Methodology
- Testing & Certification
- Wind Energy Measurements and prospects

The course is aimed at professionals engaged in the energy planning and implementation. *The course is open only for the following countries sponsored candidate. Cuba, Syria, Cyprus, Tanzania, Saudi Arabia, Afghanistan, Mauritius, Mozambique, Sudan, Jordan, Nepal, Myanmar, Bangladesh, Maldives, Thailand, Bhutan, Philippines, Sri Lanka, Malawi and China. The participation is restricted to one person from each country. It is not feasible to entertain non-government sponsored participants. The application should come through Indian embassy in the respective countries and the respective country embassies in India.* Wind Power being an engineering discipline the participant need to have Physics / Engineering background.



## C-Wet at Work

### DEVELOPMENT IN R&D UNIT

#### R&D Demonstration Wind Farm

R&D unit is presently working to set up a 2 MW wind farm as a prerequisite for development of research capabilities. It is proposed to set up two wind turbines ranging from 500 kW to 1000 kW (Pitch/Stall) near WTTS, Kayathar, to be used as an experimental facility. Some of the focus areas for research on the wind farm will be: Study on effect of grid outages on wind turbine components. Study of wake losses.

Joint and simultaneous measurements with various measuring laboratories like DEWI, RISO etc. Modeling/ simulation studies on wind turbines and subsequent validation.

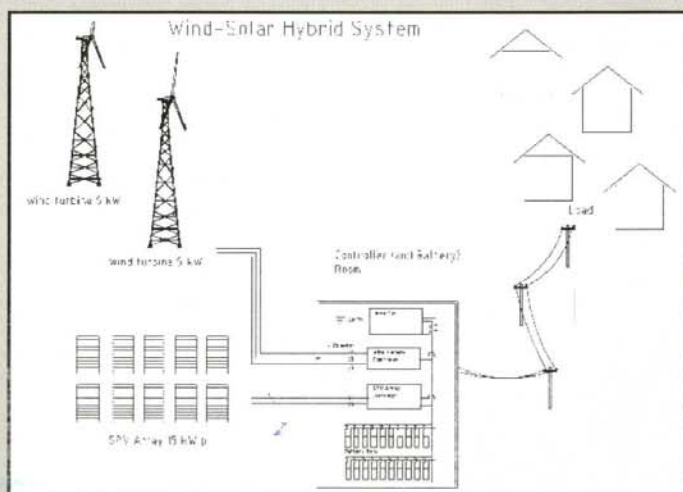
Measurements leading to formulation of International Standards.

#### Wind-Solar-Hybrid system at C-WET campus

R&D Unit is setting up a 25 kW Wind-SolarHybrid System at C-WET premises to meet the load demand partially and also to undertake R&D studies on the system. The integrated system shall consist of:

- (I) 10 kW (2 x 5 kW) small Wind Turbine Generating system
- (ii) 15 kW Solar Photo Voltaic (SPV) system and

Wind and solar energy can complement each other and can be used for charging the batteries through a common DC bus bar. A 25 kW inverter will supply the load.



Schematic layout of Wind-Solar-Hybrid System

#### Farewell

Shri S. Suresh Babu, Technician, R&D Unit was given a warm farewell and relieved of his duty with effect from 08.12.2006.



ED, C-WET felicitating Shri S. Suresh Babu

### MOVE ON IN WRA UNIT

#### Wind Atlas of India

Ministry of New and Renewable Energy (MNRE) has sanctioned a project on 'Preparation of Wind Atlas in India recently. This project will be executed by C-WET in association with Riso National Laboratory, Denmark and the project period will be two years.

#### Wind monitoring stations under various programmes

Fifty one wind monitoring stations are under operation under of MNRE programme including consultancy projects.

#### Consultancy Projects

The Unit is verifying procedures for wind monitoring at three different locations in three different states (Madhya Pradesh, Rajasthan and Gujarat) for M/s Enercon India (P) Ltd.

Apart from this the unit has taken up projects on micro siting, performance evaluation, due diligence and data validation for various companies namely M/s. Shriram EPC Ltd., Chennai., M/s.MSPL Limited., Hospet, M/s. Enercon India Ltd, Mumbai., and M/s.Tata Power Company Ltd, Mumbai.

One micro siting project has been completed for M/s Teledata Informatics Ltd. Chennai during the month of December.



## STEPS FORWARD IN TESTING UNIT

The measurements on 600 kW Suzlon wind turbine have been completed and reporting is ongoing.

Agreement for testing of Siva 250 kW wind turbine has been signed during the month of November 2006.

The preparations for testing of Suzlon 1500 kW, Enercon 800 kW and IWPL 250 kW in Gujarat during the year 2007 are ongoing. The measurements are expected to start during April 2007.

## MARCHING AHEAD IN S&C UNIT

Successfully concluded the renewal of Provisional Type Certificate of NM 48/750 kW wind turbine model and the renewed Provisional Type Certificate has been issued to M/s. NEG Micon (India) Private Limited, Chennai.

The wind turbines sectional committee, ET42, has been constituted by BIS. ED, C-WET has been nominated as Chairman of the Committee, by BIS. Unit Chief (i/c), S&C and Testing units have been nominated as members. The first meeting of the committee has been held on 28.11.06 at BIS, New Delhi. The meeting has been attended by various stakeholders of the industry. Draft Indian Standards for Wind Energy, prepared by C-WET, have been presented before the Committee.

Quality Management System (QMS) Surveillance audit has been successfully conducted by DNV as per ISO 9001:2000 and recommended for continuation of the certificate. QMS internal audit has been conducted at S&C unit. S&C unit has conducted the internal audits at Testing, WRA and F&A units.

Documentation for Revised List of Models and Manufacturers of Wind Electric Generators / Wind Turbine Equipment (RLMM) has been obtained from Manufacturers for issue of the next list. The documentation has been reviewed by the committee during the meeting held on 26.12.06 at C-WET. The list has been prepared and ready for issue.

The certification projects, taken up as per TAPS-2000, are under progress.

The continual improvement and maintaining the Quality Management System are on going.

## HIGHLIGHTS FORM ITCS UNIT

### National training course

The Fourth National training programme on **"WIND FARM DEVELOPMENT AND RELATED ISSUES"** was organized successfully on 9th and 10th November 2006 at Yashwantrao Chavan Academy of Development Administration (YASHADA), Pune.



*The Training Programme was inaugurated by Dr. G. B. Pant, Former Director, IITM, Pune.*

The training course was attended by 42 scientists, engineers and managerial level personnel from across India.

The following topics were covered in the training, wind resources assessment, design and layout of wind farms, wind turbine technology, grid integration, wind turbine certification & testing related issues and O&M aspects of wind farms.



*Participants attentively listening to the lecture*

### Annual Report

C-WET's annual report for the year 2005-2006 has been published and distributed to C-WET customers and related institutions / organisations.





## Wind Powered System Under Way to Purify Water

GE Global Research is partnering with Texas Tech University (TTU) to develop affordable water desalination systems to increase the quantity and quality of clean water in arid areas around the world.

"Developing cost effective technologies that address improving water quality and availability are of critical importance to many water stressed areas in this region."

- Dr. Dean Smith, Texas Tech University, VP for Research

The GE-Texas Tech partnership will focus on the integration of renewable energy systems, such as wind turbines, with membrane desalination processes. The development of the integrated renewable energy-water system can reduce the cost of creating new sources of freshwater from impaired resources, such as brackish water, by directly addressing the major component of operating cost of desalination systems - energy.

"Up to fifty percent of the operating costs of desalination is derived from energy consumption," said Dr. Minesh Shah, project leader, GE Global Research. "With the potential for large variability in energy costs due to fuel price volatility, desalination systems can have significant operational costs. The integration of wind energy provides an opportunity to mitigate this variability and allow for a lower cost desalination system."

"Developing cost effective technologies that address improving water quality and availability are of critical

importance to many water stressed areas in this region," said Dr. Dean Smith, Vice President for Research at TTU. "We are pleased to partner with the GE Global Research Center to work together on this problem of both regional and world-wide importance."

The focus of the research partnership will be the integrated control and optimization of the two systems to improve operations, reduce capital cost and reduce energy consumption. This would help to improve the commercialization of a renewable energy-water system. The program aims to develop a commercial scale demonstration within the next several years.

The partnership is part of GE's company-wide ecomagination initiative, in which GE has pledged to more than double its level of investment in the development of cleaner energy technologies, from \$700 million to \$1.5 billion, over the next five years.

Source: <http://www.renewableenergyaccess.com>

## Olympic Wind Turbine for London 2012

The company constructing the Olympic Games site plans to build a wind turbine which would provide enough energy to power about 1,200 homes for a year, it was announced today. The Olympic Delivery Authority (ODA) said the 120-metre tall turbine, which will have a lifespan of about 20 years, will be used to power local amenities including street lighting and housing in the Olympic Park area after London 2012. The turbine, which will cost about £2 million to build and install and has 40-metre-long blades, will be located at Eton Manor in the north of the Olympic Park site in east London.

A private company will be contracted to build the turbine

and supply power back to the Olympic site at a reduced rate. The turbine will also help to power construction machinery and lights after it is built in 2010. The plan is part of the organisers' aim to make the Olympic and Paralympic Games the most environmentally friendly held.

David Higgins, chief executive of the ODA, said: "We want to make use of as many innovative renewable technologies as possible to power the London 2012 Olympic Games and Paralympic Games and will be looking to industry to provide us with creative solutions in the months ahead."



"The wind turbine on the Olympic Park will be a symbol of the sustainability principles behind the Games." He said the turbine would act as a "green beacon" for the capital.

The ODA is also considering other green options including solar power, ground water cooling, small scale hydro and tidal power and biomass. Sports Minister Richard Caborn said the Government was committed to working with the Olympic partners to make sure the Games were environmentally, economically and socially sustainable.

He said: "Climate change is one of the five themes identified in the Sustainability Policy published in July where the Games can make the biggest impact and leave a lasting legacy."

Lord Coe, chairman of the London 2012 organising committee, said: "The wind turbine will be a dramatic and iconic feature of the Olympic Park. It will provide a visible statement of our intent to make the Games as sustainable as possible, and is a significant part of our

overall strategy and commitment to minimising the carbon footprint of the 2012 Olympic Games and Paralympic Games."

Mayor of London Ken Livingstone said: "I am determined that London will lead the way in tackling climate change and I am setting tough but achievable renewable energy targets for the way all new buildings are constructed in the capital."

Environmental charities welcomed today's announcement. Robert Napier, chief executive of the WWF which works with the ODA, said: "WWF-UK and BioRegional (also an environment charity) support the proposed urban wind turbine as part of London's broader Olympic energy plan. The London Games and legacy development must minimise energy demand from buildings, infrastructure and transport and meet its energy needs using the most sustainable options."

Construction of the turbine is expected to start in spring 2008 subject to planning permission.

Source: <http://www.alternative-energy-news.info>

## Floating Ocean Windmills Designed to Generate More Power

Ker Than, LiveScience Staff Writer

Windmills that would float hundreds of miles out at sea could one day help satisfy our energy needs without being eyesores from land, scientists said today.

Offshore wind turbines are not new, but they typically stand on towers that have to be driven deep into the ocean floor. This arrangement only works in water depths of about 50 feet or less close enough to shore that they are still visible.

Researchers at the Massachusetts Institute of Technology and the National Renewable Energy Laboratory (NREL) have designed a wind turbine that can be attached to a floating platform. Long steel cables would tether the corners of the floating platform to a concrete-block or other mooring system on the ocean floor, like a high-tech ship anchor. The setup is called a "tension leg platform," or TLP, and would be cheaper than fixed towers.

"You don't pay anything to be buoyant," said Paul Scavounos, an MIT professor of mechanical engineering and naval architecture who was involved in

the design.

The floating platforms sway side to side but not bob up and down. Computer simulations suggest that even during hurricanes, the platforms would shift by only about three to six feet and that the bottom of the turbine blades would revolve well above the peak of even the highest wave. Dampers similar to those used to steady skyscrapers during high winds and earthquakes could be used to further reduce sideways motion, the researchers say. Like the offshore windmills currently in use, the TLP's would use undersea cables to shuttle the electricity to land.

The researchers estimate their floater-mounted turbines could work in water depths ranging from about 100 to 650 feet. This means that in the northeastern United States, they could be placed about 30 to 100 miles out at sea. Because winds are stronger farther offshore, the floating windmills could also generate more energy 5.0 megawatts (MW), compared to 1.5 MW for onshore units and 3.5 MW for conventional offshore setups.



To save money, assembly of the TLP's could be done onshore probably at a shipyard and towed out to sea by a tugboat, the researchers say.

Sclavounos estimates that building and installing the TLP's should cost a third of what it costs to install current offshore tower windmills. Another advantage of using floating platforms is that the windmills could be moved around. If a company with 400 wind turbines in Boston

needs more power in New York City, it can unhook some of their windmills and tow them south.

The researchers plan to install a half-scale prototype of their invention south of Cape Cod.

"We'd have a little unit sitting out there to show that this thing can float and behave the way we're saying it will," Sclavounos said.

Source: <http://windenergynews.blogspot.com>

## India and China catch the wind

Dilip Pantosh Patil uses an ox-drawn wooden plow to till the same land as his father, grandfather and great-grandfather. But now he has a new neighbour: a shiny white wind turbine taller than a 20-story building, generating electricity at the edge of his bean field.

Wind power may still have an image as something of a plaything of environmentalists more concerned with clean energy than saving money. But it is quickly emerging as a serious alternative not just in affluent areas of the world but in fast-growing, energy-starved countries like India and China. And leading the charge here in west-central India and elsewhere is an unlikely champion, Suzlon Energy, a homegrown Indian company.

Suzlon dominates the Indian market and is expanding rapidly abroad, having just erected factories in locations as far away as Pipestone, Minnesota, Tianjin and China. Four-fifths of Suzlon's soaring order book now comes from outside India.

Not even on the list of the world's top 10 wind turbine manufacturers as recently as 2002, Suzlon passed Siemens of Germany last year to become the fifth-largest producer in terms of installed megawatts of capacity. Suzlon still trails the market leader, Vestas of Denmark, as well as General Electric of the United States, Enercon of Germany and Gamesa of Spain.

Suzlon's past shows how a company can prosper by tackling the special needs of a developing country. Suzlon's presence suggests a way of serving expanding energy needs without relying quite so much on coal, the fastest-growing fossil fuel right now but also the most polluting. And Suzlon's future is likely to be a case study

of how a manufacturer copes with China, both in capturing sales there and in confronting competition from Chinese companies.

The company is a product in many ways of India's dysfunctional power distribution system. Electricity boards owned by state governments charge more than twice as much per kilowatt-hour for industrial users as in the United States and still suffer blackouts almost every day, especially in northern India.

Subject to political pressures, the boards are often slow to collect payments from residential consumers and well-connected businesses, especially before elections. As a result, they often lack the money to invest in new equipment.

To stay open and prevent crucial industrial or computer processes from stopping, everyone from auto parts factories to outsourcing giants in India rely on even more costly diesel generators.

With natural gas prices climbing as well, wind turbines have become attractive to a wide range of businesses in India. Essar Group of Mumbai, a big industrial conglomerate active in shipping, steel and construction, is working on plans for a wind farm near Chennai, formerly Madras, after concluding that regulatory changes in India have made it financially attractive.

"The mechanisms didn't used to be there; now they are," said Jose Numpeli, vice president for operations at Essar Power. The electricity boards, he said, "know how to cost it, they know how to pay for it."



Wind will remain competitive as long as oil stays above \$40 a barrel, said Tulsi Tanti, Suzlon's chairman and managing director; the price has recently dropped to around \$60 a barrel. Below \$40 a barrel, wind energy may require subsidies to remain cost-effective, or possibly environment-based taxes on oil and other fossil fuels.

Tanti and his three younger brothers were running a textile business in Gujarat in northwestern India when they purchased a German wind turbine, only to find they could not keep it running. So they decided to build and maintain wind turbines themselves, starting Suzlon in 1995 and later leaving the textile business.

To minimize land costs, wind farms are typically in rural areas, chosen for the strength of their winds as well as low land prices. That can cause culture shock. "There were no big changes until the turbines came," Patil said, pausing from plowing here with his father in this remote, tribal area of central India where oxen remain at the center of farm life and motorized vehicles are uncommon.

The new Suzlon Energy wind farm here in Khoris is a subject of national pride. More than 300 giant wind turbines, with 33-meter, or 110-foot, blades, generate electricity from the air. But it has also struggled with the sporadic lawlessness that has long bedeviled India. S. Mohammed Farook, the installation manager, was far from happy on a recent afternoon. At least 63 new turbines, worth \$1.3 million apiece and each capable of lighting several thousand homes when the wind blows, could not be put into service because thieves had stolen their copper power cables and aluminum service ladders for sale as scrap.

The copper or aluminum fetches as little as \$1 from black market scrap dealers. But each repair costs thousands of dollars in parts and staff time, in a country that is desperately short of electricity and technicians alike.

"I am crying inside," Farook said.

Despite such problems, Suzlon has expanded rapidly as global demand for wind energy has taken off. Suzlon's sales and earnings tripled in the quarter through June 30, as the company earned the equivalent of \$41.6 million on sales of \$202.4 million.

Demand for wind turbines has particularly accelerated in India, where installations rose nearly 48 percent last year, and in China, where installations climbed 65 percent last year, although from a lower base.

Coal is the main alternative in India and China, and it is causing acid rain and respiratory ailments while contributing to global warming. China accounted for 79 percent of the world's growth in coal consumption last year while India represented another 7 percent, according to BP statistics.

China has imposed a requirement that power companies generate a fifth of their electricity from renewable sources by 2020. China's target calls for expanding wind power almost as much as nuclear energy over the next 15 years.

India already leads China in wind power and is quickly building more wind turbines.

Chinese and Indian officials are optimistic about relying much more heavily on wind.

"I believe we may break through these targets - if not, we should at least have no problem reaching them," said Zhang Yuan, vice general manager of China Longyuan Electric Power Group, the renewable energy arm of one of China's five state-owned electric utilities, China Guodian.

Kamal Nath, India's minister of commerce and industry, was even more enthusiastic.

"India is ideally suited for wind energy," he said. "The cost of it works well, and we have the manufacturing capability."

By Keith Bradsher The New York Times

Source: <http://www.wind-watch.org>

For more information

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An autonomous R&D institution established by the ministry of Non-conventional Energy Sources (MINES), Government of India to serve as a technical focal point of excellence to foster the development of wind energy in the country

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