

वार्षिक प्रतिवेदन Annual Report 2010 - 2011



C-WET
ISO : 9001-2008

पवन ऊर्जा प्रौद्योगिकी केन्द्र

CENTRE FOR WIND ENERGY TECHNOLOGY

(नवीन और नवीकरणीय ऊर्जा मंत्रालय के अधीन स्वायत्त अनुसंधान एवं विकास संस्था, भारत सरकार)

(An Autonomous R & D Institution under the Ministry of New and Renewable Energy, Government of India)

ANNUAL REPORT

2010 - 2011



CENTRE FOR WIND ENERGY TECHNOLOGY

(An Autonomous R & D Institution under the
Ministry of New and Renewable Energy,
Government of India)
Chennai, Tamil Nadu, India



QUALITY POLICY

C-WET is committed to achieve customer satisfaction, loyalty and confidence by providing credible, prompt and complete solutions of international quality to all the stakeholders in the wind energy sector.

C-WET strives to be technical focal point of excellence for the present and future. C-WET shall stay at the forefront of Wind Turbine Technology application by continuously improving its expertise.



CENTRE FOR WIND ENERGY TECHNOLOGY

(An Autonomous R & D Institution under the
Ministry of New and Renewable Energy, Government of India)

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CONTENTS

Description	Page No.
CHAIRMAN'S MESSAGE	1
EXECUTIVE DIRECTOR'S REPORT	3
THE CHARTER	7
FROM THE UNITS	8
RESEARCH AND DEVELOPMENT	9
WIND RESOURCE ASSESSMENT	16
WIND TURBINE TESTING	31
STANDARDS AND CERTIFICATION	33
INFORMATION, TRAINING AND COMMERCIAL SERVICES	36
SOLAR RADIATION RESOURCE ASSESSMENT	45
INVITED LECTURES DELIVERED BY C-WET STAFF IN CONFERENCES AND SEMINARS	46
SEMINARS / CONFERENCES / TRAININGS / MEETINGS / ATTENDED BY C-WET STAFF	52
PUBLICATIONS	58
GENERAL INFORMATION	60
HUMAN RESOURCE	64
C-WET OFFICIALS ON EXTERNAL COMMITTEES	68
AUDITOR'S REPORT	69
BALANCE SHEET	70
INCOME AND EXPENDITURE ACCOUNT	71
RECEIPTS AND PAYMENT ACCOUNT	72

Chairman's Message



As Chairman, Governing Council of C-WET, I am glad to present the Annual Report of the Centre for Wind Energy Technology (C-WET) Chennai for the year 2010-11. The work carried out by C-WET during the year 2010-11 has been very noteworthy and commendable to the wind energy industry in India which has achieved an all time high annual capacity addition of 2300 MW this financial year.

Release of Indian Wind Atlas in April 2010 at Chennai and dedication of first ever Indian research wind turbine of 2 MW in November 2010 at Wind Turbine Research Station (WTRS) at Kayathar by Hon'ble Minister for New and Renewable Energy (MNRE) Dr. Farooq Abdulla marks two major mile stones of C-WET / MNRE this year. Execution of R&D projects through multi-institutional partnership on power quality / evacuation, sustaining internationally recognized NABL accredited wind turbine testing, capacity building for wind turbine certification and Indian Standards development, releasing MNRE's RLMM list (Revised List of Models and Manufacturers) for Grid connected WTGs periodically and empanelling small wind turbines as per MNRE revised guidelines, implementation of certificate/PG Diploma courses in reputed educational institutions with IWTMA's (Indian Wind Turbine Manufacturers Association) active involvement are some of the highlights of C-WET's activities.

While the wind turbine testing unit has signed 3 new agreements with Indian Manufacturers for testing as per IEC recommendations requirements, the R&D Unit has taken up 7 new small aero-generators (Small Wind Energy Systems) for performance evaluation as per IEC-61400-2 guidelines for empanelment facilitation.

In addition to the Indo-Danish Collaboration on research in Indian Offshore wind resource assessment and in wind energy forecasting in which C-WET works with RISO, Denmark, an Indo-US Collaboration initiated showed progress. Under C-WET-NREL's wind MoU aero-structural training has been imparted to C-WET's scientists by scientists of NREL, Colorado, USA. C-WET's efforts for human resource development for the wind energy industry through (i) research proposals for implementation of certificate / PG Diploma courses by leading educational institutions (PSG) and through (ii) national, international (MEA sponsored and special (LREDA / KREDA / MNRE) training courses are certainly noteworthy and useful for wind power stakeholders in India and abroad.

C-WET as an autonomous body has also geared up to execute a project under 'JNNSM' for Solar Radiation Resource Assessment in India and initiated the works in a fast track mission mode to establish 51 stations in various potential states.

C-WET in the year 2010-11 has doubled its internal revenue generations as well, through its various industrial consultancy services involving certification, testing, wind resource assessment, verification, micro siting, technical due diligence and several value added services.

I wish C-WET and its team all success in the future years.

DEEPAK GUPTA, I.A.S
Secretary, MNRE

Executive Director's Report



Centre for Wind Energy Technology (C-WET) proactively plans and executes various programmes within the objectives of the centre, in the development of wind power sector in the country. Year after year, C-WET's experience has been very useful in providing value added services to all wind energy stakeholders.

Wind Resource Assessment, Micrositing, Due-diligence Analysis of wind power projects, feasibility and Detailed Project Report (DPR) preparation, Wind Turbine Testing, Certification, Evaluation of Certificates, Research and Development with institutional collaboration, preparation of Standards, release of RLMM list, empanelment list of Small Wind Energy Systems (SWES) and their field performance testing are some of the highlights of C-WET's activities. Significant efforts have been initiated by C-WET through research proposal as well as National and international ITEC/SCAAP (MEA) sponsored training programmes in imparting the much needed training and human resource development for the wind energy industry of India.

During the year 2010-11 the notable activities carried out by the various units are as under:

RESEARCH AND DEVELOPMENT UNIT

C-WET's consorted efforts; to carryout industry application oriented R&D programme has been quite successful in areas where IPR is not of serious concern. The outcome of the project on "Power Quality on Grid Connected Wind Power Systems", studies on "Power Evacuation" and some of the preliminary efforts on Wind Energy Forecasting as well as Gearbox re-conditioning using nano-coating are noteworthy achievements of this year. A small project on "Development of Everybody's Battery Charger" is also being carried out along with Industries, Academia partnership by C-WET, apart from Planning Health Monitoring of Wind Turbines and Aerofoil Characterization of Blade profiles.

In addition to the ongoing R&D projects, there are several R&D infrastructure development activities initiated and implemented this year. For example, dedication of a 2 MW R&D experimental wind turbine to the country at Wind Turbine Research Station (WTRS), Kayathar by Hon'ble Minister for New and Renewable Energy was a milestone turned by C-WET for doing R&D in a State-of-the-art of variable RPM multi MW wind turbine with 82 m diameter rotor and 80 m hub height of tower.

Apart from the institutional R&D, C-WET team is fully geared and actively involved this year for doing small wind turbine testing for empanelment of small wind turbines in India. Under the MNRE scheme of empanelment of Small Wind Turbine [SWT], three lists have been released during the year with name of manufacturers who qualified for empanelment and their specific small wind turbine models, as recommended by the committee. The first list was released on 24th of June 2010, the second list on 4th of August 2010 and the third list on 14th of January 2011 respectively. As on date, four models from two manufacturers have been listed in the empanelment category and seven models from five manufacturers have been listed under the provisional empanelment category.

The unit is presently in the process of type testing seven small wind turbine of 1.4 kW, 3.2 kW (2 Nos.), 3.5 kW, 4.2 kW, 5 kW and 5.1 kW rating at its WTRS, Kayathar as per the requirements of IEC-61400-2. The measurements are likely to continue for next windy season of 2011 to meet the requirements of International Standards.

Implementation of Certificate / Post Graduate Diploma Courses in Wind Energy at PSG College of Technology, Coimbatore, is one of the notable activity being carried out by the unit. The progress of R&D approved projects are periodically reviewed and monitored to ensure timely deliverables.

WIND RESOURCE ASSESSMENT UNIT

Wind Monitoring Stations at more than 1000 sites have been installed including private sector measurements of which 618 stations were established by Wind Resource Assessment (WRA) unit of C-WET with 15 stations newly installed this year and a total of 65 stations are still in operation. Of the cumulative total of 618 stations established by C-WET as on 31.03.2011, 233 stations have been found to have Wind Power Density (WPD) in excess of 200 W/m^2 at 50 m agl. In addition to the wind monitoring projects funded by MNRE, the unit has carried out 161 consultancy projects during the year 2010 -11. These short-term projects were to provide micro siting services and preparation of due diligence reports. Under the direction of the Ministry, verification of data collection procedure adopted by private firms was undertaken for a number of stations. Special efforts were taken by meeting the North-East State Nodal Agencies (SNAs) and other SNAs to get effective co-ordination of WRA projects.

Offshore Wind Resource Assessment at Dhanuskodi, Rameshwaram, Ramanathapuram District, Tamilnadu and Development of Wind Forecasting Model with Special Reference to Complex Terrain are some of the important works initiated by the unit.

Indian Wind Atlas release by Hon'ble Minister for New and Renewable Energy is another important milestone in the area of wind resource Assessment in the country. A book containing the wind resource availability across the Indian continent for harnessing wind energy has been released by the Ministry and C-WET on 29th April 2010. The Wind Atlas will carry essential data that allows wind farm developers, engineers, investors to learn about the potential generating capacity available in a particular region in India. The book was prepared by C-WET in association with the Riso DTU, Denmark and the project was completely sponsored by MNRE, Government of India.

WIND TURBINE TESTING UNIT

At the Wind Turbine Testing (WTT) unit, 3 new agreements were signed between C-WET and manufacturers for carrying out Power Curve Measurements, Safety & Function Test and Load Measurements & Analysis. Re-certification as per the requirements of ISO 9001:2008 of the testing unit was completed successfully.

The desktop audit by National Accreditation Board for Testing and Calibration Laboratories (NABL) as per the requirements of ISO/IEC 17025:2005 was completed successfully, with validity of accreditation up to October 2012. It will not be an exaggeration to state that the international quality testing of wind turbines by C-WET is recognized by most of the certifying bodies in Europe for incorporation of test results in the wind turbine type certificates.

STANDARDS AND CERTIFICATION UNIT

Standards and Certification unit carries out Certification of Wind Turbines as per TAPS-2000 (amended). The unit has completed one certification project during 2010-11 and one certification project is ongoing. In addition, four certificates have been renewed during 2010-2011.

The S & C Unit which serves as a secretariat for RLMM has successfully completed ten years in issuing the RLMM list. The unit has issued three lists in the year 2010-11. S&C unit plays an active role in preparation of Indian standards on wind turbines. In this regard, the unit is working in close co-ordination with Bureau of Indian Standards (BIS). Also the unit is actively providing its contribution in the formulation of IEC (International Electro-technical Commission) Standards through BIS. S&C unit is supporting BIS continuously on various issues for coordination with IEC/TC 88 committee. As India is a P-member in IEC/TC 88 committee, the unit is providing continuous support and contribution to BIS for voting on the draft IEC standards. Executive Director, C-WET, Unit Chief, S&C and Unit Chief, WTT have participated in the third Wind Turbine Sectional Committee meeting: ET 42 held at Bureau of Indian Standards, New Delhi.

INFORMATION, TRAINING AND COMMERCIAL SERVICES UNIT

Information Training Commercial Services (ITCS) unit had successfully organized the 9th National training course on “WIND ENERGY TECHNOLOGY” during 21st - 23rd July 2010 to address all aspects of Wind Power starting from Wind Resource Assessment to project implementation and operations & maintenance in a focused manner. The course was attended by 91 participants from academic institutes, industry,

State Nodal Agencies (SNAs), developers and consultants from various part of the country. The training course was inaugurated by Prof. Dr. V. G. Idichandi, Deputy Director, Indian Institute Technology Madras, Chennai.

The unit had successfully organized the 6th International Training Course on “WIND TURBINE TECHNOLOGY AND APPLICATIONS” during 18th October 3rd November 2010 with 24 participants from 17 countries.

The unit had also successfully organized the Special Training Course on “Wind Turbine Technology & Applications” for officials from KREDA, LREDA & MNRE held during 27th December 2010 - 6th January 2011.

SOLAR RADIATION RESOURCE ASSESSMENT UNIT:

A new unit called Solar Radiation Resource Assessment (SRRA) has been formed at C-WET, as per the guidelines of Governing Council (GC) of C-WET, to execute a project under mission mode: Solar Radiation Data Acquisition, Analysis and Implementation of 51 stations spread all over India in most potential states for solar applications, establishing a Central Receiving Station (CRS) along with calibration library and formation of mission mode project team at C-WET to execute 51 Automatic Solar Radiations Monitoring Stations (ASRMS), have been planned and the process initiated during the year.

Inauguration of conferences / seminars / workshops, invited lectures by C-WET's Scientists and deputation of scientists to conferences / seminars in India / Abroad, training of staff in various administrative functions were features spread out through the entire period during 2010-11.

Dr. S. Gomathinayagam
Executive Director, C-WET

THE CHARTER

The Centre for Wind Energy Technology (C-WET) is the technical focal point for wind energy technologies and was established at Chennai in 1998 by the Ministry of Non-Conventional Energy Resources (MNES), presently renamed as Ministry of New and Renewable Energy (MNRE). A Wind Turbine Test Station (WTTS) has also been established at Kayathar, Tamil Nadu, with the technical support and partial financial assistance from DANIDA, Denmark.

Mission

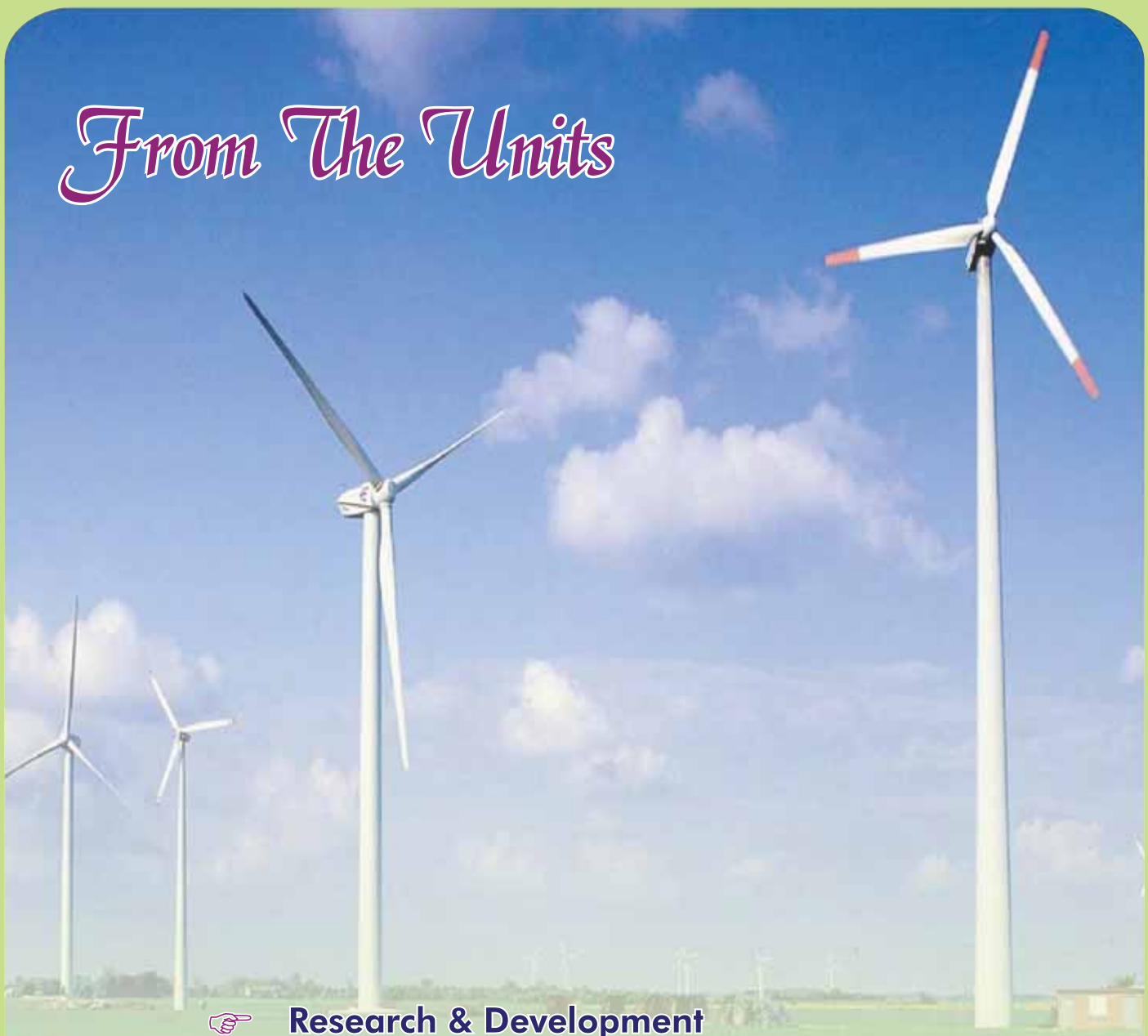
C-WET, knowledge based institution of high quality and dedication, offers services and seeks to find total solutions for the major stakeholders across the entire spectrum of the wind energy sector. It will support the wind turbine industry in achieving and sustaining quality such that products of the highest quality and reliability are installed, harnessing maximum energy available in the wind. C-WET will strongly support the wind energy industry in developing the know-how and know-why and promoting export of products and services.

Objectives

- ❖ To serve as the technical focal point for wind power development in India, for promoting and accelerating the pace of utilization of wind energy and support the growing wind power sector in the country.
- ❖ To develop and strengthen the facilities and capabilities, evolve strategies, promote, conduct, co-ordinate and support research and development programmes to achieve and maintain reliable and cost effective technology in wind power systems.
- ❖ To analyze and assess wind resources based on the data available from various sources and prepare wind energy density maps / wind atlas / reference wind data.
- ❖ To prepare and establish Indian standards on wind turbines and to develop and implement certification system in India.
- ❖ To establish world class facilities, conduct and coordinate testing of complete wind power systems and components according to internationally accepted test procedures and criteria, whereby the total performance that includes power performance, power quality, noise level, dynamics and operation and safety systems is tested according to agreed protocols.
- ❖ To accord type approval/type certification to wind turbines in accordance with Type Approval Provisional Scheme TAPS 2000 (amended).
- ❖ To undertake human resource development programmes for the personnel working in the wind energy sector.
- ❖ To promote commercial exploitation of know-how, know-why results and offer various consultancy services to the customers.
- ❖ To promote the development and commercialization of any other wind energy systems including stand-alone systems.
- ❖ To carry out any other activity in the field of renewable energy for R&D as may be assigned to it by the Ministry of New and Renewable Energy (MNRE) from time to time



From The Units

- 
-  **Research & Development**
 -  **Wind Resource Assessment**
 -  **Wind Turbine Testing**
 -  **Standards & Certification**
 -  **Information, Training & Commercial Services**
 -  **Solar Radiation Resource Assessment**

RESEARCH AND DEVELOPMENT

The R&D unit addresses the specific purpose of supporting time bound, and mission oriented research & development programmes to achieve and maintain world class, reliable and cost effective technology in wind power systems. The unit continues to improve its knowledge and skills through continuous learning to keep pace with state-of-the-art technology and excel through effective networking with Institutions. The unit carries out in-house R&D networking in research relevant areas with a mutually beneficial interdisciplinary approach for most of the projects. Interactive meetings through R&D institutions, manufacturers, sub-assembly manufacturers and designers are envisaged essential and necessary. Strategic collaboration that could assist in most suitable technological developments for our Country is nurtured by funding and technical support. Immense pool of knowledge base in the Country and abroad is accessed to meet the goals set. As of now, there is no Industry sponsored activities with C-WET in WT design /development. Due to the R&D in wind industry happens only in closed-doors for protection of their IPRs, C-WET undertakes R&D projects which are non-IPR category and having deliverables useful to the wind Industry in India. The brief of the work executed during the year 2010-11 are detailed as under:

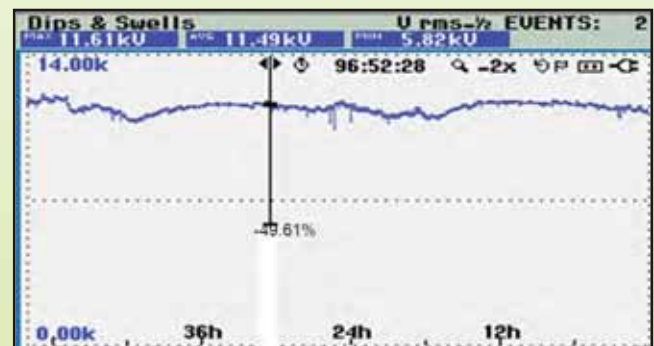
RESEARCH PROJECTS IN PROGRESS

Study on power quality issues in grid connected wind farms and identification of remedial measures (December 2009 - November 2012)

C-WET has initiated a project with an aim to give recommendations for the appropriate integration of the new wind generation system foreseen for the Indian wind power based on measurements at site and simulation studies.

Data collection is in progress at 110 kV Sultanpet substation and Gudimangalam substation. Reactive power consumption, voltage and current unbalance, voltage sag and swell, frequency deviation and harmonics were recorded, to study their effects on windmill.

In a typical case study on a voltage sag event, it was found that the wind turbines tripped due to voltage sag caused by tripping of another feeder in the same Sub Station due to earth fault. This resulted in rise in load current. Similarly, voltage swell event was recorded by manually isolating Wind turbine connected feeder, which causes voltage swell due to discharge of Capacitors connected for PF correction. The progress in the projects is periodically monitored by C-WET's R&D Council.



Voltage sag event



Voltage swell

Power Evacuation Studies for Grid Integrated Wind Energy Conversion System (February 2010 to August 2012)

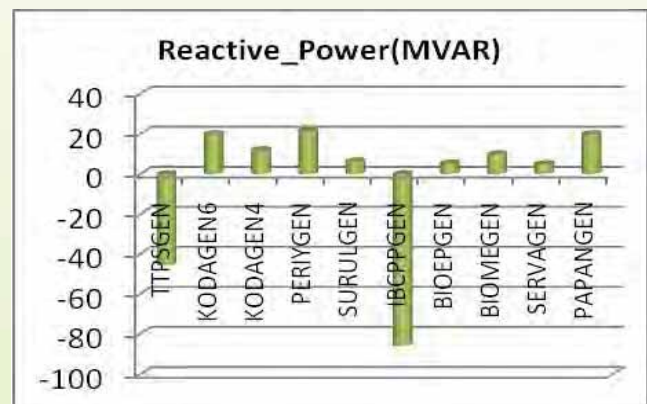
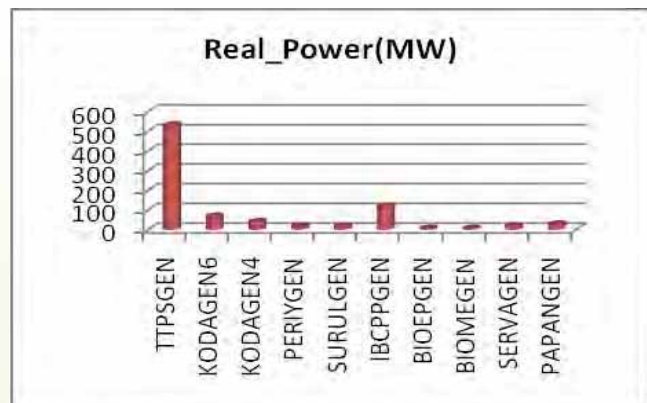
C-WET has initiated a project which aims at the optimization of wind turbine operation by ensuring evacuation of the available wind power into the grid. As part of this project, it is proposed to identify the locations where wind penetration in to the grid is an issue and facilitate to enhance the power evacuation with a Thyristor Controller Series Capacitor (TCSC) controller and Voltage Source Converter (VSC) based High Voltage Direct Current Transmission (HVDC) link.

Load flow analysis was carried out on the E.H.T layout of Tirunelveli network using “Mipower” Software by the Fast Decoupled Power Flow method and validated with MATLAB, without considering wind generation. Single line diagram of the E.H.T Layout was developed in AUTOCAD.

For the second milestone, power evacuation study was carried out covering 44 wind farm substations in the Tirunelveli region out of which 22 sub stations are dedicated substations, totaling 2857.70 MW of wind turbines. The load flow analysis considered the following cases:

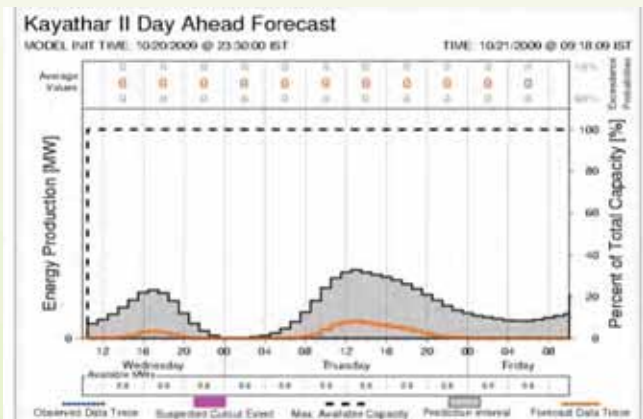
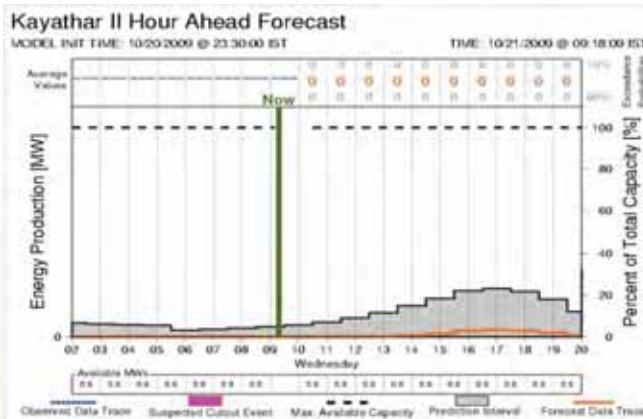
- I) No hydro generation with No wind generation
- Ii) 100 % hydro with No wind power generation
- Iii) 100 % hydro with different levels of wind power penetration

The results of the power evacuation study with the short circuit analysis (third milestone) will be used to determine the weak buses in the Tirunelveli network.



Wind energy forecasting for the 600 kW R&D / experimental wind turbine: A technology demonstration project

The Wind Energy forecasting in-house study currently underway at the WTRS on the 600 kW R&D wind turbine has provided valuable insight into the capabilities of forecasting techniques used in the industry. An advance estimate of the usable energy to be generated by the 600 kW R&D/Experimental Wind Farm at Kayathar, Tamil Nadu, on an hourly, daily and weekly basis has been estimated and has also been used for predicting weather forecast for the site. The closeness between the estimations done using the forecasting tool and the actual generations is presently under analysis and a report would soon be compiled to get a better understanding of the effectiveness of the forecasting tools.



*Hour Ahead & Day Ahead Forecast for the 600 kW
R&D turbine at WTRS, Kayathar*



Temperature Measurement underway



Typical view of Electrical Resistance

Performance Quantification Study on two 20 Years design life exhausted 200 kW Wind Turbine Gear Boxes before & after a Nano-coating on their Gear Meshing Surface

The Unit has initiated an in-house research project to quantify the Performance of two “design life exhausted 200 kW wind turbine gearboxes” before and after a nano-coating on their gear meshing surface. The project would involve comparison of vibration, temperature and sound before and after the application of nano-coating to assess the exact nature of performance improvement due to the nano-coating and whether it could become a feasible method to enhance gear usability in the older wind turbines.

Everybody's Battery Charger (February 2010 to August 2011)

C-WET has initiated a project which aims at designing and fabricating a cost effective Savonius rotor with concentrator for battery charging, with a DC power rating of 150 Watt, to be used in villages / hilly areas. Materials that can be sourced locally are being used to design and fabrication of the savonius rotor and a standard automobile generator is proposed to be used for charging the battery by changing windings to have low RPM.

The battery charger with the concentrator has been fabricated and performance evaluation of the same will be carried out in the coming months.



Everybody's Battery Charger

Implementation of Certificate / Post Graduate Diploma Courses in Wind Energy at PSG College of Technology, Coimbatore. (November 2010 to October 2013)

Based on the inputs received from the Industry and various wind sector stakeholders that a severe shortage of manpower exists in the wind sector, C-WET has encouraged academic institutional partnership to tide over the bottleneck. In the process, the proposal submitted by PSG College of Technology, Coimbatore for conducting five numbers of certificate / Post Diploma Graduate courses have been approved by the Research & Development Council and an Memorandum of Understanding was signed between C-WET & PSG on 19th November 2010. The unique features of this course are that the participants will receive a stipend facilitated by Indian Wind Turbine Manufacturers Association (IWTMA).

The courses commenced during January 2011 at Coimbatore. C-WET was instrumental in preparation of the needed syllabus for the said course and will also provide necessary support in training the trainers.

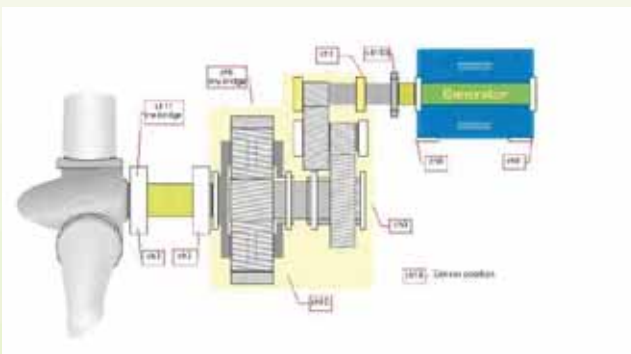


MoU signed between C-WET & PSG College of Technology & IWTMA

NEW RESEARCH PROJECTS APPROVED

Health / Condition Monitoring at Experimental / R&D Wind Farm at Kayathar

The proposal has been approved by the Research & Development Council of C-WET and procurement of sensors, Data acquisition systems and storage platforms are underway. With the installation of the state-of-the-art remote health condition monitoring system on the new R&D 2 MW Wind Turbine at WTRS, Kayathar, the early failure of sub-systems can be arrested by the proper estimation of the residual life and planning of proper maintenance schedule. An effective condition monitoring would mean that the O&M principle shifts from being a preventive maintenance schedule to that of being a corrective maintenance schedule. The current work is being taken up as a pilot project to instill awareness about such systems to the various stakeholders in the wind farm business.



Acceleration and noise proposed to be measured at various locations on the drive train, tower & blades

Experimental characteristics of wind turbine blade over full 0 - 360 degree angle of attack. (February 2011 to February 2013)

The proposal submitted by the Aeronautical department of Park College of Engineering and Technology, Coimbatore was approved by the Research & Development Council of C-WET. Under this proposal the various aerofoils would be placed inside wind tunnels and their stall hysteresis characteristics would be studied.



Proposed Aerofoil study in a Wind Tunnel

This study would be done with an emphasis to create a database on aero-foils that could be used for low wind regime wind turbine designs. The data collected is proposed to be validated by CFD methods before being made available to the stakeholders.



R&D Agreement between C-WET & Park College of Engineering

Human Resource Development by C-WET through tie-up with Amrita Vishwa Vidyapeetham University, Ettimadai, Coimbatore (June 2011 to May 2014)

C-WET is also in the process of initiating short term Post Graduate Diploma courses in Wind Power development & Wind Resource Analysis and for the purpose MoU are to be inked. This HRD initiative has been provided the approval in the Research & Development Council and the work is underway to sign the MoU and launch the courses for the development of the much needed skilled manpower for the wind industry.

R&D INFRASTRUCTURE UPGRADATION

Dedication of a 2 MW R&D Experimental Wind Turbine to the country at WTRS facility, Kayathar

The 2 MW Experimental/Research Wind Turbine at WTRS, Kayathar facility has been successfully commissioned and has been dedicated to the

country by the Honourable Minister for New and Renewable Energy, Dr. Farooq Abdullah in the presence of the Tamil Nadu State Minister for Electricity Shri. Arcot Veerasamy & Shri. Deepak Gupta, Secretary to the Ministry of New and Renewable Energy. Entire C-WET community alongwith Executive Director Dr. S. Gomathinayagam was in attendance at the inaugural function along with invitees from wind manufacturers association and other wind energy stakeholders.



Dedication speech being delivered by the Hon' Minister, MNRE



August gathering on the podium of dedication

A slew of R&D activities have been planned on the Wind Turbine, as a first measure work on the establishment of a Health Condition Monitoring System has been initiated. This exercise would help the industry to move away from a diagnostic approach of maintaining wind turbines to a Prognosis method of wind turbine maintenance.



Inauguration Plaque unveiled at the site



2 MW Kenersys make R&D Wind Turbine

Technology demonstration project on grid connected wind solar hybrid system

The Unit proposes to install 45 kW hybrid system consisting of grid connected miniature small wind farm and solar photovoltaic plant to serve as a demonstration project to meet the C-WET's load demand partially and to undertake research relevant activities. With the advent of smart grid concepts the days are not far when net metering and distributed generation would become the reality in Indian grid. C-WET being a model institution the deployment of the grid connected system without interfacing battery bank will help in studying important aspects related to grid behavior and understanding the peculiarities of such system and the concept of net metering for formulation of a policy.

TECHNICAL SERVICES RENDERED BY R&D UNIT

Small Wind Turbine Testing

The unit is presently in the process of type testing seven small wind turbine of 1.4kW, 3.2kW (2 Nos.), 3.5kW, 4.2kW, 5kW and 5.1kW rating at WTRS, Kayathar as per the requirements of IE C-61400-2. The measurements are likely to continue for next windy season of 2011 to meet the requirements of International Standards and to cover the entire operational wind speed range.



1.4 kW Model at WTRS



3.2 kW Model at WTRS



3.2 kW, 4.2 kW and 5.1 kW models at WTRS



3.5kW model at WTRS



5kW model at WTRS

Empanelment of Small Wind Turbines

The Unit is in the process of empanelling Small Wind Turbines with MNRE based on a review of documents submitted by manufacturers. As a step towards this, a Committee has been constituted with the approval of Secretary, MNRE, to review the status of various manufacturers of small wind energy systems and their recommendation for empanelment as MNRE approved manufacturers, based on the conditions stipulated in the Modified Scheme for the programme on “Small Wind Energy and Hybrid Systems”. Three lists have been released during the year with name of manufacturers who qualified for empanelment and their specific small wind turbine models, as recommended by the committee. The first list was released on 24th June 2010, the second list on 4th August 2010 and the third list on 14th January 2011 respectively. As on date, four models from two manufacturers have been listed in the empanelment category and seven models from five manufacturers have been listed under the provisional empanelment category, as per the MNRE SWES-guidelines.

WIND RESOURCE ASSESSMENT

The unit is implementing Nation wide Wind Resource Assessment (WRA) programme sponsored by the Government of India, in association with State Nodal Agencies. In order to extend support to the industry and developers, the unit takes up validation exercises, due diligence studies, micro siting and evaluation of production estimates of the proposed wind farms. The Ministry of New and Renewable Energy (MNRE), Government of India has been sponsoring

programmes to measure, analyze and publish wind data in our country for the last two decades. Winds have been measured at six hundred and eighteen locations for periods ranging from one to five years since 1986.

As on 31st March 2011, 65 stations are in operation in 16 States and one Union Territory. During 2010-11, a total number of 15 wind monitoring stations were commissioned. The overall status of the wind monitoring stations in the country is given in the table below.

Status of Wind Monitoring Stations (2010-2011)

S. No	State	Number of Stations		
		Established till 31.3.2011	Installed (new) during 2010-2011	In operation as on 31.03.2011
1.	Andaman & Nicobar	19	6	7
2.	Andhra Pradesh	63	-	1
3.	Arunachal Pradesh	6	-	-
4.	Assam	5	-	-
5.	Bihar	3	-	1
6.	Chattisgarh	7	-	2
7.	Goa	4	1	3
8.	Gujarat	69	5	6
9.	Haryana	6	-	-
10.	Himachal Pradesh	6	-	-
11.	Jammu & Kashmir	9	2	3
12.	Jharkhand	3	-	1
13.	Karnataka	49	1	2

S. No	State	Number of Stations		
		Established till 31.3.2011	Installed (new) during 2010-2011	In operation as on 31.03.2011
14.	Kerala	27	-	-
15.	Lakshadweep	9	-	-
16.	Nagaland	3	-	3
17.	Madhya Pradesh	37	-	4
18.	Maharashtra	112	-	22
19.	Manipur	8	-	2
20.	Meghalaya	2	-	2
21.	Mizoram	4	-	-
22.	Orissa	9	-	-
23.	Pondicherry	4	-	-
24.	Punjab	10	-	-
25.	Rajasthan	36	-	1
26.	Tamil Nadu	68	-	-
27.	Tripura	5	-	1
28.	Uttarakhand	11	-	-

Wind Monitoring Stations at more than 1000 sites have been installed including private sector measurements of which 618 stations were established by WRA unit of C-WET with 15 stations newly installed this year and a total of 65 stations are still in operation. Of the cumulative total of 618 stations established by C-WET as on 31st March 2011, 233 stations have been found to have Wind Power Density (WPD) in excess of 200 W/m² at 50 m/ agl. Summary of these 233 stations are given in the following table.

WPD range [W/m ²]	Number of stations
200 - 250	106
251 - 300	58
301 - 350	26
351 - 400	18
>401	25
Total	233

WPD distribution at 233 stations

WRA in the uncovered region

State wise details of the wind monitoring stations commissioned during 2010-2011 in the country under various programmes are given in the table below. All the masts are of 50m height. Sensors are placed at 50m, 30m and 10m levels above ground.

State wise installations of wind monitoring stations established during 2010-2011

Sl.No	Stations Established	State	District	Commissioned on
1.	Wandoor	Andaman & Nicobar	Andaman	14.05.2010
2.	IRBN Complex		Andaman	31.05.2010
3.	Chouldari		Andaman	05.06.2010
4.	Collinpur		Andaman	08.06.2010
5.	Hog Point		Nicobar	13.01.2011
6.	Vikas Nagar		Nicobar	08.06.2010
7.	Sarva	Gujarat	Bhavnagar	22.06.2010
8.	Virewadi		Bhavnagar	24.06.2010
9.	Jagawada		Surendra Nagar	26.06.2010
10.	Balva		Jamnagar	18.11.2010
11.	Jikiali		Amreli	20.11.2010
12.	Jogimatti	Karnataka	Chitradurga	21.07.2010
13.	Pir Ki Gali	Jammu & Kashmir	Poonch	13.10.2010
14.	Patnitop		Udhampur	18.10.2010
15.	Sirigao	Goa	North Goa	04.12.2010

Consultancy Projects

In addition to the wind monitoring projects, funded by MNRE the unit has carried out 161 consultancy projects during the year 2010-11. These short-term projects were to provide micro siting services and preparation of due diligence reports. Under the direction of the Ministry, verification of data collection procedure adopted by private firms was undertaken for a number of stations. Details of projects carried out during the financial year are given in table below:

Consultancy projects taken up during 2010-2011

No	Name of The Project	Name of The Client	Remarks
1.	Verification of procedure of Wind Monitoring at Girigashankarwadi, Satara District in Maharashtra	M/s. Kenersys India Pvt.Ltd, Pune	Completed
2.	Verification of procedure of Wind Monitoring at Banswara, Udaipur District in Rajasthan	M/s. Enercon India Limited, Mumbai	Completed
3.	Verification of procedure of Wind Monitoring at Gotibhadruk, Nasik District in Maharashtra	M/s. Enercon India Limited, Mumbai	Completed
4.	Verification of procedure of Wind Monitoring at Andhralake - Western Ridge, Pune in Maharashtra	M/s. Enercon India Limited, Mumbai	Completed
5.	Verification of procedure of Wind Monitoring at Chandwad, Nasik District in Maharashtra	M/s. Enercon India Limited, Mumbai	Completed
6.	Verification of procedure of Wind Monitoring at Igatpuri - II, Nasik District in Maharashtra	M/s. Enercon India Limited, Mumbai	Completed
7.	Verification of procedure of Wind Monitoring at Mandasur, Madhya Pradesh	M/s. Enercon India Limited, Mumbai	Completed
8.	Evaluation of Power curve Demonstration for Sadawaghapur Wind Farm in Maharashtra	M/s. Tata Power Company Limited, Mumbai	Completed
9.	Evaluation of Power curve Demonstration for 11.25MW wind farm Project at Brahmanvel, Dhule in Maharashtra	M/s. Tata Power Company Limited, Mumbai	Completed
10.	Production Estimation of For (S52 x 600kW) and (S66 x 1250 kW) Suzlon WTGs at Jodiya Site in Gujarat	M/s. Suzlon Energy Limited, Pune	Completed
11.	Consultancy Services for 10 MW wind farming projects at Tamilnadu	M/s. Southern Railway, Chennai	Completed
12.	Technical Due Diligence for wind farm projects at Agaswadi in Maharashtra	M/s. Regen Powertech Pvt. Ltd, Chennai	Completed
13.	Wind Resource Assessment studies at Tawa Dam, Hoshangabad District in Madhya Pradesh	M/s. Mauktika Energy Limited, Hyderabad	Completed
14.	Verification of Procedure of wind Monitoring at Machind, Rajsamand Dist. Rajasthan	M/s. Marut_Shakthi Energy India Limited, Bhopal	Completed
15.	Verification of Procedure of wind Monitoring at Chilarewadi, Satara District in Maharashtra	M/s. Nuziveedu Seeds Pvt. Ltd. Hyderabad	Completed
16.	Production Estimate of their proposed Wind Farm Projects at Suzlon Site (Chakla) Maharashtra	M/s. ITC Limited, Bangalore	Completed

No	Name of The Project	Name of The Client	Remarks
17.	Technical Due Diligence for wind farm projects at Gujarat & Rajasthan	M/s. ITC Limited, Gurgaon	Completed
18.	Verification of Procedure of wind Monitoring at Jungi, Kutch District in Gujarat	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
19.	Verification of Procedure of wind Monitoring at Manabha, Kutch District in Gujarat	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
20.	Verification of Procedure of wind Monitoring at Suleran, Kolhapur District in Maharashtra	M/s. Enercon (India) Limited, Mumbai	Completed
21.	Verification of Procedure of wind Monitoring at Kitawade, Kolhapur District in Maharashtra	M/s. Enercon (India) Limited, Mumbai	Completed
22.	Wind Resource Assessment study at 5 locations in Tamil Nadu	M/s. Nuziveedu Seeds Pvt. Ltd. Hyderabad	Completed
23.	Verification of Procedure of Wind Monitoring at Kitawade	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
24.	Verification of Procedure of Wind Monitoring at Barki, Kolhapur District in Maharashtra	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
25.	Verification of Procedure of Wind Monitoring at Gulumb, Kolhapur District in Maharashtra	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
26.	Verification of Procedure of Wind Monitoring at Ramoshiwadi, Nashik District in Maharashtra	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
27.	Verification of Procedure of Wind Monitoring at Amdhapuram, Tirunelveli district in Tamilnadu	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
28.	Verification of Procedure of Wind Monitoring at Madhavkurichi, Tirunelveli district in Tamilnadu	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
29.	Verification of Procedure of Wind Monitoring at Bahirewadi, Kolhapur District, Maharashtra	M/s. The Tata Power Company Limited, Mumbai	Completed
30.	Verification of Procedure of Wind Monitoring at Thagi, Mandsaur District in Madhya Pradesh	M/s. Marut - Shakti Energy India Limited, Bhopal	Completed
31.	Verification of procedure of wind monitoring at Hanamasagara Koppal District in Karnataka,	M/s. Hanamasagara Wind Power Project, Davangere	Completed
32.	Verification of procedure of wind monitoring at Nakthrana in Kutch District of Gujarat	M/s. Enercon (India) Limited, Mumbai	Completed

No	Name of The Project	Name of The Client	Remarks
33.	Verification of procedure of wind monitoring at Banswara 2 in Banswara District of Rajasthan	M/s. Enercon (India) Limited, Mumbai	Completed
34.	Verification of procedure of wind monitoring at Bothe3, Satara District in Maharashtra	M/s. Vestas Wind Technology India Pvt. Ltd., Chennai	Completed
35.	Verification of procedure of wind monitoring at Devulgaon Ghat, Beed District in Maharashtra	M/s. The Tata Power Company Ltd., Mumbai	Completed
36.	Verification of procedure of wind monitoring at Karkhel, Beed District in Maharashtra	M/s. The Tata Power Company Ltd., Mumbai	Completed
37.	Verification of procedure of wind monitoring at Taladari, Rajsamand District in Rajasthan	M/s. Consolidated Energy Consultants Limited, Bhopal	Completed
38.	Verification of procedure of wind monitoring at Dharmaturani, Tirunelveli District in Tamil Nadu	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
39.	Verification of procedure of wind monitoring at TNPL 1, Tirunelveli District in Tamil Nadu	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
40.	Verification of procedure of wind monitoring at Vellapaneri, Tirunelveli District in Tamil Nadu	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
41.	Verification of procedure of wind monitoring at Dhokarva Chotila in Rajkot District of Gujarat	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
42.	Verification of procedure of wind monitoring at Reshamiya in Rajkot District of Gujarat	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
43.	Verification of procedure of wind monitoring at Theni 1, Jangalpatty, Theni District, Tamil Nadu	M/s. Gamesa Wind Turbines Pvt. Ltd., Chennai	Completed
44.	Consultancy services for 50 MW Wind Farming Project at Rajasthan	M/s. THDC India Limited, Uttarakhand	Ongoing
45.	Verification of procedure of wind monitoring at 64 Stations in Maharashtra	M/s. Maharashtra Energy development Agency, Pune	Completed
46.	Verification of procedure of wind monitoring at Soda Bandan, Jaisalmer District, Rajasthan	M/s. Suzlon Energy Limited, Pune	Completed
47.	Verification of procedure of wind monitoring at Phalodi, Rajasthan	M/s. Suzlon Energy Limited, Pune	Completed
48.	Site Assessment for Wind Resource Assessment at Pahari, Satna District in Madhya Pradesh	M/s. THDC India Ltd., Rishikesh, Uttarakhand	Completed

No	Name of The Project	Name of The Client	Remarks
49.	Verification of procedure of wind monitoring at Thappakundu, Theni District, Tamilnadu	M/s. Regen Powertech Pvt. Ltd, Chennai	Completed
50.	Verification of procedure of wind monitoring at Jamb Amberi, Satara District, Maharashtra	M/s. Kenersys India Pvt.Ltd, Pune	Completed
51.	Technical due diligence for their proposed 40 MW wind farm project at Shiravalli and Jamb, Satara District, Maharashtra	M/s. Kenersys India Pvt.Ltd, Pune	Completed
52.	Technical due diligence, micro siting and estimation of power generation for their proposed wind farm project at Vajrakarur, Ananthapur District, Andhra Pradesh	M/s. Axis Wind Energy Ltd., Hyderabad	Completed
53.	Evaluation of Power curve Demonstration for 50.4 MW wind farm project at Gadag in Karnataka	M/s. The Tata Power Company Limited, Mumbai	Completed
54.	Evaluation of Power curve Demonstration for 50.4 MW wind farm project at Samana, Jamnagar, Gujarat	M/s. The Tata Power Company Limited, Mumbai	Completed
55.	Verification of procedure of wind monitoring at Kolgaon in Ahmadnager District of Maharashtra	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
56.	Verification of procedure of wind monitoring at Kolgaon North in Ahmadnager District of Maharashtra	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
57.	Verification of procedure of wind monitoring at Valayapalayam in Tiruppur District of Tamilnadu	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
58.	Verification of procedure of wind monitoring at Talayapalayam in Tiruppur District of Tamilnadu	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
59.	Verification of procedure of wind monitoring at Kundadam in Dindigul District of Tamilnadu	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
60.	Verification of procedure of wind monitoring at Muthianpatti in Dindigul District of Tamilnadu	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
61.	Verification of procedure of wind monitoring at Muthunayakanpatti in Dindigul District of Tamilnadu	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
62.	Verification of procedure of wind monitoring at Kottapalle in Cuddapah District of Andhra Pradesh	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
63.	Verification of procedure of wind monitoring at Yamavaram in Cuddapah District of Andhra Pradesh	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
64.	Verification of procedure of wind monitoring at Vajrakarur in Anantpur District of Andhra Pradesh	M/s. Suzlon Infrastructure Services Limited, Pune	Completed

No	Name of The Project	Name of The Client	Remarks
65.	Verification of procedure of wind monitoring at Adwadi, Nashik District, Maharashtra	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
66.	Verification of procedure of wind monitoring at Kumbhariya Kachchh District, Gujarat	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
67.	Verification of procedure of wind monitoring at Tulsan, Satara District, Maharashtra	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
68.	Verification of procedure of wind monitoring at Khokhade, Satara District, Maharashtra	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
69.	Verification of procedure of wind monitoring at Navalewadi, Satara District, Maharashtra	M/s. Shubh Wind Power Private Ltd., Karnataka	Completed
70.	Wind Resource Assessment at Puthuvypeen shore Tank farm area in Kochi, Kerala	M/s. Bharat Petroleum Corporation Limited, Kochi	Ongoing
71.	Analysis of wind monitoring data from 78 stations in Maharashtra	Maharashtra Energy Development Agency, Pune	Ongoing
72.	Wind Resource Assessment Studies at Ambalapuzha IT Park, Kerala	M/s. Infopark, Kochi	Ongoing
73.	Wind Resource Assessment study at Tehri Dam in Garhwal district, Uttarakhand	M/s. Tehri Hydro Development Corporation Ltd, Rishikesh	Ongoing
74.	Wind Resource Assessment Studies at three locations in Siddavannadurga site, Chitradurga District, Karnataka	M/s. NSL Power private limited, Hyderabad	Ongoing
75.	Wind Resource Assessment study at three locations in the Kukuru region, Betul District, Madhya Pradesh	M/s. Narmada Hydroelectric Development Corporation Ltd, Bhopal	Ongoing
76.	Wind Resource Assessment Studies at Devarkulam, Tirunelveli District, Tamilnadu	M/s. Tamilnadu Newsprint and Papers Limited (TNPL), Chennai	Ongoing
77.	Wind Data Collection, Processing and Analysis at Toranahalli Village, Belgaum district in Karnataka	M/s. Mysore Mercantile Co. Limited, Bangalore	Ongoing
78.	Production Estimation for 36MW wind farm project Kolewadi & Khabalwadi Landewadi sites in Satara District, Maharashtra	M/s. Kenersys India Private Limited, Pune	Completed
79.	Consultancy services for proposed 50MW wind farm projects in Tamilnadu, Neyveli	M/s. Neyveli Lignite Corporation Limited	Completed
80.	Micrositing and annual generation estimation for proposed 50MW wind farm project at Mundra site, Kutch district, Gujarat	The Tata Power Company Limited, Mumbai	Completed

No	Name of The Project	Name of The Client	Remarks
81.	Micrositing and annual generation estimation of proposed wind farm project at Kappatagudda site in Gadag District	M/s. Karnataka Power Corporation Limited, Bangalore	Completed
82.	Wind Resource Assessment Studies at three locations in Orissa	M/s. Orissa Renewable Energy Development Agency, Bhubaneswar	Ongoing
83.	Verification of procedure of wind monitoring at Andhralake-Central, Pune District in Gujarat	M/s. Enercon (India) Limited, Mumbai	Completed
84.	Verification of procedure of wind monitoring at Maloshi, Satara District in Maharashtra	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
85.	Verification of procedure of wind monitoring at Akal, Jaisalmer District in Rajasthan	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
86.	Verification of procedure of wind monitoring at Hearda, Davangere District in Karnataka	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
87.	Verification of procedure of wind monitoring at Sidenur, Davangere District in Karnataka	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
88.	Verification of procedure of wind monitoring at Kalmangi, Bellary District in Karnataka	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
89.	Verification of procedure of wind monitoring at Golay, Kachchh District in Gujarat	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
90.	Verification of procedure of wind monitoring at Karamtha in Kachchh District, Gujarat	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
91.	Verification of procedure of wind monitoring at Karvat in Satara District, Maharashtra	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
92.	Verification of procedure of wind monitoring at Agaswadi in Satara District of Maharashtra	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
93.	Verification of procedure of wind monitoring at Wand Notiyar in Kachchh District of Gujarat	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
94.	Verification of procedure of wind monitoring at Lathdi in Kachchh District of Gujarat	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
95.	Verification of procedure of wind monitoring at Baradiya in Jamnager District of Gujarat	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
96.	Verification of procedure of wind monitoring at Gotne in Satara District of Maharashtra	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed

No	Name of The Project	Name of The Client	Remarks
97.	Verification of procedure of wind monitoring at Torangallu in Bellary District of Karnataka	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
98.	Verification of procedure of wind monitoring at Kundur in Devangere District of Karnataka	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
99.	Technical due diligence for proposed 220.8 MW wind farm projects at 4 states (Tamilnadu, Gujarat, Andhra Pradesh & Rajasthan)	M/s. Enercon India Ltd, Mumbai	Completed
100.	Production estimate of their proposed wind farm projects at Suzlon site (Amudhapuram) and Enercon site (Vagaikulam) in Tirunelveli District, Tamilnadu	M/s. ITC Limited, Chennai	Completed
101.	Wind Resource Assessment studies at two locations in Karnataka	M/s. Karnataka Power Corporation Limited, Bangalore	Ongoing
102.	Verification of procedure of wind monitoring at Sanosara in Rajkot District of Gujarat	M/s. Kenersys India Pvt. Ltd, Pune	Completed
103.	Verification of procedure of wind monitoring at Pratapgad in Rajkot District of Gujarat	M/s. Kenersys India Pvt. Ltd, Pune	Completed
104.	Production estimate for (25x1.25MW) Suzlon WTGs at Torangallu site in Karnataka	M/s. Suzlon Energy Limited, Pune	Completed
105.	Production estimate for (18 x 1.50 MW) Suzlon WTGs at Minichery site in Karnataka	M/s. Suzlon Energy Limited, Pune	Completed
106.	Verification of procedure of wind monitoring at Tejuva in Jaisalmer District of Rajasthan	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
107.	Verification of procedure of wind monitoring at Minichery in Bellary of Karnataka	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
108.	Verification of procedure of wind monitoring at Suro Ki Dhani in Jaisalmer District Rajasthan	M/s. Suzlon Infrastructure Services Ltd, Pune	Completed
109.	Consultancy services for proposed 25 MW wind farming projects at Theni in Tamilnadu	M/s. Gamesa Wind Turbines Private Limited, Chennai	Completed
110.	Consultancy services for Production estimation of (26 x 1250 kW) Suzlon WTGs at Adodar in Gujarat	M/s. Suzlon Energy Limited, Pune	Completed
111.	Consultancy services for production estimation of (16 x 1500 kW) Suzlon WTGs at Gorsar in Gujarat	M/s. Suzlon Energy Limited, Pune	Completed
112.	Verification of procedure of wind monitoring at Theni in Theni district of Tamilnadu	M/s. Regen Powertech Private Limited, Chennai	Completed

No	Name of The Project	Name of The Client	Remarks
113.	Verification of procedure of wind monitoring at Theni - 2 in Theni district of Tamilnadu	M/s. Regen Powertech Private Limited, Chennai	Completed
114.	Verification of procedure of wind monitoring at Bhud in Sangli district of Maharashtra	M/s. Regen Powertech Private Limited, Chennai	Completed
115.	Verification of procedure of wind monitoring at Khatumba, Jamnager District, Gujarat	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
116.	Verification of procedure of wind monitoring at Rawleshwar, Kachchh District, Gujarat	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
117.	Verification of procedure of wind monitoring at Lonavla, Pune District, Maharashtra	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
118.	Verification of procedure of wind monitoring at Bhimrana, Jamnager, Gujarat	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
119.	Verification of procedure of wind monitoring at Manabha, Kutch District, Gujarat	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
120.	Verification of procedure of wind monitoring at Mokal, Jaisalmer District, Rajasthan	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
121.	Verification of procedure of wind monitoring at Veplankulam, Tirunelveli District, Tamilnadu	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
122.	Verification of procedure of wind monitoring at Akal, Jaisalmer District, Rajasthan	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
123.	Verification of procedure of wind monitoring at Lathdi, Kachchh District in Gujarat	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
124.	Verification of procedure of wind monitoring at Karvat, Satara District, Maharashtra	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
125.	Verification of procedure of wind monitoring at Gotne, Satara District, Maharashtra	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
126.	Verification of procedure of wind monitoring at Sadawaghapur Forest, Satara District, Maharashtra	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
127.	Verification of procedure of wind monitoring at Malavshi, Satara District, Maharashtra	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
128.	Verification of procedure of wind monitoring at Damanjodi 1, Koraput District, Orissa	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
129.	Verification of procedure of wind monitoring at Kolhapur 2, (Amashi), Kolhapur District, Maharashtra	M/s. Vestas Wind Technology India Private Ltd., Chennai	Completed

No	Name of The Project	Name of The Client	Remarks
130.	Consultancy services of their proposed 60 MW wind farm project at Devulgaon Ghat, Beed District, Maharashtra	M/s. The Tata Power Company Ltd., Mumbai	Completed
131.	Verification of procedure of wind monitoring at Animala, Kadapa District, Andhra Pradesh	M/s. Guttaseema Wind Energy Company (P) Ltd., Hyderabad	Completed
132.	Verification of procedure of wind monitoring at Balavenkatapuram, Anantapur District, Andhra Pradesh	M/s. Guttaseema Wind Energy Company (P) Ltd., Hyderabad	Completed
133.	Consultancy services for technical due diligence of their proposed 18 MW wind farm projects at Shirawali site in Satara District, Maharashtra	M/s. Renew Wind Power Pvt. Ltd., Mumbai	Completed
134.	Technical due diligence of their proposed wind farm (43 x 1.5MW) at Hanamsagar site, Koppal District, Karnataka	M/s. Hanamasagara Wind Power Project, Davangere	Completed
135.	Verification of procedure of wind monitoring at Somandepalli, Anantapur District, Andhra Pradesh	M/s. KSK Wind Energy Private Ltd., Hyderabad	Completed
136.	Verification of procedure of wind monitoring at K. Palayam, Coimbatore District, Tamilnadu	M/s. Gamesa Wind Turbines Pvt. Ltd., Chennai	Completed
137.	Technical due diligence of their proposed (G58 - 850kW) wind farm project at Rasipalayam site, Tamilnadu	M/s. Gamesa Wind Turbines Pvt. Ltd., Chennai	Completed
138.	Verification of procedure of wind monitoring at Pohra, Jaisalmer District, Rajasthan	M/s. RRB Energy Ltd., Chennai.	Completed
139.	Verification of procedure of wind monitoring at Chavaneshwar South, Satara District, Maharashtra	M/s. Enercon (India) Limited, Mumbai	Completed
140.	Verification of procedure of wind monitoring at Akal, Jaisalmer District, Rajasthan	M/s. RRB Energy Ltd., Chennai.	Completed
141.	Verification of procedure of wind monitoring at Vattivarlapalli, Mahboobnagar, Andhra Pradesh	M/s. Belum wind Infrastructure Pvt. Ltd., Hyderabad	Completed
142.	Verification of procedure of wind monitoring at Nesevandlapalli, Anantapur District, Andhra Pradesh	M/s. Rayalaseema Wind Energy Company Pvt. Ltd., Hyderabad	Completed
143.	Verification of procedure of wind monitoring at Gollapalli, Chittoor District, Andhra Pradesh	M/s. Rayalaseema Wind Energy Company Pvt. Ltd., Hyderabad	Completed
144.	Verification of procedure of wind monitoring at Madugupalli, Anantapur District, Andhra Pradesh	M/s. Helios Infratech Pvt. Ltd., Hyderabad	Completed

No	Name of The Project	Name of The Client	Remarks
145.	Verification of procedure of wind monitoring at Hopardi, Jodhpur District, Rajasthan	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
146.	Verification of procedure of wind monitoring at Kaladonger, Jaisalmer District, Rajasthan	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
147.	Verification of procedure of wind monitoring at Suro Ki Dhani - SE, Jaisalmer District, Rajasthan	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
148.	Verification of procedure of wind monitoring at Kavdya Donger, Ahmed Nagar District, Maharashtra	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
149.	Verification of procedure of wind monitoring at Tirumalaipalli, Kadapa District, Andhra Pradesh (regd.)	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
150.	Verification of procedure of wind monitoring at Dobbudupalli, Kadapa District, Andhra Pradesh	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
151.	Verification of procedure of wind monitoring at Uchangidurga, Davangere District, Karnataka	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
152.	Verification of procedure of wind monitoring at Hanumanthappa, Davangere District, Karnataka	M/s. Suzlon Infrastructure Services Limited, Pune	Completed
153.	Verification of procedure of wind monitoring at Muggaon, Beed District, Maharashtra	M/s. RRB Energy Ltd., Chennai	Completed
154.	Technical due diligence of their proposed wind farm at Pethshivapur, Kolhapur District, Maharashtra	M/s. Regen Powertech Pvt. Ltd., Chennai	Completed
155.	Verification of procedure of wind monitoring at Banswara-3, Banswara District, Rajasthan	M/s. Enercon (India) Limited, Mumbai	Completed
156.	Verification of procedure of wind monitoring at Banswara-4, Banswara District, Rajasthan	M/s. Enercon (India) Limited, Mumbai	Completed
157.	Technical due diligence of their proposed 31.5 MW (S88 2100 KW x 15 WTGs) wind farm project at Kundadam East in Tamilnadu	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed

No	Name of The Project	Name of The Client	Remarks
158.	Verification of procedure of wind monitoring at V.Kulam, Tirunelveli District, Tamilnadu	M/s. Enercon (India) Limited, Mumbai	Completed
159.	Technical evaluation report of the proposed 100 MW Wind Farm Projects in Mahara shtra, Madhya Pradesh, Gujarat & Karnataka	M/s. NTPC Limited, New Delhi	Completed
160.	Verification of procedure of wind monitoring at Mithapur, Jamnagar District, Gujarat	M/s. The Tata Power Company Ltd., Mumbai	Completed
161.	Verification of procedure of wind monitoring at Mahider-Chotila, Rajkot District, Gujarat	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed

Offshore Wind Resource Assessment at Dhanuhskodi, Rameshwaram, Ramanathapuram District:

MNRE has sanctioned a project titled as “Offshore wind resource assessment at Dhanuhskodi, Rameshwaram, Ramanathapuram District”, Tamilnadu. The project has two parts as follows: 1) Wind measurements at Dhanuhskodi with 100 m anemometry and 2) Synthetic Aperture Radar (SAR) data collection and analysis for offshore assessment between Kanyakumari and Rameswaram. For 100 m anemometry with mast, the site selection and land procurement have been taken up with government of Tamilnadu. The project will be completed as soon as permission for land is obtained. An agreement has been executed between C-WET & RISO, DTU on 19th August 2010 for collecting and analysis offshore SAR data between Rameshwaram and Kanyakumari. C-WET scientists attended SAR workshop at RISO-DTU, Denmark during 25th -29th

October 2010. 371 Satellite images have been downloaded from the European Space Agency (ESA) website, filtered and the best 267 images have been selected for analysis and submitted to Wind Energy Division, RISO-DTU on 29th October 2010. An agreement between C-WET and European Satellite Agency (ESA) has been signed on for utilization of data. The project is under progress. The entire project cost is funded by MNRE.

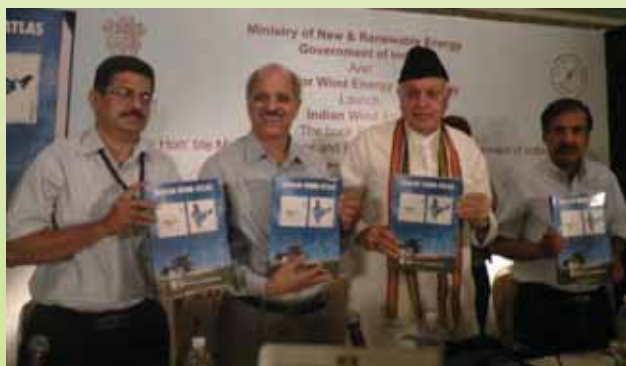
Development of Wind Forecasting Model with Special Reference to Complex Terrain

A project titled “Development of Wind forecasting model with Special Reference to Complex Terrain” at Khandke hills; Ahmed Nagar was sanctioned by the Ministry. A workshop on this regard has been conducted by M/s sanctioned by the Ministry to C-WET. C-WET approached RISO-DTU, Denmark and they agreed to carry out the project. An agreement has been executed in June 2010 between C-WET and RISO DTU, to execute the project. Project duration is 18 months. ” PREDICTOR”

model has been identified and the same is being used for forecasting. A wind farm in complex terrain with 50.4 MW has been identified for the study. A workshop on "PREDICTOR" model has been conducted by Riso-DTU at C-WET, Chennai during 5th to 9th October 2010. Site has been visited. Prediction is being done. The project cost is shared by MNRE and C-WET.

Release of "Indian Wind Atlas"

Indian Wind Atlas, a book containing the wind resource availability across the Indian continent for harnessing wind energy has been released by the Ministry and C-WET on 29th April 2010. The Wind Atlas will carry essential data that allows wind farm developers, engineers, investors to learn about the potential generating capacity available in a particular region in India. The book was prepared by C-WET in association with the Riso DTU, Denmark and the project was completely sponsored by MNRE, Government of India. Another outcome of this Indian Wind Atlas would be, for any given location in India (identified by latitude & longitude) indicative wind potential in terms of wind speed and direction distribution at 50 m level can be obtained as a library file for further micro survey analysis.



*Dr. Farooq Abdullah, Union Minister for New and Renewable Energy, releasing the Indian Wind Atlas, at a function in Chennai.
G.B. Pant, Chairman of Technical Committee of IWA and Deepak Gupta (right), Secretary, New and Renewable Energy*

Meeting & Training

The following meetings & training programmes was organized by the unit during 2010-11

- ❖ Review meetings on wind resource assessment programme for the State Nodal Agencies were held on 17th February 2011 and 18th February 2011.



- ❖ Conducted two days Windsim Software training programme at C-WET during 23rd and 24th August 2010 for understanding the advanced numerical solutions, to predict wind power resources & wind characteristics in complex sites.
- ❖ A training program on short term prediction using "Predictor" Software was organized during 5th - 6th October 2010 at C-WET and a wind farm at Khandke hills in Ahmednagar has been visited. Dr. Jesper Nissen from Riso-DTU has taken classes in the training.
- ❖ Conducted 2 days MeteoDyn Software training programme at C-WET Seminar Hall during 29th and 30th July 2010 for understanding the advanced numerical solutions, to predict wind power resources & wind characteristics in complex sites.
- ❖ A training Program for Mi-Power software has been conducted by M/s. PRDC, Bangalore during 19th to 21st January 2011 at C-WET, Chennai.

WIND TURBINE TESTING

Wind Turbine Test Station

C-WET's Wind Turbine Test Station (WTTS) near Kayathar in Tamil Nadu was established with the technical assistance of Riso National Laboratory, Denmark under Danish International Development Agency (DANIDA) grant and with partial financial assistance and guidance of MNRE. The Test Station has the following facilities:

- ❖ Availability of 2 test beds to test wind turbines up to 1250 kW capacity and 400 kW capacity and the capacity expandable based on future offers.
- ❖ Readily available grid connection for each test bed.
- ❖ Readily available reference met masts in front of each test bed, designed to heights of 75 meters and 50 meters respectively.
- ❖ Availability of Industrial PC based data acquisition systems for measurements at the control room of each test bed.
- ❖ Availability of an office cum workshop building at WTTS with facilities of carrying out functionality check of instruments and sensors. The workshop is equipped with adequate space to accommodate a nacelle for instrumentation purposes.
- ❖ Availability of sensors and transducers as per the requirement of IEC standards which are stored in the workshop as per the Quality management system procedures.
- ❖ Availability of 9 No's of 200 kW Micon make wind turbine for development of research in new measurements techniques.



Met-Mast instrumentation at site



Wind Turbine Instrumentation at Site



Quality Check during factory instrumentation



Nacelle Instrumentation at Factory

Important events during 2010-11

- ❖ An agreement was signed between C-WET and M/s. Shriram EPC Limited for Type Testing of SEPC 250 kW wind turbine with 28.5 rotor diameter at Pavor Chathiram near Tenkasi, Tamilnadu.
- ❖ An agreement was signed between C-WET and M/s. Shriram EPC Limited for Type Testing of SEPC 250 kW wind turbine with 29.6 rotor diameter at Pavor Chathiram near Tenkasi, Tamilnadu.
- ❖ An agreement was signed between C-WET and M/s. Garuda Vaayu Shakthi Limited for Type Testing of GARUDA 700 kW wind turbine at Chelianallur village, Tirunelveli Taluk, Tirunelveli District, Tamilnadu.

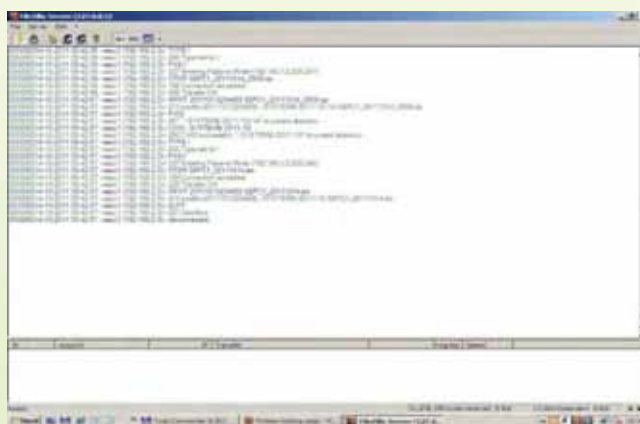
Achievements during 2010-2011

- ❖ The recertification audit as per the requirements of ISO 9001:2008 was conducted by DNV at WTTS, Kayathar test site during June 2010. The unit was recommended for re-certification valid up to August 2013.
- ❖ NABL Re-assessment Audit as per the requirements of ISO/IEC 17025- 2005 was completed successfully during August 2010 at WTTS, Kayathar valid up to October 2012.

Innovation / New Facilities / New Infrastructure

Software development for remote monitoring of selected data from various field sites through Internet

The software for remote monitoring transfer of data has been developed. The internal and external security network audit service have been completed to ensure the safety of the network and data which is not confidential in nature can be streamed live to C-WET website.



Data Acquisition and Analysis system



C-WET website image



STANDARDS AND CERTIFICATION

The Standards and Certification (S&C) unit carries out the certification of wind turbines, as per Type Approval - Provisional Scheme - TAPS-2000 (Amended), the Indian Type Certification Scheme for wind turbines, formulated in line with International Electrotechnical Commission (IEC), Standards while taking into account of the Indian

conditions. TAPS-2000 (Amended) has been approved and issued by MNRE. The S & C unit is implementing TAPS-2000 (Amended) for certification of wind turbines in India. Type certification of wind turbines plays an active and important role for the orderly growth of the Indian wind industry.

Activities:

Provisional Type Certification: Project Completed (2010-2011)

SI No.	Manufacturer's Name	Wind Turbine Model / Capacity	Status
1.	M/s.RRB Energy Limited	Pawan Shakthi – 600 kW with 65m tubular tower	Completed

Provisional Type Certificates : Renewals Completed (2010- 2011)

SI No.	Manufacturer's Name	Wind Turbine Model / Capacity	Validity
1.	M/s Southern Wind Farms Limited	GWL 225 / 225 kW	27.02.2011
2.	M/s RRB Energy Limited	V39 / 500kW with 47m Rotor	20.04.2011
3.	M/s RRB Energy Limited	Pawan Shakthi- 600 kW	04.07.2011
4.	M/s Southern Wind Farms Limited	GWL 225 / 225 kW	27.02.2012

Provisional Type Certification : On going Project (2010-2011)

SI No.	Manufacturer's Name	Wind Turbine Model / Capacity	Status
1.	M/s Suzlon Energy Limited	Suzlon S.52/600 kW	On going

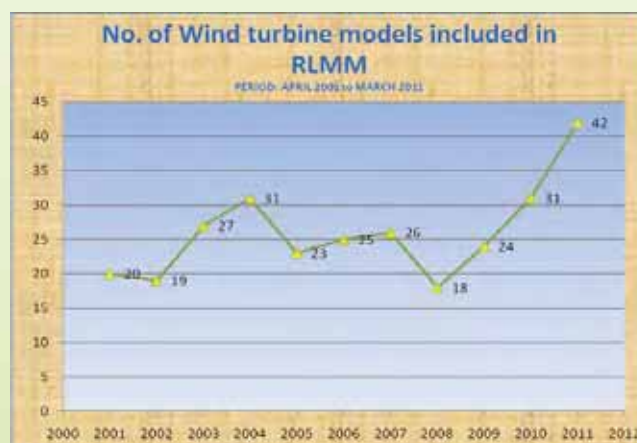
Standards:

The unit plays an active role in preparation of Indian standards on wind turbines. In this regard, the unit is working in close co-ordination with Bureau of Indian Standards (BIS). Also the unit is actively providing its contribution in the formulation of IEC (International Electrotechnical Commission) standards through BIS. S&C unit is supporting BIS continuously on various issues for coordination with IEC/TC 88 committee. As India is a P-member in IEC/TC 88 committee, the unit is providing continuous support and contribution to BIS for voting on the draft IEC standards. Executive Director, C-WET, Unit Chief, S&C and Unit Chief, Testing have participated in the third Wind Turbine Sectional Committee meeting: ET 42 held at Bureau of Indian Standards, New Delhi.

Revised List of Models and Manufacturers of Wind Turbines (RLMM)

MNRE has been issuing the guidelines for Wind Power Projects to streamline the development and facilitate healthy and orderly growth of the Wind Power Sector in the Country. Based on the MNRE guidelines, Revised List of Models and Manufacturers of Wind Turbines (RLMM), finalized by the Committee appointed by MNRE, is being issued by C-WET periodically. The list, issued by C-WET, is being widely referred by various State Nodal Agencies, State Electricity Boards and various financial institutions. The unit has issued one RLMM Main List and two Addendum Lists in the year 2010-11.

The unit which serves as a secretariat for RLMM has successfully completed ten years in issuing the RLMM list. The number of Wind turbine models included in RLMM is in the upward trend, as is seen from the figure. This number includes models which are already type certified as well as models which are under self-certification scheme, i.e. new models from existing manufacturers, models of new manufacturers in India in accordance with the MNRE Guidelines dated 8th December 2009 and 8th January 2010.



Wind Turbine Manufacturers Meet

C-WET, in co-operation with IWTMA, organized a 'Wind Turbine Manufacturers meet' on 10th March 2011 at C-WET, Chennai to improve the awareness on RLMM requirements including the requirements stipulated in the revised MNRE guidelines dated 8th December 2009 and 8th January 2010. The meeting was attended by various wind turbine manufacturers, IWTMA representatives and RLMM committee members.



Part of the Wind Turbine Manufacturer meet participants



Wind turbine Manufacturer meet in progress

Dr. S. Gomathinayagam, Chairman, RLMM committee delivered a presentation on “Onshore Wind Power 2011” and explained the role of RLMM for the healthy and orderly growth of wind turbine industry in India. Shri. A. Senthil Kumar, Secretary, RLMM committee, delivered a presentation on “Revised List of Models and Manufacturers of Wind turbines (RLMM): An Overview” and explained RLMM requirements and methodology in detail and sought the necessary co-operation from the manufacturers

for providing accurate and timely information for the RLMM processing.

Quality Management System ISO 9001:2008

Certification services of C-WET have already been certified for ISO 9001:2000 by DNV. The recertification cum upgrade audit was successfully completed by DNV team and issued ISO 9001:2008 certificate, with continued validity.



INFORMATION, TRAINING & COMMERCIAL SERVICES

The Information, Training and Commercial Services (ITCS) unit was engaged with full of activities, executing training programmes, upgrading the infrastructure for good research environment in C-WET by providing IT & Training facilities and also reaching out to the public as well as industries to promote wind energy in the country. The following are the activities during the year 2010-11

Training Programmes

Ninth National Training Course

ITCS unit had successfully organized the 9th National training course on “Wind Energy Technology” during 21st - 23rd July 2010 to address all aspects of Wind Power starting from Wind Resource Assessment to project implementation and operations & maintenance in a focused manner. The course was attended by 91 participants from academic institutes, industry, State Nodal Agencies, developers and consultants from various part of the country. The training course was inaugurated by Prof. Dr. V. G. Idichandi, Deputy Director, Indian Institute Technology (IIT) Madras, Chennai.



Prof. Dr. V. G. Idichandi delivering inaugural address

The course structure and organization of training was highly appreciated by the participants. It was appraised as a useful course for students who wish to start their career on wind energy and a refresher course for the wind industry professionals. The programme also highlighted the need for human resource development and entrepreneurship for wind energy sector. The feedback from the participants reflected the need for more number of training programmes like this frequently.

Er. S. Sukumar Solomon, Chief Engineer Non conventional Energy Services (NCES), Tamil Nadu Electricity Board (TNEB) was the Chief Guest of the valedictory function and he has distributed the course certificate to all the participants after his valedictory address.



Er. S. Sukumar Solomon distributing course certificate

6th International Training Course

ITCS unit had successfully organized the Sixth International Training Course on “Wind Turbine Technology And Applications” during 18th October to 3rd November 2010. This course was sponsored by Ministry of External Affairs (MEA), Government of India under Indian Techno Economic Cooperation (ITEC)/ Special Common Wealth Assistance for African Programme

(SCAAP) programmes and supported by Ministry of New and Renewable Energy (MNRE). This is the second ITEC/SCAAP programme organized by C-WET in a series and the third programme is planned during August 2011. The course was attended by 24 participants from academic institutes, industry, developers and Engineers from 17 countries. (Afghanistan, Bhutan, Democratic Republic of Congo, Ecuador, Egypt, Ethiopia, Gambia, Iran, Laos, Maldives, Myanmar, Palestine, Sri Lanka, Sudan, Tanzania, Thailand and Trinidad & Tobago).



Dr T.P.Ganessan releasing the course material after inaugurating the course

The training course was inaugurated by Dr. T. P. Ganesan, Pro-Vice Chancellor, SRM University, Chennai.

The training has given a complete overview about wind energy technology with the technical presentation delivered by C-WET scientist and eminent speakers from industry, academic institution, utilities and developers/investors, who is having years of experience in their areas.

Shri. N. Balakrishnan, Chief Engineer, NCES, TNEB was the Chief Guest of the valedictory function and distributed the course certificates after his valedictory address.

As part of the training, participants have attended Delhi International Renewable Energy Conference (DIREC 2010) during 27th to 29th October 2010. The participants also had a chance of visiting cultural places to give the idea about India.



Participants @ DIREC 2010, New Delhi



Participants during practical training on climbing



Participants during Cultural visit

Special Training Course

The Unit had successfully organized the Special Training Course on “Wind Turbine Technology & Applications” for officials from KREDA, LREDA & MNRE during 27th December 2010 - 6th January 2011 to transfer knowledge and special skills to the wind energy personnel active in technical and operational fields. The idea is to provide specialized training and knowledge to central and state governmental implementing agencies. The course was attended by 31 participants from Kargil Renewable Energy Development Agency

(KREDA), Ladakh Renewable Energy Development Agency (LREDA) and newly recruited scientists of Ministry of New and Renewable Energy. The training course was inaugurated by Thiru. R. Satapathy, IAS, Former Energy Secretary, Member - CAT.

During the training, the participants have visited C-WET's Wind Turbine Research Station at Kayathar, wind farms near Kanyakumari, wind turbine manufacturing facility at Pondicherry and 5 MW Solar PV plant at Sivaganaga, Madurai.



Thiru S. Nagalsamy distributing the course certificate

Thiru S. Nagalsamy, Member, Tamil Nadu Electricity Regulatory Commission (TNERC) was the Chief Guest of the valedictory function and he has distributed the course certificate to all the participants after his valedictory address.



Participants in front of C-WET building

Global Wind Day 2010 Celebration

As part of wind energy promotional activities of C-WET, Global Wind Day is celebrated every year on 15th June. Global Wind Day 2010 was celebrated with events among school children and other stake holders. Wind energy inter school quiz competition, demonstration of renewable energy facilities available at C-WET to school children and teachers was arranged. Dr. Y. E. A. Raj, Deputy Director General of Meteorology (DDGM), Regional Meteorological Centre (RMC), Chennai delivered a special lecture and marked this year's Global Wind Day. The program was highly appreciated by the participants.



Special lecture by Dr. Y. E. A. Raj

A quiz competition was organized with an idea to create awareness among the school children and also to identify the basic knowledge of students on wind energy. 130 schools in and around Chennai were invited to participate in the wind Energy Quiz event, of which 14 schools have registered to participate in the events. 36 students and 15 teachers from the schools have participated. All C-WET staff and few industry people have joined in the eventful celebration.



Students Quiz in progress



Students visiting C-WET facilities



Winners receiving the prize

The winners of the quiz competition were awarded by Dr. Y. E. A. Raj, DDGM, RMC, Chennai, Chief Guest of the event with a trophy and shield to the schools.

Dr. Y. E. A. Raj has delivered a lecture on **“A Few Aspects of Surface Wind and some of its Climatological Features”**, covering the basics on wind formation, atmospheric conditions, meteorological parameters, plotting model for weather parameters, instruments used in wind measurements, wind over India, storms and tornados, wind power harnessing, wind monitoring stations etc. and it was felt very resourceful by spectators.

Students and teachers were also taken for a campus tour to the renewable energy systems / facilities available in C-WET.

Global Wind Day ended with excellent & enthusiastic extemporary feedbacks from student participants, one of which is worth quoting here *“I was very much motivated in wind energy and energy conservation today and I want to do something towards our planet”* as a token of appreciation and a drive to organize many such programs in the future.

C-WET Newsletter “PAVAN”



PAVAN is a quarterly wind energy newsletter published by C-WET which disseminates information on C-WET's activities, wind energy news, technical articles and information on wind

energy related events. In this period, ITCS unit had published four issues of PAVAN from 25th to 28th issue. The publication has received good feedback over years. The PAVAN aims to keep the industry professionals, students and researchers updated about the progress in wind energy sector and C-WET activities.

Prof. Anna Mani Information Centre

C-WET has state-of-art library named after "Prof. Anna Mani" as Information Centre. With more than 1600 books on renewable energy in general and wind energy in particular with allied subjects. It includes books on Energy and environment, sustainable development, all engineering disciplines, science, management and personality development. C-WET's Library has

also subscribed to all major National and International Journals & Magazines on wind energy and other allied engineering disciplines. It is also having around 50 technical reports and 90 conference proceedings and other information resources like Wind Atlas and data books, maps, manuals, souvenirs, digital resources etc. C-WET library has Online Public Access Catalog (OPAC) which is an online database of materials to benefit researchers from all over the world. It also have membership with leading libraries like IIT, Anna University and American Library for reference purposes. Interested public/students can access C-WET's library with prior permission.



In this financial year, Prof. Anna Mani Information Centre (C-WET's Library) is added with 100 new books and magazines and it is maintained on par with international R&D libraries. The library also compiles news and latest developments related to wind energy every month from all information sources and sending it to MNRE as ready reference.

C-WET's Bi-lingual Website

ITCS Unit maintains the bilingual website 'www.cwet.tn.nic.in' which carries all information about wind energy development in India and abroad. The website is continuously updated with

up-to-date information on wind energy and it also has wind energy related information resources like frequently asked questions and free quarterly newsletters carrying latest developments and technical updates in the wind industry.



Home page of C-WET's Bilingual website

The website has complete guide list to more than 300 potential information resources on wind energy systems. The website also directs wind energy persons with news on trainings, conferences, exhibitions, workshops, seminars etc. Our study revealed that, an average of 200 visitors daily utilizes the information from all over the world and benefit.

IT Services

- ❖ ITCS unit is in the process of creating intranet webpage to ease the communications between the internal units and also to foster research environment.
- ❖ ITCS unit had successfully installed the new server to foster state-of-art research environment inside C-WET and the same has been used to host C-WET website. The C-WET official website can be accessed @ <http://cwet.res.in> and also www.cwet.tn.nic.in

Other Activities

- ❖ New boards carrying wind farm project implementation and wind turbine components are added in the display hall.
- ❖ ITCS unit has prepared information about C-WET's GHG mitigation activities towards climate change and it has been sent for India's Second National Communication Report to UNFCCC.

C-WET IWTMA Event

- ❖ IWTMA and C-WET jointly organized a one day workshop on WindSim software for Wind Resource Assessment on 23rd August 2010. Professionals from wind industry, C-WET scientists & engineers have attended the programme.
- ❖ Organized one day knowledge sharing seminar on “The Challenges in the composite materials and its advantage using in the wind energy sector” on 14th October 2010.

Participation in Exhibitions

C-WET stall has been put up during the following events and disseminated information on C-WET activities & services and also created general awareness on environment-friendly wind energy among the public.

- ❖ 98th Indian Science Congress: Pride of India Expo during 3rd - 7th January 2011 at SRM University, Chennai.
- ❖ International Renewable Energy Expo and Conference - 2011 “VaVoVa - 2011” during 14th - 16th January 2011 at Tamil Nadu Energy Development Agency, Chennai.

- ❖ Chennai Science Festival 2011 at Science City, Chennai during 29th January 2011 to 3rd February 2011.

Visitors to the Centre

To motivate the students towards research on wind energy achieving the indigenization and also to create awareness about the activities and services of C-WET, we encourage school & college students to visit the campus. The ITCS unit has organized the following student visits during the period 2010-11. A brief presentation about basic wind energy and C-WET were made and also the campus facilities were explained. Apart from the student visitors various delegates from foreign countries and stakeholders also visited C-WET during the period.

- ❖ C-WET arranged a presentation on “Regulatory requirements including the product safety and performance standards for the Wind Turbine Generator Systems” by Mr. Tuomo Keinanen, Director, Wind Energy Industry, Underwriters Laboratories at C-WET, on 28th April, 2010.
- ❖ Mr. Carsten Skamris, Managing Director & Mr. Peter Ellegaard, Senior Executive from M/s. BLAEST, Denmark visited C-WET from 8th to 14th June 2010 in connection with the establishment of a national facility for wind turbine blade testing.
- ❖ 16 members from SAARC countries on 17th June 2010.

- ❖ Dr. Gunjit Bir, Chief Scientist, National Renewable Energy Laboratory (NREL), USA visited C-WET and had detailed discussions with Unit Chief, S&C and S&C Scientists on NREL Codes.
- ❖ Participants of the “Wind Power Development and Use” programme organized by the LIFE Academy, Sweden and sponsored by SIDA on 26th October 2010.
- ❖ Executives from NREA, AOI & Ambassador of India during 17th to 22nd January 2011 to hold pre-MoU discussions on Wind & Solar Energy.
- ❖ 17 polytechnic teachers as part of the staff development program being organized by National Institute of Technical Teachers Training and Research, Chennai on 23rd February 2011.
- ❖ Norwegian delegates on 7th February 2011.
- ❖ Malaysian delegates on 19th February 2011.
- ❖ Dr. Sulyman Alyahya, Dean and his team from Quassim University Saudi Arabia on 8th March 2011.
- ❖ 18 members “Thai Delegation from NRCT” on 22nd and WTTS on 23rd September

Students

- ❖ 52 Students & 2 staffs of 2nd year BE-EEE Department from Vel Tech High Tech Dr. Rangarajan Dr. Sakunthala Engineering College on 27th July 2010.
- ❖ 57 Students & 2 staffs of 4th year BE-EEE Department from SRM University on 29th July 2010.
- ❖ 66 Students & 2 staffs of 2nd year BE-EEE Department from Vel Tech High Tech Dr. Rangarajan Dr. Sakunthala Engineering College on 30th July 2010.
- ❖ 18 Students and 2 staffs of 2nd year ME Power System Engineering from Vellammal Engineering College on 2nd August 2010.
- ❖ 20 students of M.Sc. Bio-Chemistry along with 2 staffs from SIES, Mumbai on 22nd December 2010.
- ❖ 41 Students and 2 staffs of BE-EEE Department from AJ Mohammed Sathak Engineering College on 9th February 2011.
- ❖ 66 Students of 4th year BE-EEE Department and 2 staffs from Vellammal Engineering College on 24th and 25th February 2011.
- ❖ 64 Students and 2 staff of 4th year BE-EEE department from Vellammal Engineering College on 3rd August 2010.
- ❖ School children (3rd to 6th Std.) from Sharanalaya Public School on 16th August 2010.

- ❖ M. Tech students from M. G. R. University on 19th August 2010.
- ❖ B.E-EEE Students from Mohammad Sathaq College of Engineering on 24th August 2010.
- ❖ B.E-EEE students from S. R. M University on 25th August 2010.
- ❖ B.E-EEE students from S. R. M University on 26th August 2010.
- ❖ The B.E. EEE students from Dr.MGR University on 14th September 2010.



Visitors during the campus visit



SOLAR RADIATION RESOURCE ASSESSMENT

Honorable Prime Minister of India has announced setting up of 20,000 MW of Solar power under Jawaharlal Nehru National Solar Mission (JNNSM) to mitigate the adverse effects of environmental pollution on Climatic changes. As a part of JNNSM, Centre for Wind Energy Technology, Chennai is implementing Solar Radiation Resource Assessment Project fully funded by Ministry of New and Renewable Energy, New Delhi with the following objectives

- To assess the ground data of solar radiation
- To establish initially 51 Automatic Solar Radiations Stations covering potential areas in the country
- To collect the data automatically at a Central Receiving Station to be established at C- WET, Chennai through GPRS mode
- To establish a Calibration Laboratory for solar radiation measuring equipments at C- WET, Chennai

For the effective implementation of this project of national importance, C-WET has established SRRA cell by posting dedicated scientific and technical group consisting Scientist E from the Ministry, two Scientists, five Project Engineers and supporting staff. The project envisages to measure solar data on Global, Diffused, Direct radiation and weather parameters, such as, rain fall, ambient temperature and pressure, relative humidity by installing equipment and system in



ASRMS at C WET, Chennai

each station. The data from & Field stations is being transmitted to Central Receiving Station automatically by GPRS. The data, thus transmitted will be analyzed and made available to various stakeholders.

A network of 21 Automatic Solar Radiations Monitoring Stations is nearing completion. The Central Receiving Station, which has already been established at C-WET, is receiving data from 17 stations and the remaining four stations are expected to commission before the end of June 2011. In the second phase of implementation of projects 15 more stations will be completed and commissioned by the end of July 2011. All the 51 stations are expected to be commissioned before the end of August 2011.



Invited lectures delivered by C-WET staff in Conferences and Seminars

Dr. S. Gomathinayagam

Executive Director

- ❖ “Power Electronics & Power & Power Systems” in the 3rd National Conference MEPPCON'10 organized by Mepco Schlenk Engineering College, Sivakasi.
- ❖ "Offshore Potential in India - A road map" in the Green Power -2010 - International Conference - cum - Exposition on Renewable Energy Technology” organised by CII on 15th July 2010.
- ❖ “ Wind Energy Mix in Renewables a status” in the National Conference on “ Trends in Renewable Energy Sources, Applications and Climate Change” organized by Sathyabama University, Chennai on 24th July 2010.
- ❖ “Save Nature and Energy for Future” in the State Level Technical Symposium "ECOFEST 10” organized by Tamil Nadu Agricultural University, Coimbatore on 28th July 2010.
- ❖ “Energy Management” in the International Conference on “Global Environment and its Sustainability: Implications and Strategies” as Chairperson organized by RKM Vivekanandha College, Chennai on 7th November 2010.
- ❖ “Research Frontiers” in the International Conference on “Recent Trends in Space Technology Services and Climate Change (RSTSCC-2010)” organized by Sathyabama University on 14th November 2010.
- ❖ “The next Generation Wind Power Technology: Contra Rotor Wind Turbine System” in the 1st Domain Expert Group Meeting for Developing NMITLI Projects on 11th December 2010.
- ❖ “Effective Alternate Energy Sources” in the National Conference on “E-for Energy” organized by St. John's International Residential School, Chennai on 4th January 2011.
- ❖ “Wind Energy Technologies” in Engineering & EHS Excellence Training programme for ITC Engineers organized by ITC Limited, Hyderabad on 16th February 2011.
- ❖ “Potential of Wind Energy in the Indian Sub-continent” in the International Conference on “Recent Trends in Renewable Energy Systems ICRTIRES-11” organized by Hindustan University on 17th March 2011.
- ❖ “Wind Turbine Technology, Manufacturing and Logistic Challenges” in the 2nd International Wind Conference and Exhibition WE20 by 2020” organized by Indian Wind Power Producers Association on 15th February 2011.
- ❖ “Recent Trends in Wind Energy Technology” in the National Level Technical Symposium ANTHRA organized by Sona College of Technology, Salem.

Research and Development Unit

Rajesh Katyal, Scientist & Unit Chief

- ❖ Co-Chaired a session “International Renewable Energy Expo & Conference 2011 (VaVoVa-2011)” during January, 2011 organized by TEDA at Chennai Trade Centre, Chennai.
- ❖ “Wind Resource Potential in the Country including Offshore Potential C-WET perspective” at 2nd Annual Conference on “Wind Power in India” at Mumbai during December 2010 conducted by Power lines.
- ❖ Chaired a session and published a paper titled “Testing of Small Wind Turbines / Aerogenerators” at International conference (Part-II) “Global Environment and Sustainability: Implication and Strategies (GESIS)” at Bangkok, Thailand during 25th to 29th November, 2010.
- ❖ Chaired a Plenary Session-III on “Wind equipments, turbines and farms A constructive yet critical look at the supply chain” at 2nd Renewable Energy Chennai 2010 conference Defining India's path to leadership in wind energy” held at Hotel Park, Chennai on 25th August, 2010

Wind Resource Assessment Unit

K. Boopathi, Scientist,

- ❖ “Wind Resource Assessment” at Velammal Engineering College, Red Hills on 20th January 2011.
- ❖ “Wind Turbine Technology & Application” to Southern state polytechnic lectures at TTI, Taramani on 22nd January 2011.

G. Arivukkodi, Junior Engineer

- ❖ “Wind Resource Assessment & Analysis” in the one day Pre-Conference Tutorial on “Wind Energy systems - Modeling and Design” as a part of the International Conference on Renewable Energy Utilization (ICREU) 2012” Organized by Coimbatore Institute of Technology at Coimbatore on 11th February 2011.

Wind Turbine Testing Unit

S.A. Mathew, Scientist & Unit Chief

- ❖ Participated and submitted the paper titled “Identification of environment and socioeconomic impact factors for wind resource land mapping using Arc GIS, WasP and Multi Criteria Decision Analysis (MCDA)” for the International Conference on “Recent advances in space technology services and climate change” organized by Sathyabama University, Chennai in association with Indian Space Research Organisation (ISRO), Bangalore and IEEE during 13th -15th November, 2010. The paper has been awarded as the “Best Paper” for a session in the conference and published in IEEE Xplore.
- ❖ “Testing of Wind Turbines” for the UGC Refresher Course in Renewable Energy at Gandhigram Rural Institute at Dindigul on 9th December, 2010.
- ❖ As a Guest of Honour delivered a lecture on “Wind Energy” in the National level “Two Day Conference on E- for Energy 2010” organized by ST. John's International Residential School, Chennai on 3rd January, 2011.

M. Anvar Ali, Scientist

- ❖ “Wind Energy Technology” & “Integration of Wind Turbine” at J.J. College of Engineering and Technology on their programme on “Climate Change Mitigation Technological Options” at Tiruchirappalli on 10th April, 2010.
- ❖ Rajalakshmi Engineering College on their workshop on “Electrical Power Management” in the Department of Electrical and Electronics Engineering at Chennai on 23rd April, 2010.
- ❖ “Grid Integration of Wind Turbines” in the training programme on “Environmental Issues, NCES & CDM” to the trainees at Staff Training College, Tamil Nadu Electricity Board at Chennai on 13th September, 2010.

R. Kumaravel, Scientist

- ❖ ELITEE 2010 “A National level Technical Symposium” as a Chief Guest at Loyola Institute of Technology on 17th September, 2010.

Standards and Certificate Unit

A. Senthil Kumar, Scientist & Unit Chief

- ❖ “Type Certification of Wind Turbines” in the Va Vo Va 2011, International Renewable Energy Conference 2011 organized by Tamil Nadu Energy Development Agency.
- ❖ “Type Certification of Wind Turbines” for the UGC Refresher Course in Renewable Energy organized by the Rural Energy Centre, Gandhigram.
- ❖ “Overview of C-WET Capabilities/Resources & Services offered” at National Wind Technology Centre/NREL, Denver, USA.
- ❖ “Role of C-WET in Wind Energy” in a meeting held with M/s. KSK Engineering Resources Pvt. Ltd., and M/s. Ravi Enteck Ltd. At Chennai.”

- ❖ “Revised List of Models and Manufacturers of Wind Turbines (RLMM) an overview” during Wind Turbine Manufacturers Meet conducted on 10th March 2011.

S. Arulselvan, Junior Engineer

- ❖ “Overview of Wind turbine Technology” in the One Day Pre-Conference Tutorial on “Wind Energy Systems Modeling and Design” as a part of the “International Conference on Renewable Energy Utilization (ICREU) 2012” organized by Coimbatore Institute of Technology at Coimbatore.

Information Training and Commercial Services Unit

P. Kanagavel, Scientist & Unit Chief (i/c)

- ❖ “Importance of Wind Energy” for the students of Velachery Government Higher Secondary School as part of Ariviyal Arangam Celebration on 3rd December 2010.
- ❖ “Renewable / Wind Energy Development in India”, “Environmental Impact of Wind Energy” and “Clean Development Mechanism (CDM) for the UGC Refresher Course in Renewable Energy at Gandhigram Rural Institute at Dindigul on 10th December 2010.
- ❖ “Wind Energy at a Glance” in the training programme on “Environmental Issues, NCES & CDM” to the trainees at Staff Training College, Tamil Nadu Electricity Board at Chennai on 13th September, 2010.
- ❖ “Renewable Energy Development in India” and “Role of C-WET in Indian Wind Energy Development” for the participants of Wind Power Development and Use programme organized by Life Academy- Sweden and sponsored by SIDA.

The following staffs delivered lecture (s) in the National & International Training Courses organized by C-WET
9th National Training Course on “WIND ENERGY TECHNOLOGY” held during 21st to 23rd July 2010.

No	Title	Speakers
1	Wind Energy Conversion Technology and Power Generation	Dr. S. Gomathinayagam, Executive Director
	Wind Turbine Tower Concept	
2	Wind Resource Assessment and Techniques	Dr. E. Sreevalsan, Scientist & Unit Chief, WRA
3	Wind Turbine Components	K. Bhoopathi, Scientist, WRA
4	Design Aspects of Drive Train	J. C. David Solomon, Scientist, R & D
5	Generators and Grid Integration of Wind Turbines	Deepa Kurup, Scientist, R & D
6	Control and Safety System of Wind Turbine System	S. Arulselvan, Junior Engineer, S & C
7	Wind Turbine Testing	S. A. Mathew, Scientist & Unit Chief, WTT
8	Type Certification and Standards of Wind Turbines	A. Senthil Kumar, Scientist & Unit Chief, S & C
9	Role of C-WET in Wind Energy Development	P. Kanagavel, Scientist & Unit Chief i/c, ITCS
10	Small Wind Turbine and Hybrid Systems	Rajesh Katyal, Scientist & Unit Chief, R & D
	Wind Turbine Foundation Concepts	
11	Indian Government Policies	A. Mohammed Hussain, Scientist & Unit Chief, WTRS

6th International Training Course on “WIND TURBINE TECHNOLOGY AND APPLICATIONS” held during 18th October to 3rd November 2010.

No	Title	Speakers
1	Wind Energy Conversion Technology and Power Generation	Dr. S. Gomathinayagam, Executive Director
	Wind Turbine Tower Concept	
2	Wind Resource Assessment Techniques – An Introduction	Dr. E. Sreevalsan, Scientist & Unit Chief, WRA
	Design and Layout of Wind Farms	
3	Siting Guidelines for Wind Measurements	R. Sasikumar, Scientist, WRA
	Monitoring Station Instrumentation and Installation	
	Station Operation and Data Collection & Analysis	

No	Title	Speakers
4	Measurement Parameters & Data Analysis	G. Arivukkodi, Junior Engineer, WRA
	Station Operation and Data Collection & Analysis	
5	Wind Resource Assessment by using Remote Sensing Instruments	K. Bhoopathi, Scientist, WRA
	Wind Turbine Components	
6	Design Aspects of Drive Train	J. C. David Solomon, Scientist, R & D
	Instrumentation requirement for Wind Turbine Measurements	
	Load Measurement	
7	Design aspects of Wind Turbine Gearbox	N. Raj Kumar, Scientist, S&C
8	Design aspects of Wind Electric Generators	S. Arulselvan, Junior Engineer, S&C
	Design requirements of Control and Protection System	
9	Wind Turbine Foundation Concepts	Rajesh Katyal, Scientist & Unit Chief, R&D
	Small Wind Turbine and Hybrid Systems	
10	Grid Integration of Wind Turbines	Deepa Kurup, Scientist, R&D
11	Wind Turbine Testing & Measurement Techniques	M. Anvar Ali, Scientist, WTT
	Safety and Function Testing	
	Power Curve Measurements	
12	Type Certification of Wind Turbines as per IEC WT 01	A. Senthilkumar, Scientist & Unit Chief, S&C
	Introduction to IEC 61400-1 and IS 875 Standards	
13	Wind Turbine Technology and its Impact	S. A. Mathew, Scientist & Unit Chief, WTT
14	Role of C-WET in Wind Energy Development	P. Kanagavel, Scientist & Unit Chief i/c, ITCS
15	Indian Government Policies, schemes and legal	A. Mohamed Hussain, Scientist & Unit Chief,

Special training Course on “WIND TURBINE TECHNOLOGY AND APPLICATIONS” for officials from KREDA, LREDA, MNRE held during 27th December 2010 - 6th January 2011.

No	Title	Speakers
1	Wind Energy Conversion Technology and Power Generation	Dr. S. Gomathinayagam, Executive Director
	Wind Turbine Tower Concepts	
2	Wind Resource Assessment by using Remote Sensing Instruments	K. Bhoopathi, Scientist, WRA
	Wind Turbine Components	
3	Wind Resource Assessment Techniques - An Introduction	Dr. E. Sreevalsan, Scientist & Unit Chief, WRA

No	Title	Speakers
4	Design and Layout of Wind Farms	Dr. E. Sreevalsan, Scientist & Unit Chief, WRA
5	Wind Data Collection & Analysis	R. Sasikumar, Scientist, WRA
6	Design Aspects of Drive Train	J. C. David Solomon, Scientist, R & D
7	Design aspects of Wind Turbine Gearbox	N. Raj Kumar, Scientist, S&C
8	Design aspects of Wind Electric Generators	S. Arulselvan, Junior Engineer, S&C
	Design requirements of Control and Protection System	
9	Small Wind Turbine and Hybrid Systems	Rajesh Katyal, Scientist & Unit Chief, R&D
	Wind Turbine Foundations Concepts	
10	Overview of Testing facilities of WTRS	M. Anvar Ali, Scientist, Testing
11	New and Renewable Energy Sources Programmes	A. Mohamed Hussain, Scientist & Unit Chief, WTRS
12	Grid Integration of Wind Turbines	Deepa Kurup, Scientist, R&D
13	Wind Turbine Testing & Measurement Techniques	S. A. Mathew, Scientist & Unit Chief, WTT
14	Type Certification of Wind Turbines as per IEC WT 01	A. Senthilkumar, Scientist, S&C
15	Role of C- WET in Wind Energy Development	P. Kanagavel, Scientist & Unit Chief i/c, ITCS
16	Environmental aspects of Wind Turbine Technology	



Seminars / Conferences / Trainings / Meetings / attended by CWET staff

Dr. S. Gomathinayagam

Executive Director

- ❖ Conference on “Emerging Technologies on Electrical Engineering “ organized by Valliyammai Engineering College chaired as Chief Guest in the paper presentation and Certificate distribution function on 3rd April 2010.
- ❖ Meeting on "Mainstreaming Green Energy, Wind Biomass and Solar" organised by Associate Chamber of Commerce and supported by MCCI on 29th April 2010.
- ❖ Meeting on “Working Group of India - US Energy Dialogue” at MNRE, New Delhi on 4th May 2010.
- ❖ Conference on " Cultural Alliance and Diversity; Gateway for Enhanced Economic Development" organised by InfoSys Technologies, Chennai on 25th May 2010.
- ❖ Road-show on "Global Investors Meet" 2010 on 3rd June 2010.
- ❖ Meeting on “CII Tamil Nadu Manufacturing Competitiveness Panel 2010 -11” organized by CII, Chennai on 10th June 2010.
- ❖ “CSIR -SERC - Foundation Day” organized by CSIR-SERC on 10th June 2010.
- ❖ "Training in Development for Renewable Energy Regulatory and Policy Frame Work for Market” chaired as Chief Guest in the inaugural function organized by WISE, Pune on 14th June 2010.
- ❖ “TOLIC Committee Meeting” organized by TOLIC, Chennai and Office of the General Manager, Southern Railway, Chennai on 1st July 2010.
- ❖ Participated in the technical presentation on “Wind Drive Technology” presented by M/s. Voith Turbo Pvt Ltd, Germany.
- ❖ “Green Power -2010 - International Conference - cum - Exposition on Renewable Energy Technology” organized by CII on 15th July 2010.
- ❖ “State Level Technical Symposium of ECOFEST-10" chaired as Chief Guest organised by Tamil Nadu Agricultural University, Coimbatore.
- ❖ “Workshop on New & Renewable Energy for School Teachers” - as Guest of Honour and invited speaker organized by Tamilnadu Science & Technology Centre on 13th August 2010.
- ❖ “Renewable Energy Programme” at ICSR Complex organized by “Energy Forum” of IIT Madras on 18th August 2010.
- ❖ “2nd Renewable Energy Chennai 2010 Conference” as chairperson organized by Exhibitions India Group, New Delhi on 25th August 2010.
- ❖ 1st Meeting of Jury Award of Awards Committee in the “Wind Power India 2011” organized by WISE, Pune on 5th October 2010.
- ❖ International Conference on “Global Environment and its Sustainability : Implications and Strategies” as Chairperson, organized by RKM Vivekanandha College, Chennai on 7th November 2010.
- ❖ Knowledge sharing Seminar / lecture on R&D by Dr. Gunjit Bir, NREL, USA during November 2010 held at C-WET, Chennai.

- ❖ Wind Session at the International Conference “DIREC 2010” at New Delhi during October 2010.
- ❖ 1st Scientific Committee Meeting of CSMST-CSC organized by NAL, Bangalore on 12th January 2011.
- ❖ “National Convention on Energy Sources - Panel Discussion” organized by Science City, Chennai on 2nd February 2011.
- ❖ Wind Turbine Sectional Committee Meeting on ET-42 organized by BIS, New Delhi on 8th February 2011.
- ❖ 2nd International Wind Conference and Exhibition WE20 by 2020” organized by Indian Wind Power Producers Association on 15th February 2011.
- ❖ Workshop on “Result Framework Document (RFD)” organized by MNRE, New Delhi on 22nd February 2011.
- ❖ “The New Technology Facilities at Vestas” invited by M/s. Vestas Wind Technology India Pvt. Ltd on 24th February 2011.
- ❖ National Conference on “New & Renewable Energy Sources NCNRES-2011” chaired as Chief Guest organized by Vinayaga Missions University on 11th March 2011.
- ❖ Doctoral Committee Meeting of MIT Dept. of Aerospace Engineering conducted by Anna University on 19th March 2011.
- ❖ International Conference on “Recent Trends in renewable Energy Systems ICRTIRES-11” organized by Hindustan University on 17th March 2011.
- ❖ A meeting on “Off-shore Wind Energy” organized by MNRE, New Delhi on 16th March 2011.

- ❖ Meeting on “Jury Award function” organised by WISE, Pune on 25th March 2011.

RESEARCH AND DEVELOPMENT

Rajesh Katyal, Unit Chief

- ❖ “Offshore Wind energy Development in India” held at MNRE, New Delhi during January 2011.
- ❖ Knowledge sharing Seminar / lecture on R & D by Dr. Gunjit Bir, NREL, USA during November 2010 held at C-WET, Chennai.
- ❖ Wind Session at the International Conference “DIREC 2010” at New Delhi during October 2010.
- ❖ Two days training program on “Regulatory & Policy Frameworks for Market Development for Renewable Energy” held on 14th & 15th June 2010 at Hotel Benz Park, Chennai organized by WISE, Pune.
- ❖ Indo-Scotland Workshop on “Vision for Offshore Wind Energy in India” during June 2010.

J.C. David Solomon, Scientist

- ❖ Wind Session at the International Conference “DIREC 2010” at New Delhi during October 2010.
- ❖ “Aero-structural Design Training” at NREL, USA from 3rd to 16th October 2010.

R. Naveen Muthu, Technician

- ❖ Onsite demonstration training on 600 kW R&D wind turbine conducted by M/s. Suzlon officials at WTRS, Kayathar during September 2010.

- ❖ Software “Mi-Power” organized by WRA Unit, C-WET during January 2011.

WIND RESOURCE ASSESSMENT UNIT

Dr. E. Sreevalsan, Scientist & Unit Chief

- ❖ Meeting of Development of Wind Power Projects in Andhra Pradesh at NEDCAP Head office, Hyderabad on 28th June 2010.
- ❖ Workshop on “Indo-Scotland Workshop on Vision for Offshore Wind Energy in India” was held at C-WET, Chennai on 23rd June 2010.
- ❖ Meeting on “Indian Offshore Wind Feasibility Study with Scottish Development International (SDI) at C-WET, Chennai on 10th February 2011.

WIND TURBINE TESTING UNIT

S.A. Mathew, Scientist & Unit Chief

- ❖ “Indo-Scotland Workshop on Offshore Wind Energy in India” organized by C-WET held on 23rd June, 2010 at C-WET.
- ❖ Two days training programme on “Metodyn Software Training” regarding advanced numerical solutions of wind characteristics in complex sites and operating the tool organized by Wind Resource Assessment (WRA) unit held on 29th and 30th July, 2010 at C-WET.
- ❖ One day knowledge sharing seminar/ lectures on “The Challenges in the composite materials and its advantage using in the wind energy sector” held on 14th October, 2010 at C-WET, conference hall conducted by C-WET and IWTMA.
- ❖ Knowledge sharing lecture on “The Research & Development towards the growth of Wind Energy Sector” given by Dr. Gunjit

Bir, Senior Research Engineer, NREL on 29th November, 2010 at C-WET, Conference Hall conducted by IWTMA and C-WET.

- ❖ Three days training programme on “Mi Power software” regarding Load flow analysis, Short circuit analysis and Transient circuit analysis organized by Wind Resource Assessment (WRA) unit during the period 19th and 21st January, 2011 at C-WET, Seminar Hall.
- ❖ “Meeting of Wind Turbines Sectional Committee, ET 42” on 8th February, 2011 at New Delhi.
- ❖ Knowledge sharing workshop on “the Challenges and Emerging Technologies for Control of Pitch / Rotor/ Yaw and its advantages using them in Wind Turbine” organized by IWTMA on 11th February, 2011 at Royal Summit at Radisson GRT, Chennai.
- ❖ Inauguration function of new Test Facility during on 24th February, 2011 at their Chennai office.
- ❖ Training programme on “Ethics and Values” conducted by Centre for Disaster Management (CDM) at Lal Bahadur Shastri National Academy of Administration (LBSNAA), Government of India, Mussoorie during the period 28th February to 4th March 2011.

R.Kumaravel, Scientist

- ❖ “Indo-Scotland Workshop on Offshore Wind Energy in India” organized by C-WET held on 23rd June, 2010 at C-WET.
- ❖ Two days training programme on “Metodyn Software Training” regarding advanced numerical solutions of wind characteristics in complex sites and operating

the tool organized by Wind Resource Assessment (WRA) unit held on 29th and 30th July, 2010 at C-WET.

- ❖ One day training course organized by M/s. Suzlon about their 600 kW wind turbine on 16th August, 2010 at C-WET.
- ❖ Workshop on Wind Resource Assessment by WindSim held on 23rd August, 2010 at C-WET.
- ❖ Training Program on “Regulatory & Policy Framework for Market Development for Renewable Energy” organized by World Institute of Sustainable Energy (WISE) held on 14th & 15th June 2010, at Hotel Benzz Park, Chennai.

M.Anvar Ali, Scientist

- ❖ One day knowledge sharing seminar/ lectures on “The Challenges in the composite materials and its advantage using in the wind energy sector” held on 14th October, 2010 at C-WET, conference hall conducted by C-WET.
- ❖ Knowledge sharing workshop on “the Challenges and Emerging Technologies for Control of Pitch / Rotor/ Yaw ad its advantages using them in Wind Turbine” organized by IWTMA on 11th February, 2011 at Royal Summit at Radisson GRT, Chennai.
- ❖ One day training course organized by M/s. Suzlon about their 600 kW wind turbine on 16th August, 2010 at C-WET.
- ❖ Workshop on Wind Resource Assessment by WindSim held on 23rd August, 2010 at C-WET.
- ❖ Training programme on “Basic Fire Safety & Basic Life Support & First Aid Skills”

organized by M/s. Usha Fire Safety Equipments Pvt. Ltd. On 4th February, 2011 at the office of the M/s. Usha Fire, Chennai.

S.Paramasivan, Junior Engineer

- ❖ Knowledge sharing workshop on “the Challenges and Emerging Technologies for Control of Pitch / Rotor/ Yaw ad its advantages using them in Wind Turbine” organized by IWTMA on 11th February, 2011 at Royal Summit at Radisson GRT, Chennai.

STANDARDS AND CERTIFICATION UNIT

A. Senthil Kumar, Scientist & Unit Chief

- ❖ Two days training program held during 14th to 15th June 2010 on Regulatory & Policy Framework for market development for Renewable Energy organized by M/s. World Institute of Sustainable Energy.
- ❖ One day workshop on “Vision for Offshore Wind Energy in India” organized by C-WET as part of “Indo-Scotland Energy cooperation” held on 23rd June 2010.
- ❖ One day training on basics / fundamentals of operational details of Suzlon 600 kW wind turbine generator conducted by M/s. Suzlon Energy Limited held on 16th August 2010.
- ❖ Delhi International Renewable Energy Conference 2010 (DIREC 2010) held at New Delhi.
- ❖ 2nd Renewable Energy Chennai 2010 conference organized by Comnet Conferences, New Delhi.
- ❖ Panel discussion of “Wind Energy Systems Technology Development & Certification” in the VaVoVa2011, International Renewable Energy Conference 2011 organized by

Tamil Nadu Energy Development Agency.

- ❖ Discussions with Dr. Gunjit Bir, Senior Scientist, National Renewable Energy Laboratory, USA on NREL codes.
- ❖ “Wind Turbine Sectional Committee Meeting” on ET-42 organized by BIS, New Delhi on 8th February 2011.

N. Rajkumar, Scientist

- ❖ Two days training program held during 14th to 15th June 2010 on Regulatory & Policy Framework for market development for Renewable Energy organized by M/s. World Institute of Sustainable Energy.
- ❖ One day workshop on “Vision for Offshore Wind Energy in India” organized by C-WET as part of “Indo-Scotland Energy cooperation” held on 23rd June 2010.
- ❖ Two days training program on “Metedyn Software” conducted by M/s. Metedyn, Asia held on 29th & 30th July 2010.
- ❖ One day training on basics / fundamentals of operational details of Suzlon 600 kW wind turbine generator conducted by M/s. Suzlon Energy Limited held on 16th August 2010.
- ❖ One day workshop on “Advances in Micrositing” conducted by M/s. Windsim A/S, Norway, organized by C-WET & IWTMA held on 23rd August 2010.
- ❖ One day technology workshop on “The challenges and Emerging Technologies for control of Pitch / Rotor / Yaw and its advantage using them in wind turbines” held on 11th February 2011.

A.G. Rangaraj, Scientist

- ❖ One day training on basics / fundamentals of operational details of Suzlon 600 kW

wind turbine generator conducted by M/s. Suzlon Energy Limited held on 16th August 2010.

- ❖ One day workshop on “Advances in Micrositing” conducted by M/s. Windsim A/S, Norway, organized by C-WET & IWTMA held on 23rd August 2010.
- ❖ One day practical onsite demonstration training on 600 kW Experimental / R&D wind turbine conducted by M/s. Suzlon Energy Limited at Wind Turbine Test Station, Kayathar, C-WET held on 21st September 2010.
- ❖ One day technology workshop on “The challenges and Emerging Technologies for control of Pitch / Rotor / Yaw and its advantage using them in wind turbines” held on 11th February 2011.
- ❖ Delhi International Renewable Energy Conference 2010 (DIREC 2010) held at New Delhi.

S. Arulselvan, Junior Engineer

- ❖ Two days training program held during 14th to 15th June 2010 on Regulatory & Policy Framework for market development for Renewable Energy organized by M/s. World Institute of Sustainable Energy.
- ❖ One day training on basics / fundamentals of operational details of Suzlon 600 kW wind turbine generator conducted by M/s. Suzlon Energy Limited held on 16th August 2010.
- ❖ Three days training programme on “Mi-Power Software” conducted by M/s. Power Research and Development Consultants Private Limited, Bangalore held during 19th January 2011 to 21st January 2011.

C. Stephen Jeremias, Junior Engineer

- ❖ One day training on basics / fundamentals of operational details of Suzlon 600 kW wind turbine generator conducted by M/s. Suzlon Energy Limited held on 16th August 2010.
- ❖ One day workshop on “Advances in Micrositing” conducted by M/s. Windsim A/S, Norway, organized by C-WET & IWTMA held on 23rd August 2010.
- ❖ One day practical onsite demonstration training on 600 kW Experimental / R&D wind turbine conducted by M/s. Suzlon Energy Limited at Wind Turbine Test Station, Kayathar, C-WET held on 21st September 2010.

B. Muthulakshmi, Senior Stenographer

- ❖ One day workshop on “Role Excellence: Personal Assistance and Executive Secretaries” held on 10th July 2010 organized by M/s. Management Study Centre, Chennai.
- ❖ “Orientation workshop in Hindi” organized by C-WET.

INFORMATION, TRAINING AND COMMERCIAL SERVICES UNIT**P. Kanagavel, Scientist & Unit Chief (i/c)**

- ❖ Networking 2010, International Conference and workshop organized by IIT Chennai during 10th to 14th May.
- ❖ Delhi International Renewable Energy Conference (DIREC 2010) during 27th to 29th October 2010 at New Delhi.

- ❖ Seminar on Carbon footprint and carbon credit organized by CII Tamil Nadu at Hotel Radisson, Chennai.
- ❖ 2 day workshop on CDM and Energy Efficiency during 16th and 17th September 2010.
- ❖ 2nd Annual Conference on wind Power in India at Delhi during 13th & 14th December 2010.
- ❖ International conference and Exhibition on Wind Energy 20 by 2010 Organized by IWPA at Pragati Maidan, New Delhi during 15th to 17th February 2011.

FINANCE AND ADMINISTRATION**G. Rajan, AAO**

- ❖ Five days work shop on Public Finance Management from 12th March 2010 to 16th March 2010 organized by Institute of Secretarial Training and Management, New Delhi.
- ❖ Three days training programme on “Reservation Policy” conducted by Institute of Public Administration from 26th August 2010 to 28th August 2010.
- ❖ Practical oriented training in “Advanced Excel” for 5 weekends from 5th to 27th March 2011 conducted by MSME, Chennai.

M. Selvakumar

- ❖ Technical Workshop for Group 'D' employees from 6th to 8th January 2011 organized by Integrated Training and Policy Research, New Delhi.



PUBLICATIONS

Dr.S.Gomathinayagam, Executive Director

- ❖ “Alternative Energy and Wind Power” published in the St. John's International Residential School Special Souvenir.
- ❖ “Testing of Small Wind Turbines / Aerogenerators”, in the National Seminar organized by Institution of Engineers, MP State Centre, Bhopal during January 2011.
- ❖ “Wind Variability Analysis for a Complex Wind Farm Site in India”, published in Indian Journal of Science and Technology Vol.3, Issue 9-10, 2010.

Rajesh Katyal, Scientist & Unit Chief, R&D

- ❖ “Testing of Small Wind Turbines / Aerogenerators”, in the National Seminar organized by Institution of Engineers, MP State Centre, Bhopal during January 2011.
- ❖ “Wind Variability Analysis for a Complex Wind Farm Site in India”, published in Indian Journal of Science and Technology Vol.3, Issue 9-10, 2010.

Dr. E. Sreevalsan, Scientist & Unit Chief, WRA

- ❖ “Statistical Methods for wind Energy Estimation” in Indian Power Directory 2010, 10th edition published by Consolidated Energy Consultant Limited, Bhopal.
- ❖ E. Sreevalsan, Jake Badger, Siddarth Shankar Das, R. Sasi Kumar, G. Arivukkodi “Indian Wind Atlas” published by Centre for Wind Energy Technology Chennai on 29th April 2010.
- ❖ “Assessment and Analysis of Wind Resources in Complex Terrain with CFD Model and

validation with Real Time Data published by The Global Wind Energy Conference (GWEC), China Wind Power 2010, Beijing, China.

K. Boopathi, Scientist, WRA

- ❖ A technical paper on “Assessment and Analysis of Wind Resources in Complex Terrain with CFD Model and validation with Real Time Data published by The Global Wind Energy Conference (GWEC), China Wind Power 2010, Beijing, China.

Visits Abroad

Dr. S. Gomathinayagam, Executive Director

- ❖ National Renewable Energy Laboratory (NREL), U.S.A to understand and plan possible areas of cooperation in the field of wind energy during 10-14 May 2010 with official delegation headed by Joint Secretary (WE), MNRE, New Delhi.

Three broad areas were identified for collaboration:

- Aero-Structural design of Wind Turbines
- Wind Turbine Experimental Testing
- Wind Resource Assessment
- ❖ B2B meeting in Egypt with wind turbine manufacturers of India along with Ministerial Delegation headed by Honorable Minister for New and Renewable Energy while signing an MoU on Indo-Egypt co-operation wind and solar energy during 19th to 21st January, 2011.

Rajesh Katyal, Unit Chief, R&D

- ❖ National Renewable Energy Laboratory (NREL), U.S.A to understand and plan possible areas of cooperation in the field of wind energy during 10-14 May 2010 with official delegation headed by Joint Secretary (WE), MNRE, New Delhi.
- ❖ Presented a paper titled “Testing of Small Wind Turbines / Aero generators” at the International Conference, GESIS during 25th to 29th November 2010 at Bangkok, Thailand.

Dr. E. Sreevalsan, Scientist & Unit Chief, WRA

- ❖ Scotland during the period 16th to 22nd May 2010 as a member of MNRE delegation for exploratory work on the renewable area.
- ❖ M/s. RISO-DTU, Denmark to attend a training programme on Offshore Wind Energy Assessment using SAR under the project “Offshore Wind Energy Assessment using SAR” on November 2010.
- ❖ Onference on “All Energy Conference Exhibition 2010” at Aberdeen, United Kingdom on 19th & 20th May 2010.

K. Boopathi, Scientist, WRA

- ❖ RISO-DTU, Denmark to attend a training programme on Offshore Wind Energy Assessment using SAR under the project “Offshore Wind Energy Assessment using SAR” on November 2010.

A. Senthil Kumar, Scientist & Unit Chief, S & C

- ❖ Training course on “NREL codes for design aspects of Wind Turbines” from 1st to 15th

October 2010 conducted by National Renewable Energy Laboratory, USA to initiate one of the main activities identified under the MoU signed between NREL and C-WET.

N. Raj Kumar, Scientist, S & C

- ❖ Training course on “NREL codes for design aspects of Wind Turbines” from 1st to 15th October 2010 conducted by National Renewable Energy Laboratory, USA to initiate one of the main activities identified under the MoU signed between NREL and C-WET.

J. C. David Solomon, Scientist R&D

- ❖ Training course on “NREL codes for design aspects of Wind Turbines” from 1st to 15th October 2010 conducted by National Renewable Energy Laboratory, USA to initiate one of the main activities identified under the MoU signed between NREL and C-WET.

P. Kanagavel, Scientist & Unit Chief (i/c), ITCS

- ❖ 1st phase of International Training Course on “Wind Power Development and Use” organized by LIFE Academy / Sida, Sweden held at China during 19th to 20th January 2011 and delivered a presentation on Indian wind energy to the international participants.
- ❖ “Wind Power Development and Use” training course organized by LIFE Academy, Sweden and sponsored by SIDA, Sweden durin 21st March to 14th April 2011.



General Information

Governing Council

The following are the members of the Governing Council & Annual General Body
(To administer and guide the affairs of the Centre)

1.	Shri. Deepak Gupta, Secretary, I.A.S., MNRE, New Delhi,	Chairman
2.	Shri. Sharad Gupta, I.A.S., Director General, Bureau of Indian Standards, New Delhi	Member
3.	Shri. Rajarshi Bhattacharya, I.A.S., Additional Secretary & Financial Adviser, MNRE, New Delhi	Member
4.	Shri. S. M. Dhiman, Member Planning, CEA, New Delhi	Member
5.	Shri. Ramesh Kumar Khanna, I.A.S., Principle Secretary to the Government, Energy Department, Govt. of Tamil Nadu, Chennai	Member
6.	Dr. A. R. Upadhyay, Director, National Aerospace Laboratories, Bangalore	Member
7.	Shri. Shashi Shekar, I.A.S, Joint Secretary (Admn, P&C, IR, RTI, Vig), MNRE, New Delhi	Member
8.	Shri. Debasish Majumdar, Managing Director, IREDA, New Delhi	Member
9.	Dr. Kota Hari Narayana, Raja Ramanna Fellow, National Aerospace Laboratories, Bangalore	Member
10.	Shri. D. V. Giri, Chairman, IWTMA, Chennai	Member
11.	Dr. S. Gomathinayagam, Executive Director, C - WET, Chennai	Member Secretary

Management Committee

The following are the members of the Management Committee
(To take decisions as and when required and to inform GC from time to time)

1.	Chairman, Governing Council, C - WET	Chairman
2.	Financial Adviser, MNRE	Member
3.	Executive Director, C - WET	Member

Finance Committee

The following are the members of the Finance Committee
(To review the financial performance of the Centre)

1.	Shri. Rajarshi Battacharya, I.A.S., Additional Secretary & Financial Adviser, MNRE, New Delhi	Chairman
2.	Shri. Ramesh Kumar Khanna, I.A.S., Secretary to Govt., Energy Department, Government of Tamil Nadu	Member
3.	Shri. Shashi Shekar, I.A.S, Joint Secretary (Admn, P&C, IR, RTI, Vig), MNRE, New Delhi	Member
4.	Dr. S. Gomathinayagam, Executive Director, C-WET, Chennai	Member
5.	Shri. G. Upadhyay, Director (WE), MNRE, New Delhi	Member
6.	Shri. A. K. Kaushik, Director (Finance), MNRE, New Delhi	Member
7.	Shri. D. Lakshmanan, General Manager (F&A), C-WET, Chennai	Member Secretary

Research And Development Council

The following are the members of the Research and Development Council (To guide C-WET on laying down Research direction to serve the Indian Wind energy Sector)

1.	Dr. Kota Hari Narayana, Raja Ramanna Fellow, NAL, Bangalore	Chairman
2.	Shri. Shashi Shekar, I.A.S, Joint Secretary (Admn, P&C, IR, RTI, Vig), MNRE, New Delhi	Member
3.	Dr. G. B. Pant, Former Director & Honorary Fellow, IITM, Pune	Member
4.	Shri. Ajit K. Gupta, National Project Management, UNDP/GEF Global Water Heating Project & Former Adviser, MNRE	Member
5.	Smt. K. A. Fathima, Sr Director & Head, Power Electronics Group, C-DAC, (Formerly ER&DCI), Trivandrum	Member
6.	Shri. M. P. Ramesh, Former Executive Director, C-WET, Bangalore	Member
7.	Shri. K. P. Sukumaran, Former Adviser, MNRE, New Delhi	Member
8.	Shri. D. V. Giri, Chairman, IWTMA, Chennai	Member
9.	Dr. S. Gomathinayagam, Executive Director, C-WET, Chennai	Member
10.	Shri. Rajesh Katyal, Unit Chief, R&D, C-WET, Chennai	Member Secretary

Empanelment Committee on Small Wind Turbine

The following are the members of the Empanelment Committee on Small Wind Turbine (to review the status of various manufactures of small wind energy system and their recommendation for empanelment of MNRE / C-WET approved manufactures)

(i)	Executive Director, C-WET	Chairman
(ii)	Director, MNRE - dealing with SWES Programme	Member
(iii)	Outside Expert - Shri K.P. Sukumaran, Ex-Adviser, MNRE	Member
(iv)	Outside Expert - Shri M.P. Ramesh, Ex-ED, C-WET and Presently President, Energy India Ltd.	Member
(v)	Representatives from Industries	Invitee
(vi)	Unit Chief, R & D, C-WET	Member - Secretary

Revised List Of Models And Manufacturers Of Wind Turbines (RLMM) Committee

The following are the members of the Revised List of Models and Manufacturers of Wind
Turbines (RLMM) Committee

1.	Dr. S. Gomathinayagam, Executive Director, C-WET, Chennai	Chairman
2.	Shri. G. Upadhyay, Director (Wind Energy), MNRE	Member
3.	Shri. D. V. Giri, Chairman, IWTMA, Chennai	Member
4.	Shri. K. Kasthurirangaian, Chairman, IWPA, Chennai	Member
5.	Shri. A. Senthil Kumar, Unit Chief, S&C, C-WET, Chennai	Secretary

Hindi Promotion Committee

The following are the members of the Hindi Promotion Committee (Constituted for the purpose of
promotion of Hindi Official Language in C - WET)

1.	Dr. S. Gomathinayagam, Executive Director, C-WET	Chairman
2.	Shri. Rajesh Katyal, Scientist & Unit Chief, R&D, C-WET	Member Secretary
3.	Shri. D. Lakshmanan, General Manager, (F&A,) C - WET	Member
4.	Shri. G. Rajan, Admin & Accounts Officer, C-WET	Member
5.	Shri. P. Kanagavel, Scientist & Unit Chief i/c, ITCS, C-WET	Member
6.	Mr. R. Kumaravel, Scientist, Testing, C-WET	Member

VIGILANCE AWARENESS WEEK

Vigilance awareness week for the year 2010 was observed in C-WET from 25th October 2010 to 1st November 2010 and all the employees have taken a pledge as instructed by the Central Vigilance Commission.

NATIONAL DAY CELEBRATIONS

The Independence Day and the Republic Day were celebrated with reverence at the C-WET Campus. The events began with a parade of the security personnel at C-WET followed by Flag Hoisting and concluded with distribution of sweets.



OFFICIAL LANGUAGE ACT

- ❖ Shri R. Vinod Kumar, Technician, WRA Unit was nominated for Prabodh examination from January 2011 organized by Hindi Teaching Scheme and passed the examination. C-WET has been an active member in the Town Official Language Implementation Committee, Chennai. The Hindi version of

“PAVAN”, the Quarterly News Bulletin of C-WET is considered a standard communications in Hindi.

- ❖ Hindi fortnight was celebrated in C-WET from 14th to 28th September 2010. Various competitions were conducted and prizes distributed. A Hindi Workshop was organized in C-WET to all staff from 11th March 2011 to 16th May 2011 for 40 days to inculcate rudimentary knowledge in Official Language.

COMMITTEE FOR PREVENTION OF SEXUAL HARASSMENT OF WOMEN AT WORK PLACE

In pursuance of Government instructions, a Complaints Committee for women for redressal of complaints concerning sexual harassment in work place has been constituted in C-WET and the Committee conducted its meetings on 17th May 2010 and 18th January 2011. No complaints received during the year 2010-11.

RIGHT TO INFORMATION ACT

During the year 2010-11, 4 applications were received seeking information under RTI Act, 2005 and requisite details have been given to all of them.

PARLIAMENTARY STANDING COMMITTEE VISIT:

The Parliamentary Standing Committee on Energy has made an on-the-spot study visit in connection with examination of the subjects “Technological Advancements and its uses in Renewable Energy Sector and funding of Renewable Energy Projects” during 28th January to 2nd February 2011. The new Joint Secretary Shri. Shashi Shekhar I.A.S and Executive Director along with C-WET's team of Scientists attended the committee.



Human Resources

Sl. No	Name	Cadre
Office of Executive Director		
1.	Dr. S. Gomathinayagam	Executive Director
2.	Smt. Anuradha Babu	Private Secretary
General Management		
3.	Shri D. Lakshmanan	General Manager (F&A)
4.	Shri G. Rajan	Administration cum Accounts Officer
5.	Shri R. Girirajan	Assistant
6.	Smt. K. Tamilselvi	Assistant
7.	Smt. J. Rekha	Stenographer
8.	Shri M. Malaravan	Senior Driver
9.	Shri S. Maruthanayagam	Driver
10.	Shri M. Selvakumar	Daftari
Research and Development		
11.	Shri Rajesh Katyal	Scientist 'E'
12.	Shri J.C. David Solomon	Scientist 'C'
13.	Smt Deepa Kurup	Scientist 'B'
14.	Shri R. Naveen Muthu	Technician
Wind Resource Assessment		
15.	Shri E. Sreevalsan	Scientist 'E'
16.	Shri K. Boopathi	Scientist 'C'
17.	Shri R. Sasikumar	Scientist 'B'
18.	Smt. T. Arivukkodi	Junior Engineer
19.	Shri T. Suresh Kumar	Junior Engineer
20.	Shri B. Krishnan	Junior Engineer
21.	Shri R. Vinod Kumar	Technician
22.	Shri K.A. Haji Abdul Ibrahim	Daftari

Sl. No	Name	Cadre
Wind Turbine Testing		
23.	Shri S.A. Mathew	Scientist 'D'
24.	Shri M. Anvar Ali	Scientist 'D'
25.	Shri M. Karuppuchamy	Junior Engineer
26.	Shri A.R. Hasan Ali	Junior Engineer
27.	Shri Y. Packiyaraj	Junior Engineer
28.	Shri S. Paramasivan	Junior Engineer
Standards and Certification		
29.	Shri A. Senthil Kumar	Scientist 'D'
30.	Shri N. Rajkumar	Scientist 'B'
31.	Shri A.G. Rangaraj	Scientist 'B'
32.	Shri S. Arulselvan	Junior Engineer
33.	Shri C. Stephen Jeremias	Junior Engineer
34.	Smt. B. Muthulakshmi	Senior Stenographer
Information, Training and Commercial Services		
35.	Shri P. Kanagavel	Scientist 'C'
36.	Shri M.R. Gunasekaran	Senior Stenographer
Employees on deputation from MNRE		
Wind Turbine Research Station		
37.	Shri A. Mohammed Hussain	Scientist 'E'
Solar Radiation Resource Assessment		
38.	Dr. G. Girdhar	Scientist 'E'

New Recruitments

Sl. No.	Name	Cadre
1.	Shri A.G. Rangaraj	Scientist 'B'
2.	Smt. J. Rekha	Stenographer

Staff Promotion During 2010 - 2011

Sl. No.	Name	Previous Cadre and Scale of Pay	Promoted Cadre and Scale of pay	Date of promotion
1	Shri M. Malaravan	Driver 5,200 - 20200 + GP Rs. 1,900/-	Sr. Driver 5,200 - 20200 + GP Rs. 2,400/-	01.04.2010
2	Shri D. Lakshmanan	GM (F&A) 15,600 - 39,100 + GP Rs.7,600/-	GM(F&A) 37,400 - 67,000 + GP Rs.8,700/-	02.07.2010
3	Shri M. Anvar Ali	Scientist 'C' 15,600 - 39,100 + GP Rs.6,600/-	Scientist 'D' 15,600 - 39,100 + GP Rs.7,600/-	01.01.2011



C-WET officials on External Committees, Bodies and Membership of Associations

Dr. S. Gomathinayagam

- Institution of Engineers (India), Life Member / Chartered Engineer
- Computer Society of India, Life Member
- Instrument Society of India, Life Member
- Indian Society of Wind Engineers, Life Member
- Indian Meteorological Society, Life Member
- External Examiner of UGC-JRF PHD program for MIT, Anna University, Member
- Expert Advisory Committee, Tamil Nadu, Scientists Award- (TANSA) - 2008 for Engineering and Technology.
- Executive Committee Member of Institute of Energy Studies, Anna University, Chennai.
- Member of Monitoring Committee, NIMITLI, Wind Turbine Development Project of CSIR
- Chairman, Wind Turbine Sectional committee ET42 of B/S

D. Lakshmanan

- National Institute of Personnel Management, Kolkata, Corporate Member.

Rajesh Katyal

- Institution of Engineers (India), Life Member / Chartered Engineer

Dr. E. Sreevalsan

- Indian Meteorological Society, Member.
- Doctoral Committee (Academic Research), Sathyabama Deemed University, Chennai, Member.
- Committee Member of Evaluation RFQ & RFP Bid Committee (Wind Farms in Kerala)
- Tender Evaluation Committee (Technical) of NTPC, BPCL and SAIL, Member

A. Senthil Kumar

- Wind Turbines Sectional Committee, ET 42 of BIS, Member.

R. Kumaravel

- Institution of Engineers (India), Associate Member.

P. Kanagavel

- Society for the Advancement of Library and Information Science (SALIS), Member.
- Indian Academic Library Association (IALA), Member.



AUDITOR'S REPORT

**The Executive Director
C-WET
Chennai 600 100**

AUDITOR'S REPORT TO THE MEMBERS OF THE GOVERNING BODY OF CENTRE FOR WIND ENERGY TECHNOLOGY, CHENNAI-600 100

We have audited the attached Balance sheet of Centre For Wind Energy Technology (C-WET) Velachery - Tambaram Main Road, Pallikaranai, Chennai 600 100 as at March 31, 2011 and also the Income and Expenditure Account for the year ended on that date annexed thereto. These financial statements are the responsibility of the management of Centre For Wind Energy Technology (C-WET). Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with auditing standards generally accepted in India. Those Standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatements. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management as well as evaluating the overall financial statements presentation. We believe that our audit provides reasonable basis for our opinion.

We report that:

- a) We have obtained all the information and explanations, which to the best of our knowledge and belief were necessary for the purpose of our audit.
- b) In our opinion proper books of accounts as required by law have been kept by Centre For Wind Energy Technology (C-WET) so far as it appears from our examination of those books.
- c) The Balance Sheet and Income and Expenditure Account dealt with by this report are in agreement with the books of account.
- d) The Balance Sheet and Income and Expenditure Account dealt with by this report are prepared in accordance with the applicable Accounting Standards issued by the Institute of Chartered Accounts of India.
- e) In our opinion and to the best of our information and according to the explanations given to us, they said accounts together with schedules, accounting policies and notes there on give a true and fair view in conformity with the accounting principles generally accepted in India;
- (I) In the case of the Balance Sheet, of the state of affairs of the Centre For Wind Energy Technology (C-WET) as at 31st March, 2011; and
- (Ii) In the case of the Income and Expenditure Account, of the excess of income over expenditure for the year ended on that date.

Date : 23.09.2011
Place : Chennai

FOR V.SOUNDARARAJAN & CO.,
Chartered Accountants
FIRM REGN NO. 003943S

Sd/-
V.S. RAVIKUMAR
PARTNER (Membership No. 018030)

CENTRE FOR WIND ENERGY TECHNOLOGY
 (An Autonomous R&D Institution under MNRE, Government of India)
 Chennai - 600 100

BALANCE SHEET AS AT 31ST MARCH, 2011

		(Amount in Rs.)	
	Schedule	31st March, 2011	31st March, 2010
CAPITAL FUND AND LIABILITIES			
CAPITAL FUND	1	136,536,012	110,277,201
EARMARKED - PROJECTS	1A	173,629,599	48,033,193
RESERVES AND SURPLUS	2	282,107,693	182,058,796
CURRENT LIABILITIES AND PROVISIONS	3	80,836,146	109,064,529
TOTAL		673,109,450	449,433,719
ASSETS			
FIXED ASSETS	4	153,391,082	99,328,178
CURRENT ASSETS, LOANS AND ADVANCES	5	519,718,368	350,105,541
TOTAL		673,109,450	449,433,719
SIGNIFICANT ACCOUNTING POLICIES	13		
NOTES ON ACCOUNTS	14		

For Centre for Wind Energy Technology

As per our Report attached
 for V.Soundararajan & Co.,
 Chartered Accountants
 Firm Regn.No.003943S

Sd/-

D.Lakshmanan
 General Manager (F&A)

Sd/-

Dr . S.Gomathinayagam
 Executive Director

Sd/-

President/Chairman

Sd/-

V.S.Ravikumar
 Partner
 M.No. 018030

CENTRE FOR WIND ENERGY TECHNOLOGY

(An Autonomous R&D Institution under MNRE, Government of India)

Chennai - 600 100

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 2011

			(Amount in Rs.)
	Schedule	For the year ended 31st March, 2011	For the year ended 31st March, 2010
INCOME			
Income from Scientific & Technical Consultancy Services	6	107,715,044	55,025,957
Income from publication	7	4,509,600	2,110,400
Interest Earned	8	17,290,365	17,507,431
Other Income	9	9,681,407	5,114,259
Grants from Government of India allocated for Revenue expenditure during the year	11	24,681,011	20,148,753
Grants from Government of India allocated for In house project expenditure during the year		6,439,625	5,622,804
Deferred Income transferred from Capital Fund (vide note no.4)	4	22,827,009	26,953,070
TOTAL (A)		193,144,061	132,482,674
EXPENDITURE			
Establishment Expenses	10	23,213,262	21,779,252
Other Administrative Expenses	11	40,503,729	31,583,474
In house project expenditure		6,439,625	5,622,804
Depreciation	4	22,938,548	27,064,609
TOTAL (B)		93,095,164	86,050,139
Balance being excess of Income over Expenditure (A-B)		100,048,897	46,432,535
Prior period adjustment	12	0	87,252
BALANCE BEING SURPLUS TRANSFERRED TO GENERAL RESERVE ACCOUNT		100,048,897	46,345,283
SIGNIFICANT ACCOUNTING POLICIES	13		
NOTES ON ACCOUNTS	14		

For Centre for Wind Energy Technology

As per our Report attached
for V.Soundararajan & Co.,
Chartered Accountants
Firm Regn.No.003943S

Sd/-
D.Lakshmanan
General Manager (F&A)

Sd/-
Dr S.Gomathinayagam
Executive Director

Sd/-
President/Chairman

Sd/-
V.S.Ravikumar
Partner
M.No. 018030

CENTRE FOR WIND
(An Autonomous R&D Institution under Ministry of
Chennai)

RECEIPTS AND PAYMENTS ACCOUNT

RECEIPTS	31st March, 2011	(Amount in Rs.) 31st March, 2010
I. Opening Balances		
(a) Cheques in hand	1,559,242	40,605
(b) Bank balances		
i) In Current Account	66,229,859	31,233,454
ii) In Deposit Accounts	233,000,000	193,100,000
(c) Stamps on hand	1,967	2,471
II. Grants Received		
(a) From Government of India	80,000,000	84,000,000
(b) Subsidy from TEDA (for Water Pumping Wind Mill)	0	45,000
(c) Sale of Fixed Assets	206,456	
(d) From Government of India for execution various projects	139,000,000	27,406,866
III. Income on Investments		
IV. Interest Received		
(a) On Bank deposits	18,005,906	17,507,431
V. Other Income		
(a) Fees for services	90,599,557	46,130,584
(b) Income from publications	844,600	80,400
(c) Energy receipts	5,825,577	9,676,201
(d) Misc. income	12,774,354	7,071,837
VI. Amount borrowed		
VII. Any other receipts		
(a) Fees received in advance on Consultancy projects	59,825,157	51,245,755
(b) Security deposit received	1,183,605	4,336,570
(c) Earnest money deposit received	142,000	296,000
(d) Service tax realized	7,715,292	11,508,484
(e) TDS to be remitted	367,767	193,518
(f) Advance and Deposits	12,335,532	3,744,368
TOTAL	729,616,871	487,619,544

For Centre for Wind Energy Technology

Sd/-
D.Lakshmanan
General Manager (F&A)

Sd/-
Dr.S.Gomathinayagam
Executive Director

ENERGY TECHNOLOGY

New & Renewable Energy, Government of India)

600 100

FOR THE YEAR ENDED 31ST MARCH, 2011

PAYMENTS	31st March, 2011	(Amount in Rs.) 31st March, 2010
I. Expenses		
(a) Employee related Expenses	26,269,338	22,891,189
(b) Administrative Expenses - (Operational & TA/DA)	26,329,065	20,036,429
II. Payments made against funds for various projects		
Out of CFA		
(a) In house R&D project expenses	9,122,031	7,815,444
(b) Seminar & Information dissemination	2,750,896	1,192,360
(c) Accreditation fee	36,548	30,000
Out of Grants for projects		
(a) WRA Lakshadweep	293,466	1,022,131
(b) WRA Offshore project at Dhanushkodi	2,404,596	98,237
(c) WRA in Karkil District, Jammu & Kashmir	707,953	
(d) Wind Shear Assessment	4,932,773	604,336
(e) North-Eastern Project 2006-07	1,281,451	844,081
(f) Study on Uncovered / New areas (2003-04 to 2010-11)	15,673,510	20,415,659
(g) Development Wind forecasting Model	620,122	
III. Investment and Deposits made		
IV. Expenditure on Fixed assets & Capital Work-in-Progress		
(a) Purchase of Fixed assets	18,022,800	19,716,088
(b) Expenditure on Capital Work-in-progress	59,256,779	35,274,936
(c) Advance on capital account (including imports)	3,074,749	3,804,943
V. Refund of Surplus Money		
(a) Balance of Grants-in-aid to Government of India	13,000	
VI. Other Payments		
(a) Refund of Security deposits	1,412,552	
(b) Refund of Earnest Money Deposits	681,250	
(c) Expenditure on Consultancy Projects	15,375,071	10,197,953
(d) Advance & Deposits	4,341,916	396,760
(e) Payment of TDS	95,568	125,903
(f) Service tax remittances	7,715,292	11,508,484
(g) Receivable from Debtors	1,914,758	2,893,653
(h) Festival advance paid	2,700	4,500
(i) Transfer of fees received in advance	92,895,372	27,955,390
VII. Closing Balances		
(a) Cheques in hand	2,489,082	1,559,242
(b) Bank Balances		
i) In Current Account	15,852,922	66,229,859
ii) In Savings Bank Account	147,251,261	
iii) In Deposit Accounts	268,800,000	233,000,000
(c) Stamps on hand	50	1,967
TOTAL	729,616,871	487,619,544

For Centre for Wind Energy Technology

As per our Report attached
for V.Soundararajan & Co.,
Chartered Accountants Firm Regn.No.003943S

Sd/-
D.Lakshmanan
General Manager (F&A)

Sd/-
Dr S.Gomathinayagam
Executive Director

Sd/-
President/Chairman

Sd/-
V.S.Ravikumar
Partner
M.No. 018030



पवन ऊर्जा प्रौद्योगिकी केन्द्र CENTRE FOR WIND ENERGY TECHNOLOGY

(नवीन और नवीकरणीय ऊर्जा मंत्रालय के अधीन स्वायत्त अनुसंधान एवं विकास संस्था, भारत सरकार)
(An Autonomous R & D Institution under the Ministry of New and Renewable Energy, Government of India)

वेलचेरी - ताम्बरम प्रमुख मार्ग, पल्लिकरणै, चेन्नई - 600 100, तमिलनाडु, भारत
Velachery - Tambaram Main Road, Pallikaranai, Chennai - 600 100, Tamil Nadu, India

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E-mail / ईमेल : info@cwet.res.in

Website / वेबसाइट : www.cwet.tn.nic.in / <http://cwet.res.in>