

वार्षिक प्रतिवेदन

ANNUAL REPORT

2011 - 2012



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 2011-2012



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ISO 9001 : 2008

Centre for Wind Energy Technology

An Autonomous Research & Development Institution
Ministry of New and Renewable Energy, Government of India

Chennai - 600 100 - 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.



C-WET

CENTRE FOR WIND ENERGY TECHNOLOGY

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EXECUTIVE DIRECTOR'S REPORT



Centre for Wind Energy Technology (C-WET) proactively plans and executes various programmes within the objectives of the centre for 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; from this year onwards C-WET would also provide authentic Solar Radiation Resource data to Solar Project developers and 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. C-WET's Solar Radiation Resource Assessment mission mode project contributes to research in other renewable energy areas as assigned by MNRE. Consorted efforts by C-WET towards facilitation of Indian Offshore Wind Power Projects including policy development needs a special mention.

During the year 2011-12 the notable activities carried out by the various units are as under:

RESEARCH AND DEVELOPMENT UNIT

C-WET's R&D programme is focused towards industry's needs especially in the non-IPR regime in the areas of "Power Evacuation Studies for Grid Integrated Wind Energy Conversion System" and studies on "Power quality issues in grid connected wind farms and identification of remedial measures". The power quality is also one of the major areas of interest and particularly in weak grid scenario. A new project on "Study and control of weak grid connected matrix converter based DFIG system" and two projects for "Human Resource Development and Capacity Building in Wind Energy" at PSG College of Technology, and Amrita Vishwa Vidyapeetham University, Coimbatore are ongoing. The R&D projects are showing good progress, giving useful results for

generating new research areas of interest. The number of proposals from the industry has been bare minimum, except the offer of stipend to students undergoing specialized courses under HRD programme.

An academic project on “Study of Experimental characteristics of wind turbine blade over full 0 – 360 degree of attack” has been commenced at Park College of Engineering and Technology, Coimbatore involving wind turbine test. The study of the “Health / Condition Monitoring on the 2 MW R&D Experimental Wind Turbine at WTRS facility, Kayathar” has been operational in the wind season. The instrumentation for health monitoring includes monitoring of blade, drive train, shaft, gear bearing and power performance.

The R&D division has completed the project on “Development and validation of design methodologies and design tools to enable wind turbine rotor and blades to be optimized for low and moderate wind regimes”. The outcome of the project is development of capacity building in one of the National Laboratories viz. National Aerospace Laboratories (NAL), Bangalore including infrastructure building for blade manufacturing.

The unit is presently in the process of type testing of eight small wind turbines of 1.4 kW, 3.2 kW, 4.2 kW, 5 kW, 5.1 kW and 10 kW at the Wind Turbine Research Station, Kayathar as per the requirements of IEC-61400-2 together with IEC 61400-12-1. Most of measurements are

likely to be completed during the current windy season.

WIND RESOURCE ASSESSMENT UNIT

Wind resources have been measured cumulatively at 665 locations till 31.03.2012. 82 stations are in operation in 14 States and one Union Territory. Fourty seven Wind Monitoring Stations were commissioned during 2011-12. In addition, over 122 consultancy projects have been taken up in the areas of technical due diligence, site assessment, DPR preparation, WPD maps, wind monitoring and verification of procedure.

Offshore Wind Resource Assessment project at Dhanuskodi, Rameshwaram, Ramanathapuram District has been sanctioned by MNRE. The project has two parts. 1) Wind measurements with 100 m anemometry is under progress 2) Satellite based offshore Wind Resource Assessment study – Synthetic Aperture Radar (SAR) has already been completed. An assignment to be given to Scottish Development International under MNRE funding for offshore location identification off Tamil Nadu Coast has been initiated.

Development of wind forecasting model with special reference to complex terrain with 50.4 MW wind farm has been identified for the study. C-WET Scientists and Engineers were trained in Denmark and the RISO model with “PREDIKTOR” is running at C-WET for forecasting. Wind measurement at 120 m level and

reassessment and validation of wind power potential at high levels in India are in progress.

WIND TURBINE TESTING UNIT

A testing facility at WTTS, Kayathar where Wind Turbines can be tested according to international standards IEC 61400-12-1,13,1 is equipped to undertake type testing and testing of wind turbines. An Inter Laboratory Comparison (ILC) for Power Curve Measurements has been completed as per the requirements of IEC 61400-12-1 between C-WET and NREL, USA under the project “NREL-C-WET”, ROUND ROBIN 2011 involving proficiency testing. An Equipment Database (Inventory /deployment) Management System (EDBMS) has been developed, tested and put in use. The testing services of the unit conforms to the requirements of the Quality Management System Standard ISO 9001:2008 and has been accredited in accordance with the requirements of ISO/IEC 17025:2005 by National Accreditation Board for Testing and Calibration Laboratories (NABL), New Delhi. Two agreements have been signed for testing between C-WET and manufacturers. These will be tested during the wind season in 2012.

WIND TURBINE RESEARCH STATION UNIT

C-WET owned R&D infrastructure machines at Kayathar comprises of first generation 9 WTGs of 200 kW capacity, one 600 kW constant speed WTG, and latest generation one WTG of 2000 kW

(variable speed) capacity . It provides an excellent opportunity for practical valued research with the well maintained research wind turbines. C-WET is also feeding to the State’s (Tamilnadu) Electricity Grid with few millions of units (kWh) this year. Over 300 Engineering students in and around Tamilnadu, participants of 7th & 8th International training of C-WET-MEA, delegates from Swedish International Development Agency (SIDA) sponsored training course and other dignitaries from Government of India have visited the WTRS, Kayathar R&D facilities.

STANDARDS AND CERTIFICATION UNIT

Standards and Certification unit is implementing TAPS 2000 (amended) for certification of Wind Turbines which has been prepared in line with requirements of international standards taking into account of Indian External and GRID conditions. S&C unit has completed renewable of certificates for three Wind Turbine models. Bureau of Indian Standards (BIS) has formulated Wind Turbine Sectional Committee (ET 42) for preparation of Indian Standards on Wind Turbines under the Chairmanship of Executive Director of C-WET. Presently, 5 nos of draft Indian Standards are under process by BIS. Based on the MNRE guidelines, to facilitate healthy and orderly growth of wind power sector in the country Revised List of Models and Manufacturers of Wind Turbines (RLMM), is being issued by C-WET periodically.

The periodical audit was successfully completed by DNV team. A Structural Model of 2 MW research Wind Turbine has been created by C-WET Scientists using NREL codes and the results compared with commercially available industry recognized aero-elastic code “BLADED”, as part of Indo-US collaboration with C-WET-NREL.

INFORMATION, TRAINING AND COMMERCIAL SERVICES UNIT

The unit had successfully organized two National trainings (during May and December 2011) with 154 National participants and two International training courses, one during August 2011 was sponsored by MEA, GOI under ITEC/SCAAP programme supported by MNRE, attended by 26 participants from 17 different countries. The course was inaugurated by Shri Sudeep Jain, IAS, CMD, TEDA and Shri R.Murugan, Managing Director, TANTRANSCO Ltd. was the Chief Guest of Valedictory function and another International training course was organized during February 2012 sponsored by MEA under India Africa Forum Submit specially for African countries and supported by MNRE. 26 participants from 11 African countries attended the course. The course was inaugurated by Shri K.P.Sukumaran, National Project Manager, UNDP, Former Advisor, MNRE and former Executive Director, C-WET and Dr. S. Iniyar, Professor & Director, Institute for Energy Studies, Anna University was the Chief Guest of Valedictory function.

Global Wind Day has been celebrated this year on June 15, Dr.K.S.Dhathathreyan, Head of Centre for Fuel Cell Technology, Chennai was the Special Invitee on the occasion, delivering the address.

A Memorandum of Understanding (MoU) has been signed between C-WET and LIFE Academy, Sweden for Knowledge Sharing. Almost 1000 Engineering students have visited the facilities of C-WET. As part of awareness creation, several exhibitions have been participated by C-WET.

SOLAR RADIATION RESOURCE ASSESSMENT UNIT

Fifty one dedicated automatic SRRA stations have been established during the period 23rd May 2011 to 20th October 2011 in 10 States and 1 Union Territory. Level-1 server has been established at C-WET to collect the data which is sampled at every one second and averaged over one minute and transmitted every ten minutes to the Central Receiving Station (CRS) installed at C-WET. Level-2 server has also been established for performing quality check and generation of reports on daily/monthly basis. C-WET has entered into an agreement with GIZ, New Delhi under Indo-German collaboration to assess the quality of the data and to generate reports after analyzing the raw data under a SolMap Project, involving development of a ground truth verified Solar Irradiation Map for India.

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



RESEARCH AND DEVELOPMENT

Research and Development (R&D) Unit addresses the specific purpose of supporting time bound, and mission oriented Research and 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 net-working with Institutions. The unit carries out in-house R&D net-working in research relevant areas with a mutually beneficial interdisciplinary approach for most of the projects. Interactive meetings through R&D institutions, manufacturers, stake holders and designers are envisaged as 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 WTG design/development. Due to the fact that R&D in wind Industry happens only behind closed-doors for the 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 2011-12 are detailed as under:

R & D Projects

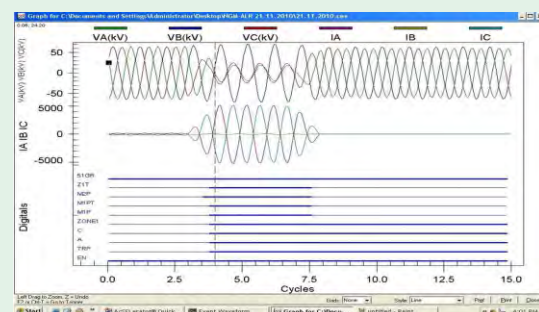
Power Evacuation Studies for Grid Integrated Wind Energy Conversion System

The power evacuation study for Grid Integrated Wind Energy Conversion system is one of the major issues faced by both

Wind Turbine Industry and Utility, particularly in the State of Tamil Nadu. The R&D unit had initiated a project for one power evacuation study for identifying weak links in the power system, conducting load flow analysis and short circuit analysis by modeling the Wind Turbine, Thyristor Controller Series Capacitor (TCSC) and Voltage Source Convertor (VSC) based High Voltage Direct Current Transmission (HVDC) lines and conducting power evacuation studies to develop stability model and transient stability analysis for Wind Turbines. The project aims to identify the locations where wind penetration in to the grid is a problem, the objective is to enhance the power evacuation with a TCSC controller and VSC based HVDC link. The work is underway and is likely to be completed by August 2012.

Study on power quality issues in grid connected wind farms and identification of remedial measures

The power quality is also one of the major areas of interest and particularly in weak grid scenario. For the purpose, the R&D unit has initiated a project jointly with Tamil Nadu Energy Development Agency (TEDA), RMK Engineering College, Chennai and Amrita School of Engineering, Coimbatore to undertake the power quality issues in the



Voltage parameter monitored at windfarm in Coimbatore Circle

grid connected wind farms and to recommend appropriate integration of the new wind generation system foreseen for the Indian wind power based on measurements at site and simulation studies.

Power quality data has been collected from the Coimbatore circle, which are exclusively connected with wind turbines and the data is being used for the simulation work.

Study and control of weak grid connected matrix converter based DFIG system

R&D unit has initiated a project with the help of SSN College of Engineering, Chennai approved by the Research Council (RC) of C-WET, to undertake simulation of the Matrix Converter controlled DFIG for a 5 kW wind power system and development of needed hardware modules. The project aims at implementing a novel method of increasing the reliability of the system under fault conditions by using a partially redundant converter that supports the system. The control strategy will also account for the maximum power point tracking to improve the performance of the system for a wide wind speed range. The project is likely to be completed by 2014.

HRD Project Capacity Building in Wind energy at PSG College of Technology

HRD is one of the key areas where industry is facing hardship in getting the trained technician / qualified personnel particularly for O&M of wind turbine for its expected design life of 20 years. The R&D unit of C-WET has initiated courses in two colleges. One of the beneficiaries is PSG College of Technology, Coimbatore. Three Certificate courses of 6 month duration and two Post Graduate Diploma courses of 9 months duration were sponsored by

C-WET at PSG College of Technology and the courses were initiated in January 2011. The first batch of students has graduated and many have been absorbed by the industry and the 2nd batch course has commenced since January 2012.

Human Resource Development (HRD) through tie-up with Amrita Vishwa Vidyapeetham University, Ettimadai, Coimbatore and C-WET has recently initiated a short term Post Graduate Diploma course in Wind Power Development & Wind Resource Analysis and for the purpose an MoU was inked with Amrita Vishwa Vidyapeetham University. Under this MoU, C-WET shall support the course for three consecutive years period. The courses would help developing skilled manpower which is the need of the hour for the wind industry.

The course commenced in August 2011. The two Semesters are of 9 months duration of which the first Semester has been completed and the second Semester is likely to be completed in May 2012. The intake is 15 candidates per batch. 5 candidates have obtained placement at the end of first semester.

Experimental characteristics of wind turbine blade over full 0 – 360 degree angle of attack.

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. 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.

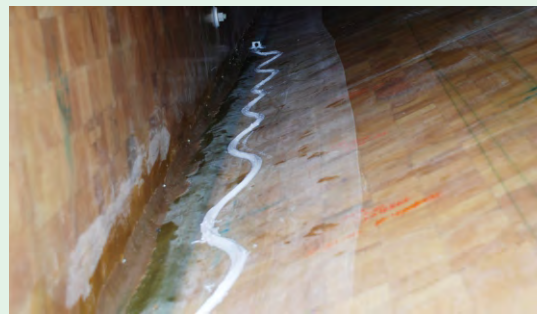
The Data collected is proposed to be validated by CFD methods before being made available to the stakeholders.

Health / Condition Monitoring on the 2 MW R&D Experimental Wind Turbine at WTRS facility, Kayathar

The 2 MW Experimental / Research Wind Turbine at C-WET's Kayathar WTRS facility has been procured for the purpose of conducting pioneering and cutting edge research whose results would be disseminated for the benefit of the wind energy stakeholders. As a part of this endeavour the unit has successfully completed the instrumentation for health/condition monitoring for the drive train and blades. The measurements from the components would be used to study the dynamics of the system and identify areas of defect / malfunction or deviation in operational characteristics. This defect prediction method of prognosis would, in the future, become the guiding line for any kind of Operation and Maintenance (O&M)



Instrumentation on the drive train



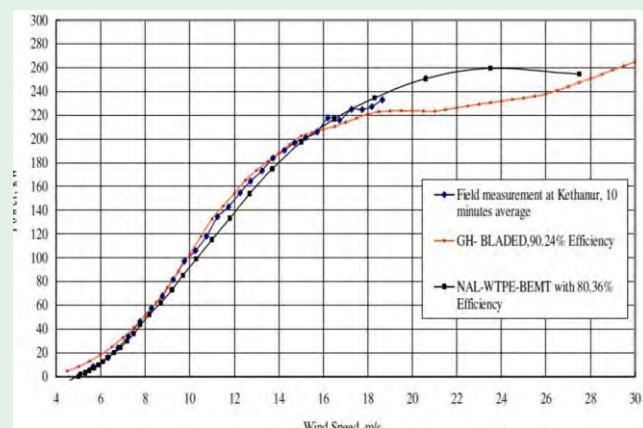
Instrumentation on the blade

activity that the wind industry would want to perform.

R & D Projects Completed

Development and validation of design methodologies and design tools to enable wind turbine rotor / blades to be optimized for low and moderate wind regimes.

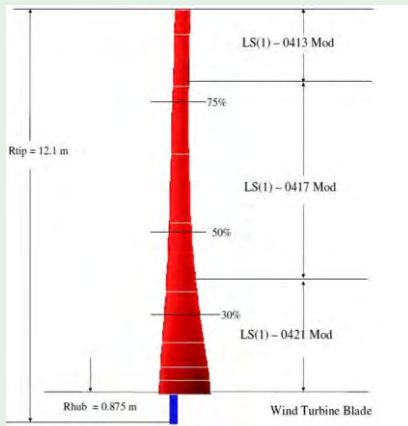
R&D unit had initiated the project in close association with National Aerospace Laboratories (NAL), Bangalore. The project has reached its conclusion. National Aerospace Laboratories was successful in developing a fully indigenous design methodology for developing rotors



Field testing of 300kW turbine



Test Turbine at Kethanur field measurements



Rotor blade developed for the 300 kW Turbine

specifically for low and moderate regimes. The design methodology has been checked out by NAL on a candidate 300 kW wind turbine rotor and additional 300 kW wind turbine blades were fabricated and field tested by them on an available wind turbine platform.

In addition, a wind augmentation device gurney flap has also been investigated. NAL has used the design methodology, on an external project not funded by C-WET, to design a 500 kW NMITLI HAWT with gurney flaps and field tested the turbine at

Kethanur wind farm, Coimbatore. The Project was technically completed and closed.

Commercial Services to the Stakeholders

Testing of Small Wind Turbine at WTRS

The unit is presently in the process of type testing eight small wind turbines of ratings 1.4 kW, 3.2 kW, 4.2 kW, 5 kW, 5.1 kW and 10 kW rating at the Wind Turbine Research Station, Kayathar as per the requirements of IEC-61400-2 together with IEC 61400-12-1. The measurements are underway and are likely to be completed during the current windy season (April – September 2012).

Honours Received

Shri Rajesh Katyal, co-authors had published and presented a paper titled “Optimization of Wind Turbine Lattice Towers” in Second International Conference on Wind Energy – WEIT-2011 held at National Institute of Technical Training & Research (NITTTR), Bhopal, under the Ministry of Human Resource and Development, Government of India, during 12th - 14th October 2011. The paper was selected as a “Best Paper” (Award – First) and citations were given away by the Hon'ble Governor of Madhya Pradesh His Excellency Shri Ram Naresh Yadav.



Rajesh Katyal receiving the certificate



WIND RESOURCE ASSESSMENT

The unit is implementing Nationwide Wind Resource Assessment 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 665 locations for periods ranging from one to five years since 1986. As on 31st March 2012, 82 stations are in operation in fourteen States and 1 Union Territory. During 2011-12 a total number of 47 wind monitoring stations were commissioned. Details of new wind monitoring stations installed and in operation are given in the below table.

Status of Wind Monitoring Stations (2011-12)

S.No.	State	Number of Stations		
		Established till 31.3.2011	Installed (new) during 2011-2012	In operation as on 31.03.2012
1.	Andaman & Nicobar	25	-	7
2.	Andhra Pradesh	63	15	16
3.	Arunachal Pradesh	6	-	-
4.	Assam	1	1	1
5.	Bihar	3	2	3
6.	Chattisgarh	7	-	-
7.	Goa	4	-	3
8.	Gujarat	69	-	6
9.	Haryana	6	-	-

S.No.	State	Number of Stations		
		Established till 31.3.2011	Installed (new) during 2011-2012	In operation as on 31.03.2012
10.	Himachal Pradesh	6	-	-
11.	Jammu & Kashmir	9	15	18
12.	Jharkhand	3	-	-
13.	Karnataka	49	10	12
14.	Kerala	27	2	2
15.	Lakshadweep	9	-	-
16.	Madhya Pradesh	37	-	3
17.	Maharashtra	112	-	4
18.	Manipur	8	-	2
19.	Meghalaya	2	1	3
20.	Mizoram	4	-	-
21.	Nagaland	3	-	-
22.	Orissa	9	-	-
23.	Pondicherry	4	-	-
24.	Punjab	10	-	-
25.	Rajasthan	36	-	1
26.	Sikkim	1	1	1
27.	Tamil Nadu	68	-	-
28.	Tripura	5	-	-
29.	Uttarkhand	11	-	-
30.	Uttar Pradesh	11	-	-
31.	West Bengal	10	-	-
Total		618	47	82

Of the cumulative total of 665 stations established till 31.03.2012, 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 Distribution at the 233 Stations

WPD range (W/m ²)	Number of Stations
200-250	106
251-300	58
301-350	26
351-400	18
>401	25
	233

WRA in the uncovered area

State wise details of the wind monitoring stations commissioned during 2011-2012 in the country under various programmes are given in the following table. All the masts are of 25 m, 50 m and 80 m height. Sensors are placed at 10 m, 25 m (25 m height mast), 10 m, 30 m, 50 m (50 m height mast), 20 m, 50 m, 78 m (80 m height mast) levels & above ground.

State wise installations of wind monitoring stations established during 2011-2012

S.No.	Stations Established	State	District	Commissioned On
1.	Kangan	Jammu & Kashmir	Ganderbal	27.04.2011
2.	Parihaspura		Baramula	30.04.2011
3.	Gulmarg		Baramula	03.05.2011
4.	Uplina		Baramula	05.05.2011
5.	Taru		Leh	24.08.2011
6.	Fortula		Leh	27.08.2011
7.	Upshi		Leh	25.08.2011
8.	Diskit		Leh	30.08.2011
9.	Hanely		Leh	03.09.2011
10.	Chushul		Leh	01.09.2011
11.	Khumbuthang		Kargil	13.10.2011
12.	Photang		Kargil	16.10.2011
13.	Rungdum		Kargil	17.10.2011
14.	Hambotingla		Kargil	21.10.2011
15.	Lakthang		Kargil	22.10.2011
16.	Zindapur	Bihar	Gaya	20.05.2011
17.	Shankarnagar		Munger	26.05.2011
18.	Rymbai	Meghalaya	Jaintia Hills	23.05.2011
19.	New Panbari	Assam	Dhubri	14.06.2011
20.	Sadam	Sikkim	South Sikkim	20.06.2011
21.	Vysapuram	Andhra Pradesh	Anantapur	12.08.2011
22.	Basavapuram		Anantapur	14.08.2011
23.	Kuttalapalli		Anantapur	16.08.2011

S.No.	Stations Established	State	District	Commissioned On
24.	Kodiganipalli	Andhra Pradesh	Chittoor	19.08.2011
25.	Molagavalli		Kurnool	21.08.2011
26.	Chinnakolumulapalli		Kurnool	27.08.2011
27.	Gnagadevipalli		Kaddapa	29.08.2011
28.	Ottugunla		Mahabub Nagar	02.09.2011
29.	Bandameedapalli		Rangareddy	04.09.2011
30.	MangiThanda		Medak	06.09.2011
31.	GopiyanaayakThanda		Medak	08.09.2011
32.	Samudrathanda		Nizamabad	20.10.2011
33.	Patha Ananthapur		Adilabad	22.10.2011
34.	Ontimamidi		East Godavari	24.10.2011
35.	Malameedapalli		Prakasam	25.10.2011
36.	Dasarahalli	Karnataka	Bellary	10.02.2012
37.	Huilgol		Gadag	11.02.2012
38.	Dotihalu		Koppal	12.02.2012
39.	Jeyur		Bijapur	13.02.2012
40.	Shamsherpurwadi		Bidar	16.02.2012
41.	Nagaranaballi		Hassan	03.03.2012
42.	Ganganur		Chamrajnagar	05.03.2012
43.	Gopalanaballi		Tumkur	07.03.2012
44.	Beermangala		Chickaballapur	09.03.2012
45.	Somagudda		Chitradurga	13.03.2012
46.	Puthupally / Kanjikodi	Kerala	Palakkad	23.03.2012
47.	Vandiperiyar		Idukki	25.03.2012

C-WET has released partial funds to the following State Nodal Agencies to install wind monitoring stations during this financial year. Details are given in the below table.

Fund released for State Nodal Agencies to install WMS during 2011-2012

S.No.	State	No. of Stations Sanctioned	Mast Height (m)	Amount (Rs. in Lakhs)
1.	Assam	1	50	0.65
2.	Manipur	3	50	1.84
3.	Meghalaya	4	50	1.95
4.	Orissa	7	80	10.50
5.	Leh (J & K)	6	50	13.00
Total		21		27.94

Consultancy Projects

In addition to the wind monitoring projects, funded by MNRE the unit has carried out 121 consultancy projects during the year 2011-12. These short-term projects were to provide micro siting services and preparation of due diligence reports. Under

the direction from the Ministry, verification of data collection procedure adopted by private firms were undertaken. Six nos of wind monitoring stations have been installed under consultancy projects. Details of projects carried out during the financial year are given in the following table.

Consultancy projects taken up during 2011-2012

S.No.	Name of the Project	Name of the Client	Remarks
1.	Technical Due Diligence of their proposed 10.5 MW wind farm project at Karnataka	M/s. NMDC Ltd., Hyderabad	Completed
2.	Detailed project report for the 10 MW wind farm at Bidda site in Reasi District, Jammu & Kashmir	M/s. NHPC Ltd. Faridabad	Completed
3.	Technical due diligence of their proposed 45 MW wind farm project at Dalot site in Rajasthan	M/s. Regen Powertech Pvt. Ltd., Chennai	Completed
4.	Technical due diligence of their proposed 99 MW wind farm project at Poolavadi site in Tamilnadu	M/s. Regen Powertech Pvt. Ltd., Chennai	Completed
5.	Technical due diligence of their proposed 44.1 MW (21 S88 x 2100 kW) wind farm project at Sindhgiri in Karnataka	M/s. Suzlon Energy Ltd., Pune	Completed (draft)
6.	WPD Map of Yelmarwadi - Bhud, Satara District, Maharashtra	M/s. Gamesa Wind Turbines Pvt. Ltd., Chennai	Completed
7.	WPD Map of Revangaon in Maharashtra	M/s. Vestas Wind Technology India Pvt. Ltd., Chennai	Completed
8.	Site Assessment for wind monitoring at 11 sites in Andhra Pradesh	M/s. Ecoren Energy India Pvt. Ltd., Hyderabad	Completed
9.	Wind Monitoring Study at Yarada Hills, Vishakhapatnam District, Andhra Pradesh	M/s. Ganga-varam Port Ltd., Andhra Pradesh	Ongoing
10.	Site Assessment for wind resource assessment in the Pahari region, Sarda & Ghaghara River Basin, Uttar Pradesh	M/s. THDC India Ltd., Risikesh	Completed
11.	Identifying of suitable locations for carrying out wind monitoring study at 7 locations in Kerala	M/s. NTPC Ltd., Secunderabad	Ongoing

S.No.	Name of the Project	Name of the Client	Remarks
12.	Site Assessment of WPP at four locations of NHPC Power Station/Projects	M/s. NHPC Ltd., Faridabad	Ongoing
13.	Wind monitoring study at 6 locations in Kerala	M/s. ANERT, TVM	Ongoing
14.	Preparing WPD map of palsi site in satara Region, Maharashtra	M/s. R.S India Wind Energy Pvt. Ltd., Gurgaon	Ongoing
15.	Verification of procedure of wind monitoring at Eguvapalli, Anantapur District, Andhra Pradesh	M/s. Guttaseema Wind Energy Company Pvt. Ltd., Hyderabad	Completed
16.	Verification of procedure of wind monitoring at Ellutla, Ananthapur District, Andhra Pradesh (Regd.)	M/s. Enercon (India) Ltd., Mumbai	Completed
17.	Verification of procedure of wind monitoring at Dorigallu, Ananthapur District, Andhra Pradesh	M/s. Enercon (India) Ltd., Mumbai	Completed
18.	Verification of procedure of wind monitoring at Mutusukota, Ananthapur District, Andhra Pradesh	M/s. Enercon (India) Ltd., Mumbai	Completed
19.	Verification of procedure of wind monitoring at Kunkontla, Ananthapur District, Andhra Pradesh	M/s. Enercon (India) Ltd., Mumbai	Completed
20.	Verification of procedure of wind monitoring at Guravapalli, Ananthapur District, Andhra Pradesh	M/s. Vayu Urja Bharat Pvt. Ltd., Hyderabad	Completed
21.	Verification of procedure of wind monitoring at 38 stations in Maharashtra	M/s. Maharashtra Energy Development Agency, Pune (@ Rs.60000/-+service tax per station)	Ongoing
22.	Verification of procedure of wind monitoring at Bheseda, Jaisalmer District, Rajasthan	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
23.	Verification of procedure of wind monitoring at Dangiri, Jaisalmer District, Rajasthan	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
24.	Verification of procedure of wind monitoring at Ramgad, Jaisalmer District, Rajasthan	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed

S.No.	Name of the Project	Name of the Client	Remarks
25.	Verification of procedure of wind monitoring at Mokal Diggi, Jaisalmer District, Rajasthan	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
26.	Verification of procedure of wind monitoring at Habur, Jaisalmer District, Rajasthan	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
27.	Verification of procedure of wind monitoring at HPCL - 1, Jaisalmer District, Rajasthan	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
28.	Verification of procedure of wind monitoring at Suro Ki Dhani - North, Jaisalmer District, Rajasthan	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
29.	Verification of procedure of wind monitoring at Suro Ki Dhani - West, Jaisalmer District, Rajasthan	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
30.	Verification of procedure of wind monitoring at Ratkuriya-V, Jodhpur District, Rajasthan	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
31.	Verification of procedure of wind monitoring at Tejuva West, Jaisalmer District, Rajasthan	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
32.	Verification of procedure of wind monitoring at Atmakuru, Anantapur District, Andhra Pradesh	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
33.	Verification of procedure of wind monitoring at Raketla, Anantapur District, Andhra Pradesh	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
34.	Verification of procedure of wind monitoring at Betsur, Belgaum District, Karnataka	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
35.	Verification of procedure of wind monitoring at Rudgi, Bijapur District, Karnataka	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed

S.No.	Name of the Project	Name of the Client	Remarks
36.	Verification of procedure of wind monitoring at Maharsavali, Aurangabad District, Maharashtra	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
37.	Verification of procedure of wind monitoring at Rajavadlajam, Rajkot District, Gujarat	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
38.	Verification of procedure of wind monitoring at Raipur, Rajasthan	M/s. Regen Powertech Pvt. Ltd., Chennai	Completed
39.	Verification of procedure of wind monitoring at Pingarala, Ratlam District, Madhya Pradesh	M/s. DJ Energy Pvt. Ltd., New Delhi	Completed
40.	Verification of procedure of wind monitoring at Ramasagaram, (Tagguparti) Anantapur district, Andhra Pradesh	M/s. Gamesa Wind Turbines Pvt. Ltd., Chennai	Completed
41.	Verification of procedure of wind monitoring at Jamanwada NE, Kuttch District, Gujarat	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
42.	Verification of procedure of wind monitoring at Anehalu, Chitradurga District, Karnataka	M/s. NMDC Ltd., Hyderabad	Completed
43.	Verification of procedure of wind monitoring at Jambusar Nada, Bharuch District, Gujarat	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
44.	Verification of procedure of wind monitoring at Shethvadala, Jamnagar District, Gujarat	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
45.	Verification of procedure of wind monitoring at Vadgam, Anand District, Gujarat	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
46.	Verification of procedure of wind monitoring at Ghodewadi, Nashik District, Maharashtra	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
47.	Verification of procedure of wind monitoring at Khirsara, Kuttch District, Gujarat	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed

S.No.	Name of the Project	Name of the Client	Remarks
48.	Verification of procedure of wind monitoring at Dasalpur, Kachchh District, Gujarat	M/s. Suzlon Infrastructure Services Ltd., Pune	Ongoing
49.	Verification of procedure of wind monitoring at Khangarpur, Jamnager District, Gujarat	M/s. Suzlon Infrastructure Services Ltd., Pune	Ongoing
50.	Verification of procedure of wind monitoring at Mandsaur, Mandsaur District, Madhya Pradesh	M/s. Enercon (India) Ltd., Mumbai	Completed
51.	Verification of procedure of wind monitoring at Kottalapalle, Anantapur District, Andhra Pradesh	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
52.	Verification of procedure of wind monitoring at Ellutla, Anantapur District, Andhra Pradesh	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
53.	Verification of procedure of wind monitoring at Ellutla South, Anantapur District, Andhra Pradesh	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
54.	Verification of procedure of wind monitoring at Chilvarapalli, Anantapur District, Andhra Pradesh	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
55.	Verification of procedure of wind monitoring at Ramgiri I, Anantapur District, Andhra Pradesh	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
56.	Verification of procedure of wind monitoring at Ramgiri III, Anantapur District, Andhra Pradesh	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
57.	Verification of procedure of wind monitoring at Alankarpeta, Anantapur District, Andhra Pradesh	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
58.	Verification of procedure of wind monitoring at Yadiki, Anantapur District, Andhra Pradesh	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed

S.No.	Name of the Project	Name of the Client	Remarks
59.	Verification of procedure of wind monitoring at Dorigallu, Cuddapah District, Andhra Pradesh	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
60.	Verification of procedure of wind monitoring at Payagattapalli, Cuddapah District, Andhra Pradesh	M/s. Suzlon Infrastructure Services Ltd., Pune	Completed
61.	Verification of procedure of wind monitoring at Phalodi, Jodhpur District, Rajasthan (Extn.)	M/s. Suzlon Energy Ltd., Pune	Completed
62.	Verification of procedure of wind monitoring at Soda Bandhan, Jaisalmer District, Rajasthan	M/s. Suzlon Energy Ltd., Pune	Completed
63.	Verification of procedure of wind monitoring at Dangri, Jaisalmer District, Rajasthan	M/s. Inox Renewables Ltd., Noida	Completed
64.	Verification of procedure of wind monitoring at Rajgarh, Jaisalmer District, Rajasthan	M/s. Inox Renewables Ltd., Noida	Completed
65.	Verification of procedure of wind monitoring at Bhud Phase 2 in Maharashtra	M/s. Regen Powertech Pvt. Ltd., Chennai	Completed
66.	Verification of procedure of wind monitoring at Pungamattur (Vagarai) in Tamilnadu	M/s. Regen Powertech Pvt. Ltd., Chennai	Completed
67.	Verification of procedure of wind monitoring at Virugalpatti, Tirupur District, Tamilnadu	M/s. Regen Powertech Pvt. Ltd., Chennai	Completed
68.	Verification of procedure of wind monitoring at Periyapatti, Tirupur District, Tamilnadu	M/s. Regen Powertech Pvt. Ltd., Chennai	Completed
69.	Verification of procedure of wind monitoring at Akal, Jaisalmer District, Rajasthan	M/s. RRB Energy Ltd., Chennai	Completed
70.	Verification of procedure of wind monitoring at Baradvi, Banaskantha District, Gujarat	M/s. Suzlon Energy Ltd., Pune	Ongoing
71.	Verification of procedure of wind monitoring at Humbarne, Satara District, Maharashtra	M/s. Suzlon Energy Ltd., Pune	Completed
72.	Verification of procedure of wind monitoring at Jath-2, Sangli District, Maharashtra	M/s. Suzlon Energy Ltd., Pune	Completed

S.No.	Name of the Project	Name of the Client	Remarks
73.	Verification of procedure of wind monitoring at Gudepanchgani - II, Satara District, Maharashtra	M/s. Suzlon Energy Ltd., Pune	Completed
74.	Verification of procedure of wind monitoring at AINI, Kolhapur District, Maharashtra	M/s. Samarth Multi-trade Pvt.Ltd., Mumbai	Completed
75.	Verification of procedure of wind monitoring at Tirumalayapalle in Andhra Pradesh	M/s. Enercon (India) Ltd., Bangalore	Completed
76.	Verification of procedure of wind monitoring at Pottipadu, Anantapur District, Andhra Pradesh	M/s. Axis Energy Ventures (India) Pvt. Ltd., Hyderabad	Completed
77.	Verification of procedure of wind monitoring at Amidyala, Anantapur District, Andhra Pradesh	M/s. Axis Energy Ventures (India) Pvt. Ltd., Hyderabad	Completed
78.	Verification of procedure of wind monitoring at Lottavaram, Anantapur District, Andhra Pradesh	M/s. Axis Energy Ventures (India) Pvt. Ltd., Hyderabad	Completed
79.	Verification of procedure of wind monitoring at Vidapanakallu, Anantapur District, Andhra Pradesh	M/s. Axis Energy Ventures (India) Pvt. Ltd., Hyderabad	Completed
80.	Verification of procedure of wind monitoring at Vellappaneri in Tamilnadu	M/s. Trishe Developers Pvt. Ltd., Chennai	Completed
81.	Verification of procedure of wind monitoring at Chillangulam in Tamilnadu	M/s. Trishe Developers Pvt. Ltd., Chennai	Completed
82.	Verification of procedure of wind monitoring at Saighar, Satara District, Maharashtra	M/s. TS Wind Power Developers, Satara	Completed
83.	Verification of procedure of wind monitoring at Kolvan, Kolhapur District, Maharashtra	M/s. TS Wind Power Developers, Satara	Completed
84.	Verification of procedure of wind monitoring at Uthumalai, Tirunelveli District, Tamilnadu	M/s. Suzlon Energy Ltd., Pune	Ongoing

S.No.	Name of the Project	Name of the Client	Remarks
85	Verification of procedure of wind monitoring at Mallasandram, Krishnagiri District in Tamilnadu	M/s. Trishe Developers Pvt. Ltd., Chennai	Completed
86.	Verification of procedure of wind monitoring at Chavaneshwar, Satara District in Maharashtra	M/s. Enercon (India) Ltd., Mumbai	Completed
87.	Verification of procedure of wind monitoring at Nerimatla (Palturu), Anantapur District, Andhra Pradesh	M/s. Gamesa Wind Turbines Pvt. Ltd., Chennai.	Completed
88.	Verification of procedure of wind monitoring at Jampar, Jamnagar District in Gujarat	M/s. Suzlon Energy Ltd., Pune	Completed
89.	Verification of procedure of wind monitoring at Jamanwada SE, Kutch District in Gujarat	M/s. Suzlon Energy Ltd., Pune	Completed
90.	Verification of procedure of wind monitoring at Bhanukotamala, Kadapa District in Andhra Pradesh	M/s. Suzlon Energy Ltd., Pune	Completed
91.	Verification of procedure of wind monitoring at Kondapuram, Kadapa District in Andhra Pradesh	M/s. Suzlon Energy Ltd., Pune	Completed
92.	Verification of procedure of wind monitoring at Kapatrala, Kurnool District in Andhra Pradesh	M/s. Suzlon Energy Ltd., Pune	Completed
93.	Verification of procedure of wind monitoring at Mutchukota, Anantapur District in Andhra Pradesh	M/s. Suzlon Energy Ltd., Pune	Ongoing
94.	Verification of procedure of wind monitoring at Mutsukota North, Anantapur District in Andhra Pradesh	M/s. Suzlon Energy Ltd., Pune	Ongoing
95.	Verification of procedure of wind monitoring at Kuderu, Anantapur District in Andhra Pradesh	M/s. Suzlon Energy Ltd., Pune	Completed
96.	Verification of procedure of wind monitoring at Amrapur , District in Gujarat	M/s. Gamesa Wind Turbines Pvt. Ltd., Chennai	Ongoing
97.	Verification of procedure of wind monitoring at Mendhegiri, Sangli District in Maharashtra	M/s. Maharashtra Energy Development Agency, Pune	Completed

S.No.	Name of the Project	Name of the Client	Remarks
98.	Verification of procedure of wind monitoring at Panhalipada, Dhule District in Maharashtra	M/s. Suzlon Energy Ltd., Pune	Completed
99.	Verification of procedure of wind monitoring at Bhadrampalli Forest, Anantapur District in Andhra Pradesh	M/s. Suzlon Energy Ltd., Pune	Completed
100.	Verification of procedure of wind monitoring at Marutla, Anantapur District in Andhra Pradesh	M/s. Suzlon Energy Ltd., Pune	Ongoing
101.	Verification of procedure of wind monitoring at Katrimala, Anantapur District in Andhra Pradesh	M/s. Suzlon Energy Ltd., Pune	Completed
102.	Verification of procedure of wind monitoring at Yaparlapadu North, Kurnool District in Andhra Pradesh	M/s. Suzlon Energy Ltd., Pune	Completed
103.	Verification of procedure of wind monitoring at Poladiya, Kachchh District in Gujarat	M/s. Suzlon Energy Ltd., Pune	Ongoing
104.	Verification of procedure of wind monitoring at Wankaner, Rajkot District in Gujarat	M/s. Suzlon Energy Ltd., Pune	Ongoing
105.	Verification of procedure of wind monitoring at Bhadrapuram 1 RF, Anantapur District in Andhra Pradesh	M/s. Helios Infratech Pvt. Ltd., Hyderabad (3 months)	Completed
106.	Verification of procedure of wind monitoring at Bhadrapuram 2, Anantapur District in Andhra Pradesh	M/s. Helios Infratech Pvt. Ltd., Hyderabad (3 months)	Ongoing
107.	Verification of procedure of wind monitoring at Peddakotla, Anantapur District in Andhra Pradesh	M/s. Helios Infratech Pvt. Ltd., Hyderabad (3 months)	Ongoing
108.	Verification of procedure of wind monitoring at Ramallakota, Kurnool District, Andhra Pradesh	M/s. Suzlon Energy Ltd., Pune	Completed
109.	Verification of procedure of wind monitoring at GotiKhurd, Sangli District, Maharashtra	M/s. Suzlon Energy Ltd., Pune	Completed
110.	Verification of procedure of wind monitoring at Akal NE, Jaisalmer District, Rajasthan	M/s. Suzlon Energy Ltd., Pune	Ongoing

S.No.	Name of the Project	Name of the Client	Remarks
111.	Verification of procedure of wind monitoring at Pohra, Jaisalmer District, Rajasthan	M/s. RRB Energy Ltd., Chennai (3 months)	Completed
112.	Verification of procedure of wind monitoring at Katrimala-1, Anantapur District in Andhra Pradesh	M/s. Suzlon Energy Ltd., Pune (3 months)	Completed
113.	Verification of procedure of wind monitoring at Ramallakota West, Kurnool District in Andhra Pradesh	M/s. Suzlon Energy Ltd., Pune (3 months)	Ongoing
114.	Verification of procedure of wind monitoring at Hebbattam, Kurnool District in Andhra Pradesh	M/s. Suzlon Energy Ltd., Pune (3 months)	Ongoing
115.	Verification of procedure of wind monitoring at Dasve, Pune District in Maharashtra	M/s. Lavasa Corporation Ltd., Mumbai	Ongoing
116.	Verification of procedure of wind monitoring at Khandke, Ahmed Nagar District in Maharashtra	M/s. Enercon (India) Ltd., Mumbai	Ongoing
117.	Verification of procedure of wind monitoring at Kaveli Konda, Anantapur District in Andhra Pradesh	M/s. Suzlon Energy Ltd., Pune	Completed
118.	Verification of procedure of wind monitoring at Nagewadi, Osmanabad District in Maharashtra	M/s. Suzlon Energy Ltd., Pune	Ongoing
119.	Verification of procedure of wind monitoring at Haripar, Rajkot District in Gujarat	M/s. Suzlon Energy Ltd., Pune	Ongoing
120.	Verification of procedure of wind monitoring at Bhadthar, Jamnagar District in Gujarat	M/s. Suzlon Energy Ltd., Pune	Ongoing
121.	Verification of procedure of wind monitoring at Sautada, Beed District in Maharashtra	M/s. Suzlon Energy Ltd., Pune	Ongoing
122.	Verification of procedure of wind monitoring at South Dhone, Kurnool District, Andhra Pradesh	M/s. Enercon (India) Ltd. Mumbai.	Ongoing

Offshore Wind Resource Assessment at Dhanuskodi, Rameshwaram, Tamil Nadu

MNRE has sanctioned a project titled, “Offshore Wind Resource Assessment at Dhanuskodi, Rameshwaram, Ramanathapuram District”. The project has two parts as follows. 1) Wind measurements with

100 m anemometry and 2) Satellite based Offshore Wind Resource Assessment Study Synthetic Aperture Radar (SAR). An agreement has been executed between C-WET and RISO, DTU on 19th August 2010 for collecting and analysing of offshore SAR data. C-WET Scientists attended SAR workshop at RISO-DTU, Denmark during

25th - 29th October 2010. 371 Satellite images between Kanyakumari and Rameswaram 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 ESA has been signed for utilization of data. The project Part-1 is under progress and the project Part-2 has already been completed. 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” was sanctioned by the MNRE. 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 carry out the project. Project duration is 18 months. A wind farm in complex terrain with 50.4 MW has been identified for the study. Site visit has been made. PREDIKTOR” model of RISO-DTU is being used for Wind power forecasting. RISO-DTU, Denmark Scientist imparted training to C-WET Scientists and Engineers. The project cost is shared by MNRE and C-WET. The project duration has been extended upto June 30th 2012.

Wind Measurement at 120 m level

Four numbers of 120 m height wind mast are operational at Lamba (Gujarat), Akal (Rajasthan), Jagmin (Maharashtra) and Jogimatti (Karnataka) during current financial year. Measurements have been carried out at 10, 30, 60, 90 and 120 m level.



120 m anemometry at Jogimatti

Reassessment and Validation of Wind Power Potential at high levels in India

As per the Indian Wind Atlas, install-able wind power potential has been estimated as 49 GW at 50 m agl with the assumption of 2% land availability (as land assessment was not a part of the Wind atlas preparation, the assumption was made as per the results of micro survey studies done for a few stations in the country) in the wind farm potential area and of course, this is the most conservative reference scenario of assessment and these details are made clear in the Indian Wind Atlas. Regarding the Tamil Nadu wind power potential, C-WET has estimated 5374 MW at 50 m agl with 2 % land availability. Tamil Nadu's present installed capacity has crossed 6000 MW. However, everyone should notice one important point that out of 6000 MW, more than 4000 MW has been installed at above 50 m agl. Unfortunately, without noticing this fact, many people including researchers used to criticize the estimation of C-WET not

only in the conferences but also in their research papers. As the current technology brings up the wind turbine of higher hub heights in the range of 80-120 m, and also land use pattern is not considered in previous assessment, it is necessary to know the potential at higher hub height level with the details of actual land availability. Potential can be described in different scenarios. The 'moderate' scenario takes into account all existing or planned policy measures and also the advantages of modern wind turbines in terms of its new heights, rotor diameters and overall efficiency. In that case, Indian wind power potential might be more than 100 GW at 80 m level and relevant maps are made available in Indian Wind Atlas book. As per the most 'ambitious' scenario, it could go even more than this figure. However, the actual resources and land availability have to be assessed and validated with the actual measurements and land surveys. The estimated potential with 2% and 6% land availability for 7 States without any validation may be given as indicated in the below table.

The estimated potentials of land availability

S.No.	State	Potential with 2% land availability GW	Potential with 6% land availability GW
1	Andhra Pradesh	14	42
2	Gujarat	35	105
3	Karnataka	14	42
4	Maharashtra	6	18
5	Madhya Pradesh	12	36
6	Rajasthan	5	15
7	Tamil Nadu	14	42

In these circumstances, it is proposed to conduct a realistic assessment considering tangible land availability for wind farming for 7 wind potential States, namely Tamil Nadu, Karnataka, Andhra Pradesh, Maharashtra, Madhya Pradesh, Gujarat and Rajasthan at 100 m level facilitating validation of meso scale based results indicated in the Wind Atlas. MNRE has launched a reassessment programme with 100 m anemometry to validate the potential at 100 m level in 7 potential States including the land assessment. This project will have the following objectives.

1. Preparation of Micro scale Wind Atlas for 100 m level with a spatial resolution of 200 m - 1000 m using existing Numerical Wind Atlas (lib file) of the country with the cross checking of observed Wind Climate files made available through the existing surface wind measurements data. The raw or meteorological potential of the country will also be estimated at this stage.
2. Estimation of technical potential at 100 m level: GIS techniques will be used to assess the land availability and estimate technical potential.
3. Validation of the above results with actual measurements (100 m Anemometry) and estimate the real technical potential.
4. Micro level Investment Grade Potential Assessment: Detailed Wind Energy maps for selected sites. This will be done after reviewing the results of third phase.

Acquisition of Land, wind masts materials and instrumentation are under progress.

Meetings & Trainings

Wind Profile measurement by using LIDAR at WTTS/ WTRS, Kayathar

- Conducted 3 days onsite LIDAR training programme at WTRS/WTTS, Kayathar during 23rd to 25th August 2011.
- Review meetings and special training on wind resource assessment programme for the State Nodal Agencies from North East Region, Jammu and Kashmir,



Scientist/Engineers during the training programme

Kargil and Ladakh were held on 9th February 2012 and 10th February 2012.

- Review meeting on “WRA project including 100 m Anemometry” has been conducted on 29th November 2011 at C-WET, Chennai. Representatives from SNAs had participated.



Review meets in progress



SNA Officials in C-WET Campus



WIND TURBINE TESTING

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 from the Ministry of New and Renewable Energy (MNRE), Government of India.

The Test Station has the following facilities;

- ◆ Availability of two test beds to test wind turbines up to a total capacity of 1650 kW, the capacities of which are expandable based on requests from potential customers.
- ◆ Readily available grid connection for each test bed.
- ◆ Readily available reference met masts in front of each test bed, designed to heights of 75 m and 50 m for acquiring meteorological data at the hub heights of the test turbines.
- ◆ 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 requirements of IEC standards which are stored as per the Quality Management System (QMS) procedures.
- ◆ Availability of 9 numbers of 200 kW Micon make wind turbine for

development of new measurements techniques.

- ◆ In-house laboratory for calibration and functionality check-up of instruments.
- ◆ In-house laboratory for data warehousing, signal conditioning, equipments design and training calibration etc.

Contributions

C-WET has established a test facility at WTTS, Kayathar, where wind turbines can be tested according to the International Standards. WTTS is presently equipped to undertake Type Testing (TT) of wind turbines and to conduct the testing of wind turbines as per the requests of customers / manufacturers and the following tests are normally carried out as per International standards IEC 61400-12-1, 13, 1;

1. Power performance measurement
2. Yaw efficiency test
3. Safety and functional test
4. Load measurements
5. User defined measurements

The above mentioned tests are also being carried out at field sites, subject to the site meeting the requirements of IEC Standards.

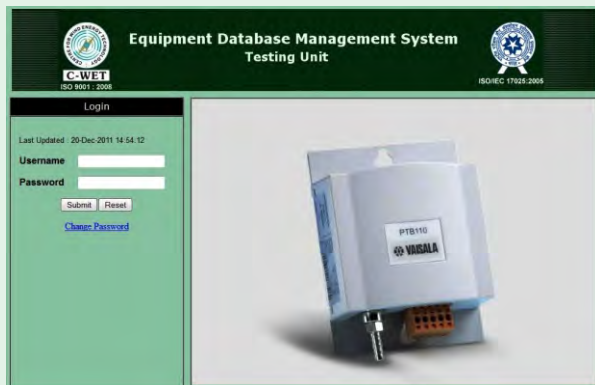
The testing facilities are certified as per the requirements of ISO 9001:2008 and accredited as per the requirements of ISO / IEC 17025:2005.

The unit contributes to the wind energy community by knowledge transfer through National and International training

programmes and by contributing technical papers to various National / International journals on a periodical basis.

Achievements

- ◆ An Inter Laboratory Comparison (ILC) for Power Curve Measurements has been completed as per the requirements of IEC 61400-12-1 between C-WET and NREL, USA under the project NREL-C-WET ROUND ROBIN 2011.
- ◆ An *Equipment Database Management System (EDMS)* has been developed, tested and deployed. This database management tool assists in the maintenance of the details regarding history, storage, calibration, transportation and deployment of all sensors / transducers and data acquisition systems. The deployment has been done in C-WET's server and is in use.



Screen shot of Equipment Database Management System (EDMS)

- ◆ The testing services of the unit confirms to the requirements of the Quality Management System Standard ISO 9001:2008 and has been accredited in accordance with the requirements of ISO / IEC 17025:2005 by National Accreditation Board for Testing and Calibration Laboratories (NABL), New Delhi.

Achievements by Unit Staff

S.A.Mathew, Scientist & Unit Chief

- ◆ Completed Master Degree in Engineering (Environmental) from Sathyabama University with first class (Distinction 9.0 CGPA).
- ◆ Completed a project on “Wind Resource Land Mapping” using WasP, Arc GIS and MCDA. The report has been finalized and submitted.
- ◆ Selected as a member for Technical Committee for the International Conference on Green Technology & Environmental Conservation (GTEC-2011) held during 15th -17th December, 2011 in association with Tamil Nadu Pollution Control Board (TNPCB), NSWAI and ISWA, organized by Sathyabama University and evaluated the technical papers received from Sathyabama University for presentation and publication during the conference.

Meetings Organized

- ◆ Mr. Philipp Kley and Mr. Sanjay Marathe of M/s. FEV India Pvt. Ltd., regarding the products which are useful to the wind energy sector.
- ◆ Mr. P. Chandramouli, Director and Mr. Subhash Babu of M/s. Garuda regarding discussions on measurements of Garuda 700 kW wind turbine on 25th November 2011.
- ◆ Mr. M.S. Bhoi, Manager of M/s. Elecon Engineering regarding discussions on finalization of test plan of Elecon 600 kW wind turbine on 28th February 2012.

- ◆ Mr. Subhash of Garuda regarding discussion on Type Testing of Garuda 1700 kW wind turbine on 12th March 2012.

Collaborations / Agreement

- ◆ An agreement was signed between C-WET and M/s. Elecon Engineering Company Ltd., for Type Testing of Elecon



Agreement between C-WET and M/s. Elecon Engg Company Ltd.

600 kW wind turbine on 6th September 2011 at Chettikurchi site, Kovilpatti Taluk, Tuticorin District.

- ◆ An agreement was signed between C-WET and M/s. Jyoti Ltd., for Type Testing of WIND JYOTI SE 850 56 / 70 kW wind turbine on 11th October 2011 at WTTS, Kayathar.



Agreement between C-WET and M/s. Jyoti Ltd.



WIND TURBINE RESEARCH STATION

C-WET established Experimental Wind Turbine Research Station (WTRS) at Kayathar, Thoothukudi District, Tamil Nadu with more than 20 years old 9 x 200 kW Wind Electric Generator's (WEG), 1 x 600 kW WEG and 1 x 2000 kW WEG for conducting R&D related activities, in addition to Type Testing facilities and small wind turbine performance testing facilities. This C-WET owned R&D infrastructure machines at Kayathar comprises first generation (200 kW) WEG's and latest generation (2000 kW variable speed) WEG. Strategic efforts are made to improve the machine efficiency with suitable controller by bringing minimum reactive power consumption in the first generation WEG's. While providing an excellent opportunity for practical valued

research with the well maintained research wind turbines, C-WET is also feeding the State's (Tamil Nadu) Electricity Grid with million units this year. This results in additional internal revenue generation for C-WET to sustain the activities of the organization.

Visitors to Research Station

- ◆ The Advisory Committee Members on Official Language of MNRE, New Delhi on 10th March 2012.
- ◆ C-WET's 8th International Training Course participants on 17th February 2012.
- ◆ 32 students and 4 staff members from D.M. & R Technical Training Institute, Tirumangalam, Madurai on 27th October 2011.



Welcoming the Members of Advisory Committee on Official Language of MNRE



LIFE Academy, Sweden Training participants visiting 2 MW R&D WEG



Visit of students from PSG College of Engineering



O&M of R&D wind farm at WTRS, Kayathar - Fixing of Generator Bearing

- ◆ 23 Delegates from Life Academy, Sweden on 24th October 2011.
- ◆ 35 Students and 3 staff members from NGN Engineering College, Chennai on 17th September 2011.
- ◆ 35 students and 3 staff members from Veltech Engineering College, Avadi, Chennai on 27th August 2011.
- ◆ 65 students and 4 staff members from Mamallan Engineering College, Chennai on 20th August 2011.
- ◆ 30 students and 2 staff members from PSG College of Engineering, Coimbatore on 6th August 2011.
- ◆ 40 students and 4 staff members from Sri Venkateswara Polytechnic College, Nammakkal on 5th August 2011.



STANDARDS & CERTIFICATION

Wind Energy Sector in India is growing in a large scale with introduction of more new wind turbine models with increased unit size and larger rotor diameter. Type Certification of wind turbines plays an active role to facilitate the orderly growth of wind energy sector. TAPS-2000 (amended), the Indian Certification Scheme for wind turbines, has been approved and issued by the Ministry of New and Renewable Energy

(MNRE). The Scheme has been prepared in line with requirements of International Standards viz., IEC Standards while taking into account of Indian external conditions.

Standards & Certification unit of C-WET is implementing TAPS-2000 (amended) for Certification of Wind Turbines. S&C unit has completed the renewal of Certificates of 3 wind turbine models.

Certification - Renewals Completed (2011-2012)

Sl.No.	Manufacturer's Name	Wind Turbine Model / Capacity	Validity
1.	M/s. RRB Energy Limited	V 39-500 kW with 47m Rotor	20.4.2012
2.	M/s. RRB Energy Limited	Pawan Shakthi - 600 kW	04.7.2012
3.	M/s. Southern Wind Farms Limited	GWL 225 / 225 kW	05.1.2013

Standards

S&C unit plays an active role in preparation of Indian Standards on Wind Turbines. Bureau of Indian Standards (BIS) has formulated Wind Turbines Sectional Committee (ET 42) for preparation of Indian Standards on Wind Turbines under the Chairmanship of the Executive Director, C-WET. In addition, BIS is involved in voting of draft IEC Standards to IEC Technical Committee on Wind Turbines (IEC TC 88). Being an active member of ET 42, S&C unit provides the technical support to BIS for preparation of Indian Standards as well as voting of draft IEC Standards. Presently, five numbers of draft Indian Standards are under process by BIS.

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 following four RLMM lists were issued by C-WET during the year 2011-12.

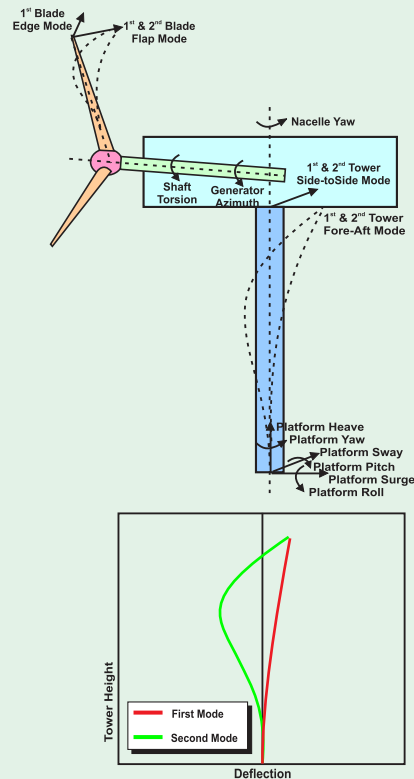
S.No.	RLMM List	Issued on
1.	RLMM Main List	22.06.2011
2.	Addendum – I to RLMM Main List	26.09.2011
3.	Appendix to RLMM Addendum - I List	30.11.2011
4.	Addendum – II to RLMM Main List	19.03.2012

Quality Management System

Certification services of C-WET are certified as per the requirements of ISO 9001: 2008 by Det Norske Veritas (DNV). Periodic Audit was successfully completed by DNV team. The continual improvement and maintaining the Quality Management System as per ISO 9001:2008 are ongoing.

Collaborations / Agreement

For the Collaborative area on “Aero-elastic Codes” under the MoU between C-WET and NREL, USA, Structural model of a wind turbine has been created by C-WET scientists using NREL Codes as well as commercially available industry recognized Aero-elastic Code. Further, interim report on the results of the Aero-elastic Codes has been made available to NREL, USA.



Overview Of Wind Turbine Modes



INFORMATION, TRAINING AND COMMERCIAL SERVICES

The Information, Training and Commercial Services (ITCS) unit, as a focal point for information dissemination and training programmes had a fruitful year 2011 - 12 executing training programmes, upgrading the infrastructure for good research environment in C-WET by providing IT and Training facilities and also undertaken several outreach activities reaching out to the public as well as industries to promote Wind Energy in the country. The following are the activities carried out during the year 2011 -12;

Training Programmes

ITCS unit had trained about 800 National and 200 International professionals through its National and International training programmes since 2004. During the year 2011 – 2012, the unit had successfully organized two National training and two International training courses with 154 national and 52 International participants. The programmes were highly acclaimed for course structure, intellectual level, hospitality and the organizing capabilities.

National Training Courses

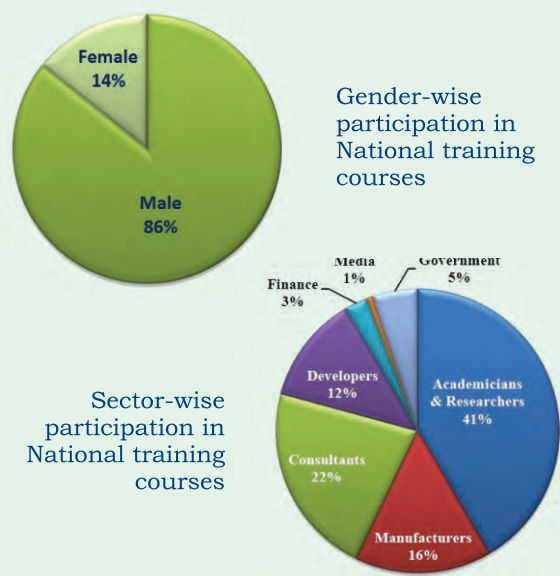
National training courses are of 3 days duration designed to orient the participants towards wind turbine technology starting from wind resource assessment to wind farm development including O&M, financial aspects and benefits. The lectures were delivered by C-WET scientists, industry, academic and other National experts. As part of the training course, all the participants were provided Course Material, the compilation of write-ups by the faculties. During this period, the unit had organized 10th and 11th National training

courses during May and December 2011 respectively. 154 participants from diverse background across the country underwent training and 2011-2012 saw increased number of student participants from colleges and universities which is a good sign of green vibrancy prevailing among the student community. There have been huge suggestions demanding frequent training courses and special training courses.

The chart shows year-wise participation in the National raining courses and the highest number of participation in the year 2011 resembling the increasing green awareness among the public.



The gender-wise and education wise participation are shown in the above charts.



Course evaluations are completed after all training to gather useful feedback from the participants. 87% of participants rated the overall training experience “Excellent” or “Good” and said the training provided necessary skills and confidence.

Tenth National Training Course

The unit had organized 10th National training course on “Wind Energy Technology” during 25th to 27th May 2011 with an objective to provide basic knowledge on Wind Turbine Technology and provided a platform to exchange views and experience with wind energy experts. The programme has provided comprehensive knowledge right from Wind Resource Assessment to Installation and Commissioning of wind farms along with technical and financial challenges.



Shri. Ramesh Kumar Khanna, I.A.S
inaugurating the course

The course was inaugurated by Shri. Ramesh Kumar Khanna, I.A.S., Principal Secretary to Government, Energy Department, Government of Tamil Nadu. The course was attended by 60 participants from dynamic mix of backgrounds, such as developers, manufacturers, academicians, utilities, SNAs etc. Dr. N. Lakshmanan, Project Director, Structural Engineering Research Centre (SERC), Chennai delivered the valedictory speech and distributed the certificate to the course participants.



Dr. N. Lakshmanan distributing the course certificate

Eleventh National Training Course

The 11th National Training Course on “Wind Energy Technology” was organized during 28th to 30th December 2011 with 93 participants across the country. This course attracted highest number of participation after rejecting many number of applications due to limited seating capacity and to provide quality training. The significant highlight of the course is the huge participation from students and research scholars; about 53 participants are students and research scholars.



Release of Course Material by dignitaries
during inaugural function

The course was inaugurated by Prof. Dr. C. P. Vendhan, Emeritus Professor, Ocean Engineering Department of Indian Institute of Technology (IIT) Madras, Chennai. As part of the course, Course Material has been brought out, which was released by the Chief Guest. The Course Material book is a ready reference study

material for the participants to revise their studies, when they will be back to working. The book will also be a tool to prepare themselves in advance during the training course and prepare for the next session/day. Prof. Dr. S. K. Bhattacharya, Head, Ocean Engineering Department of IIT Madras, Chennai was the Chief Guest for the Valedictory Function and distributed the course certificates to the participants.



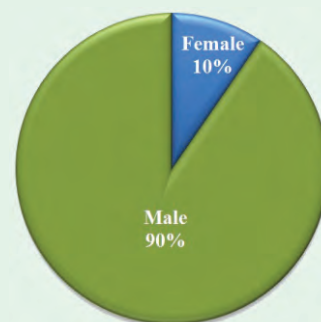
Prof. Dr. S. K. Bhattacharya distributing the course certificate

International Training Courses

International training courses are framed for 3-4 weeks with classroom lectures, visits to the wind farms and manufacturing facility with practical classes. About 45 lectures on topics starting from wind resource assessment to wind farm development along with financial and policy studies were covered during the course. New topics, including integration of wind energy with other renewable energy sources, small wind turbine design, solar energy applications and renewable energy for rural applications were launched during this period. The resource persons are drawn from C-WET, Industry, Academic and Utilities. During this period, about 52 participants across the continents have participated and the participants are mostly Government officials from Ministries. The participants are from African and Asian

countries where lack of human resource is hindering the diffusion of renewable energy sources. The feedbacks shown that about 96% of the participants rated the overall training experience “Excellent” or “Good” and said the training has provided confidence and employable skills. Gender-wise participation is shown in the chart.

During this period two International training courses were organized by the unit;



Gender-wise participants in International Training Course

Seventh International Training Course

7th International training course on “Wind Turbine Technology and Applications” was organized during 3rd – 26th August 2011 to address all aspects of Wind Power starting from Wind Resource Assessment to project implementation and Operations and Maintenance in a focused manner. The course was sponsored by Ministry of External Affairs (MEA), Government of India under ITEC/SCAAP programme and supported by Ministry of New and Renewable Energy (MNRE), Government of India. The course was attended by 26 participants from 17 different countries. The participants were from Afghanistan, Bhutan, Democratic Republic of Congo, Ecuador, Egypt, Ethiopia, Gambia, Iran, Laos, Maldives, Myanmar, Palestine, Sri Lanka, Sudan, Tanzania, Thailand and Trinidad and Tobago.

The training course was inaugurated by Shri. Sudeep Jain, I.A.S Chairman and Managing Director, TEDA.



Shri. Sudeep Jain, I.A.S inaugurating the course

During the training course, the International participants were taken to wind farms in and around Kanyakumari, Wind Turbine Research Station at Kayathar and wind turbine manufacturing facilities at Tada (ReGen Powertech Pvt. Ltd.), Gumidipoondi (Leitner Shriram manufacturing Ltd.) and Silvassa, Mumbai (Global Wind Power Ltd.).



Participants during practical training

Shri. R. Murugan, Managing Director, TANTRANSCO Ltd., was the Chief Guest of the Valedictory Function. He has distributed the course certificates to all the participants after his valedictory address.



Participants in front of C-WET Campus

Eighth International Training Course

8th international training course on “Wind Turbine Technology and Applications” was organized during 1st – 24th February 2012. This is a special course for African Countries sponsored by MEA, Government of India and Supported by MNRE, under India Africa Forum Submit. Twenty six participants from 11 African countries attended the course. The participants were from Burundi, Congo, Ethiopia, Mali, Mauritius, Mozambique, Niger, Nigeria, Sudan, Tanzania and Zimbabwe.

The course content for the training was very comprehensive syllabus with experts in various fields giving lectures and specific case studies. Practical training with wind resource assessment, instrumentation, Testing and R&D equipment was made available and factory visits to M/s. Suzlon



Participants during cultural visit

Energy Limited at Pondicherry & M/s. Leitner Shriram Manufacturing Limited at Gummidipoondi, Chennai and study visit to SERC were organized.

The training course was inaugurated by Shri K. P. Sukumaran, National Project Manager, UNDP, former Advisor, MNRE and former Executive Director, C-WET.



Shri K. P. Sukumaran inaugurating the course

The course structure and organization of training was highly appreciated by the participants. The participants were very much satisfied by the quality of lectures and hospitality they found in India and the feedback from the participants reflected the need for more number of training programmes like this frequently.

Dr. S. Iniyan, Professor and Director, Institute for Energy Studies, Anna University, Chennai was the Chief Guest for the Valedictory Function and he had been kind enough to distribute the course certificates to the participants.



Dr. S. Iniyan distributing the course certificate

Global Wind Day 2011 Celebration

C-WET has been celebrating Global Wind Day every year on June 15th since 2009. Quiz and painting competitions were organized among students invited from various schools in and around Chennai. As part of the Global Wind Day 2011 celebration, slogan writing contest on Wind Energy was organized for C-WET staff and the best three slogans were prized.

In the contest, 49 C-WET staff members participated and top 3 slogans were selected by the jury. The first prize was given for the slogan “Embrace the Wind, Experience the Power”, the second prize was awarded to the slogan “Wind can blow light, can glow Light..... Choose!” and third prize was given to the slogan “Windy Environment, Winning Environment”.



Dr. K. S. Dhathathreyan delivering the special talk

Dr. K. S. Dhathathreyan, Head of Centre for Fuel Cell Technology, Chennai was the Special Invitee on the occasion to deliver a special talk on “Sustainable Hydrogen Energy – Role of Wind Power”. The talk was well received by the participants and provided lots of information about how to interlink the Hydrogen and Wind Energy.

This year, the C-WET's Global Wind Day celebration not only focused on wind energy, but also looked at the environmental benefits of renewable energy and



Dr. K. S. Dhathathreyan distributing the prizes to the winners

other alternative energy sources such as Hydrogen. During the celebration, Dr. K. S. Dhathathreyan along with Dr. S. Gomathinayagam has distributed the prizes to the winners of slogan writing contest.

C-WET's Newsletter "PAVAN"



32nd Issue of PAVAN

ITCS Unit regularly publishing C-WET's Newsletter PAVAN and it is a quarterly wind energy newsletter published in bilingual (Hindi & English) by C-WET which disseminates information on C-WET's activities, wind energy news, technical articles and information on wind energy related events. During 2011 -12, ITCS unit had published four issues of PAVAN from 29th to 32nd 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 & services.

Prof. Anna Mani Information Centre

C-WET has the state-of-art library named after renowned meteorologist "Prof. Anna Mani" as Information Centre, which is established and maintained by ITCS unit. With more than 1600 books on renewable energy in general and wind energy in particular with allied subjects, includes books on energy and environment, sustainable development, all engineering disciplines, science, management and personality development.



C-WET's Library

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 300 technical reports and 300 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 shows list of available resources of library. It also has membership with leading libraries like IIT Madras, 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 on latest developments related to wind energy every month from all information resources.

C-WET's Bi-lingual Website

ITCS unit maintains the bilingual websites <http://cwet.res.in> and 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 and free quarterly newsletters



Home page of C-WET's Bilingual website

carrying latest developments and technical updates in the wind industry.

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.

C-WET - IWTMA Event

C-WET and IWTMA jointly organized a one day knowledge sharing seminar / lectures on "The Challenges and Opportunities in Indian State Grid System for Renewable Energy penetration" on 8th July 2011 at C-WET Conference Hall.



Participants during knowledge sharing session

Memorandum of Understanding

Centre for Wind Energy Technology (C-WET), Chennai, India and LIFE Academy, Kopmannagatan 2, SE - 652 Karlstad, Sweden have signed the Memorandum of Understanding (MoU) on 18th October 2011.

C-WET & LIFE Academy will jointly undertake the following activities without having any financial gain or financial implications:

- General information exchange.
- Training programmes.
- Mutual promotion & dissemination.
- Sharing of experience/expertise.
- Exchange of information and

materials and mutual assistance.

- Seminars and conferences
- Collaboration projects.
- Usage of infrastructure.
- Usage of Logo & name.
- Dispute resolution.

Participation in Exhibition

The unit had established stalls during exhibitions and trade fairs and demonstrated the activities and services of C-WET along with environmental benefits of harvesting wind energy. C-WET representatives took part in the following events and interacted with thousands of wind energy professionals, researchers, students and general public;

- ◆ “Wind Power India 2011” conference cum expo during 7th to 9th April 2011 at Chennai Trade Centre organized by IWTMA, WISE and GWEC.
- ◆ “World Environment Day” Celebration on 3rd June 2011 at Cognizant, MEPZ, Tambaram, Chennai.
- ◆ 99th Indian Science Congress Exhibition held during 3rd to 7th January 2012 at Bhubaneswar, Odisha.



C-WET Stall at 99th Indian Science Congress Exhibition at Bhubaneswar

- ◆ 3rd International Conference and Exhibition organized by Indian Wind Power Association (3 WE 20 by 2020)

during 5th – 7th February 2012 at CODISSIA, Coimbatore.



C-WET Stall at 3rd International Conference and Exhibition at Coimbatore

- ◆ International Conference and Expo on Renewable Energy (RENERGY 2012) held at Chennai Trade Centre, Chennai during 12th – 13th March 2012 organized by Tamil Nadu Energy Development Agency (TEDA).

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 and College students to visit the campus. During the period from April 2011 to March 2012, the following visits were coordinated by ITCS Unit. Shri P. Kanagavel, Scientist & Unit Chief (i/c) has made a presentation on wind energy and its status along with C-WET's activities & services during the visits and the campus facilities were also showcased.

- ◆ University of Strathclyde, Scotland visited on 4th April 2011. C-WET has hosted the students from 2nd to 17th April 2011 and arranged visits to events, institutions and industries dealing with wind energy.
- ◆ 20 Polytechnic Teachers visited as a part of the training on “Non-Conventional

Energy Sources” organized by National Institute of Technical Teachers Training and Research, (NITTTR), Chennai on 10th August 2011.

- ◆ 26 participants from 12 countries of LIFE Academy, Sweden as part of the International Training course on wind Power Development and Use - Regional Phase in India along with 3 coordinations on 18th October 2011 and Wind Turbine Testing Station, Kayathar on 23rd October 2011.
- ◆ 21 participants of LIFE Academy, Sweden as part of the International training course on Wind Power Development and Use - Regional Phase in India along with 3 co-ordinators on 29th February 2012.



LIFE Academy training participants

Student Visitors

- ◆ 30 students of ME - Energy Engineering and Solar Engineering Students from Institute for Energy Studies, Anna University, Chennai on 5th April 2011.
- ◆ 10 faculty members of Civil Engineering Department from Jerusalem College of Engineering, Chennai on 28th April 2011.
- ◆ 63 students of BE – Electrical and Instrumentation Engineering from Sathyabama University, Chennai on 21st July 2011
- ◆ 6 students from Tagore Engineering College, Chennai and 55 students from Central Institute of Technology, Assam, organized by The National Small Industries Corporation Limited (NSIC), Chennai on 13th July 2011.
- ◆ 63 students of BE – Electrical and Electronics Engineering from SRM University, Chennai on 29th September 2011
- ◆ 63 students of BE - Electrical & Electronics Engineering from Hindustan University, Chennai on 27th September 2011.
- ◆ 69 students of Electrical and Instrumentation Engineering from Sathya-bama University, Chennai on 9th September 2011.
- ◆ 60 students of Mechanical Engineering Department from VIT University, Chennai on 5th October 2011.
- ◆ 88 students of Electronics and Instrumentation Engineering Department from Hindustan Institute of Technology and Science, Padur, Chennai on 9th December 2011.
- ◆ 26 students of PG Diploma in Wind Power Development from Amrita University, Coimbatore on 11th January 2012.



Students during the Campus visit

- ◆ 65 students of Electrical & Electronics Engineering Department from Velammal Engineering College, Chennai on 19th January 2012.
- ◆ 67 students of Electrical & Electronics Engineering Department from Velammal Engineering College, Chennai on 20th January 2012.
- ◆ 65 students of Electrical and Electronics Engineering Department from Eswari Engineering College, Chennai on 12th February 2012.
- ◆ 67 students of Electrical & Electronics Engineering Department from Eswari Engineering College, Chennai on 14th February 2012.
- ◆ 77 students of Electrical and Electronics Engineering Department from Panimalar Institute of Technology, Chennai on 16th February 2012.
- ◆ 68 students of Electrical and Electronics Engineering Department from Muthammal Engineering College, Namakkal on 19th February 2012.
- ◆ 3 students of Electrical and Electronics Engineering Department from SRR Engineering College, Kanchipuram on 21st March 2012.
- ◆ 60 students of Electrical and Electronics Engineering Department from Hindustan University, Chennai on 23rd March 2012.
- ◆ 52 students of Electronics & Instrumentation Engineering Department from Sathyabama University, Chennai on 26th March 2012.
- ◆ 52 students of Electronics & Instrumentation Engineering Department from Sathyabama University Chennai on 28th March 2012.
- ◆ 52 students of Electronics & Instrumentation Engineering Department from Sathyabama University Chennai on 30th March 2012.



SOLAR RADIATION RESOURCE ASSESSMENT

As a part of the Jawaharlal Nehru National Solar Mission (JNNSM), MNRE sanctioned a project on “Solar Radiation Resource Assessment (SRRA)” to C-WET, Chennai with the following objectives.

- ◆ Assess the ground level solar radiation prelude to the preparation of Solar Atlas for the country.
- ◆ Establish Automatic Solar Radiation Monitoring Stations covering potential areas of the country.
- ◆ Establish a Central Receiving Station

(CRS) at C-WET to collect data automatically and remotely from the field solar radiation stations.

- ◆ Establish a calibration laboratory at C-WET for the calibration of solar radiation measuring equipments.

A SRRA cell has been established in C-WET with dedicated scientific and technical staff. Fifty one dedicated automatic SRRA stations have been established during the period 23rd May 2011 to 20th October 2011 in 10 States and 1 Union Territory under the program as detailed below.

SRRA sites with coordinates and date of commission

Sl. No	Station Name	Date of commission	Elevation (m amsl)	District	Latitude (°N)	Longitude (°E)
Andhra Pradesh						
1	Medak	15.09.2011	467	Medak	18°2'27.31"	78°15'58.68"
2	Chilakapalem	20.10.2011	87	Srikakulam	18°16'10.86"	83°48'33.55"
3	Rajahmundry	18.10.2011	94	East Godavari	17°3'52.7"	81°52'0.9"
4	Guruzala	17.10.2011	122	Guntur	16°33'46.5"	79°39'31.6"
5	Tirupathi	13.10.2011	190	Chittoor	13°37'37.4"	79°23'47.9"
6	Kadiri	14.10.2011	531	Ananthapur	14°6'34.5"	78°8'50.1"
Chhattisgarh						
7	Bilaspur	19.08.2011	267	Bilaspur	22°04'30.7"	82°11'03.4"
Gujarat						
8	Santalpur	02.07.2011	30	Patan	23°46'34.2"	71°10'34.6"
9	Bhogat	24.06.2011	14	Jamnagar	22°1'43.2"	69°15'40.0"
10	Jambua	25.06.2011	29	Vadodra	22°12' 56.34"	73°11' 24.82"
11	Vartej	01.08.2011	30	Bhavnagar	21°44'26.29"	72°4'16.35"
12	Kotada Pitha	29.07.2011	207	Amreli	21°56'51.37"	71°12'34.81"
13	Sadodar	05.08.2011	192	Jamnagar	22°03'03.8"	70°14'04.3"
14	Chandrodi	18.08.2011	74	Kutch	23°20'2.08"	70°38'14.5"
15	Gandhinagar	07.08.2011	61	Gandhinagar	23°9' 13.00"	72°40' 8.56"
16	Idar	13.08.2011	221	Sabarkantha	23°49' 47.5"	73°0' 10.8"
17	Tharad	15.08.2011	67	Banaskantha	24°22'38.2"	71°37'47.9"
18	Keshod	15.06.2011	61	Junagadh	21°16'29.0"	70°12'42.8"

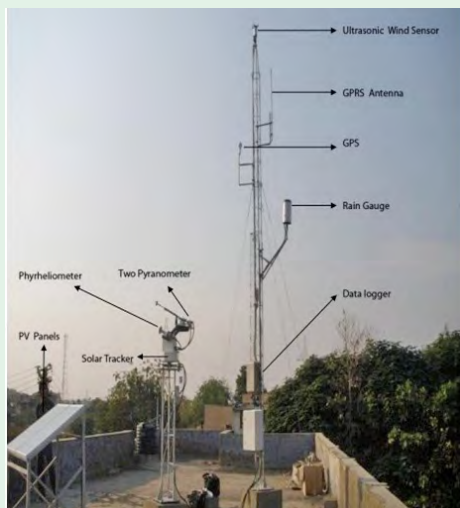
Sl. No.	Station Name	Date of commission	Elevation (m amsl)	District	Latitude (°N)	Longitude (°E)
Haryana						
19	Gurgaon(SEC)	20.10.2011	259	Gurgaon	28°25'31.2"	77°09'18.8"
Jammu & Kashmir						
20	Leh	23.08.2011	3252	Leh	34°08'24.5"	77°28'50.1"
Karnataka						
21	Bijapur	10.09.2011	567	Bijapur	16°50'48.5"	75°45'5.7"
22	Belgaum	04.09.2011	803	Belgaum	16°25'7.86"	74°47'35.15"
23	Bellary	29.08.2011	885	Bellary	14°54'14.74"	75°59'27.21"
24	Gulbarga	01.09.2011	478	Gulbarga	17°19'10.7"	76°51'16.4"
25	Chitradurga	20.09.2011	760	Chitradurga	14°12'56.3"	76°25'40.0"
Madhya Pradesh						
26	Neemuch	30.09.2011	501	Neemuch	24°28'43.09"	74°52' 11.0"
27	Mandsaur	31.08.2011	461	Mandsaur	24°04'25.7"	75°01'49.5"
28	Rajgarh	14.09.2011	412	Rajgarh	23°59'12.6"	76°43'38.8"
Maharashtra						
29	Pandharpur	05.08.2011	480	Solapur	17°39'19.92"	75°22'9.7"
30	Karad	11.08.2011	599	Satara	17°18'34.1"	74°11'10.0"
31	Shegaon	25.07.2011	288	Buldana	20°46'47.91"	76°40'45.12"
Pondicherry						
32	Pondicherry	24.06.2011	36	Pondicherry	11°57'35.78"	79°48'37.80"
Rajasthan						
33	Mathania	10.06.2011	271	Jodhpur	26°16'15.8"	72°59'7.2"
34	Jodhpur(IIT)	04.06.2011	233	Jodhpur	26°16' 15.8"	73°02'04.8"
35	Pokhran	16.06.2011	293	Jaisalmer	26°54'58.4"	71°55'39.5"
36	Amarsagar (Jaisalmer)	23.06.2011	288	Jaisalmer	26°56'30.89"	70°52'27.28"
37	Phalodi	28.05.2011	242	Jodhpur	27°7' 03.6"	72°20' 43.0"
38	Bap (Bodana)	30.06.2011	168	Bikaner	27°36'21.24"	72°6'31.27"
39	Balotra	27.06.2011	126	Barmer	25°48'19.35"	72°14'12.95"
40	Bagora	24.06.2011	91	Jalore	25°12'50.6"	72°1'03.3"
41	Ratangarah (Churu)	30.06.2011	312	Churu	28°4'56.31"	74°36'0.39"
42	Ajmer	15.06.2011	501	Ajmer	26°24'01.6"	74°39'38.2"
43	Sirohi	22.06.2011	362	Sirohi	24°51'57.8"	72°49'58.0"
44	Kota	17.06.2011	304	Kota	25°08'27.3"	75°48'35.1"
Tamil Nadu						
45	Chennai(CWET)	28.05.2011	1	Kancheepuram	12°57'21.79"	80°12'59.75"

Sl. No.	Station Name	Date of commission	Elevation (m amsl)	District	Latitude (°N)	Longitude (°E)
Tamil Nadu						
46	Karaikudi	23.05.2011	101	Sivagangai	10°5'08.48"	78°47'46.82"
47	Ramanatha-puram	03.06.2011	10	Ramanatha-puram	9°22'11.44"	78°46'11.92"
48	Kayathar	10.06.2011	102	Tuticorin	8°56'42.50"	77°43'24.12"
49	Trichy	29.07.2011	87	Trichy	10°45'35.47"	78°48'45.33"
50	Erode	03.08.2011	272	Erode	11°16'12.00"	77°36'15.29"
51	Vellore	23.07.2011	231	Vellore	12°58' 26"	79°9'32"

At each of the SRRA station, the following instruments are used for measuring the solar and meteorological parameters.

Sl.No.	Instruments	Parameters / Use
1	Pyranometer	Global Solar Radiation (W/m^2)
2	Shaded Pyranometer	Diffuse Solar Radiation (W/m^2)
3	Pyrheliometer	Direct Solar Radiation (W/m^2)
4	Solar Tracker (Two Axis Automatic solar Tracker with shading disc)	For tracking Sun
5	Ultrasonic Wind Sensor	Wind Speed (m/s) and Wind Direction (deg)
6	Rain Gauge (Tipping Bucket)	Rain Accumulation (mm)
7	Pressure sensor	Atmospheric Pressure(mb)
8	Temperature and Relative Humidity sensor	Temperature (°C) and Relative Humidity (%)
9	GPS	For synchronization of Sun Tracker with Sun movement
10	Data logger and Modem	For collecting data samples from the sensors, averaging and transferring the same to CRS at C-WET, Chennai
11	GPRS	To transmit the data through mobile SIM cards to CRS at C-WET, Chennai
12	Solar PV Panel	For charging battery for powering SRRA stations
13	External Battery	For storage of SPU Power

At each SRRA station, data is sampled at every one second and averaged over one minute and transmitted every ten minutes to the CRS installed at C-WET. A typical photograph of the SRRA station is shown in the picture below.



SRRA Station



Level-1 & Level-2 Servers at CRS

Central Receiving Station (CRS)

SRRA Unit has established a Level-1 server for collection of raw data every 1 minutes from all the 51 SRRA stations. A level-2 server has also been established for performing quality check and generation of reports on daily/monthly basis.



Training Program at Jodhpur, Rajasthan



Training Program at C-WET, Chennai

Quality Assurance

To ensure the quality and accuracy of the data transmitted to CRS at C-WET, through GPRS, proper monitoring of the data on a daily basis and regular maintenance and preventive visits are being undertaken to each SRRA station. To make the SRRA data user and investor friendly, the Ministry/ C-WET has entered into an agreement with GIZ, New Delhi under Indo-German collaboration to assess the quality of the data, generate automatically daily and monthly reports after analyzing the raw data. The project has been named as SolMap Project, under which the German experts have provided algorithms and trained C-WET staff on data analysis, quality check, and generation of reports.



INVITED LECTURES DELIVERED BY C-WET STAFF IN CONFERENCES AND SEMINARS

Dr. S. Gomathinayagam

Executive Director

- ◆ “Wind Power: Infirmity Or Sustainability?” organized by RENERGY 2012 at Chennai Trade Centre on 12th March 2012.
- ◆ Invited talk in the International Conference on RE Resources for 21st century- Amrita College of Engineering, Coimbatore on 9th March 2012.
- ◆ “Wind power development in India - way forward” in the Regional Phase of the International training course on "Wind Power Development and Use" organized by LIFE Academy, Sweden at Hotel Raj Park, Chennai on 29th February 2012.
- ◆ “Impact of Wind Energy in today's overall Indian Energy Scenario” at National Symposium on Energy Resources, Environmental Impacts & Industrial Waste Management at Sri Venkateswara University, Tirupati on 27th February 2012.
- ◆ “Offshore Wind Energy Turbine Technology” at IIT Madras at Department of Chemical Engineering on 21st February 2012.
- ◆ “Recent Trends in Wind Energy Technology” at Cape Institute of Technology - Levingipuram for the One day National Seminar on Opportunities and Challenges in Renewable Power Generation” on 10th February 2012.
- ◆ “Wind Power Technology and Development” at the One day Seminar on “Recent Trends and Development in Wind Energy organized by Hindustan University, Chennai on 25th January 2012.
- ◆ “Communal Harmony” in the Communal Harmony Fortnight Celebration of Audit & Accounts Department, Chennai on 2nd September 2011.
- ◆ “Leveraging the latest technological advancement to enable cost-effective offshore wind power generation” in the Renewcon-2011 conference at Mumbai on 29th September 2011.
- ◆ “Wind Energy Awareness” in the 5th Meeting of Board of Research organized by St. Peter's University on 22nd August 2011.
- ◆ “New Horizons for Wind Potential & Resource Assessment” in the Wind Power India – 2011 Conference and Exhibition at Chennai Trade Centre on 8th April 2011.
- ◆ “Wind Energy Program: An Overview” in the National Seminar on “Green Energy” organized by IITA-Allahabad and Rajiv Gandhi Institute of Information Technology, Amethi on 15th April 2011.
- ◆ “Wind Power Mitigates Power-cuts: Infirmity or Sustainability” organized by Association of Consulting Civil Engineers (India), Chennai on 25th June 2011.
- ◆ “Wind Power Development in India and Abroad” in the Faculty Development Programme organized by Amrita College of Engineering, Coimbatore on 30th June 2011.

Research & Development Unit

Rajesh Katyal, Scientist & Unit Chief

- ◆ Presentation on C-WET activities and Hindi implementation works carried out in C-WET at WTRS, Kayathar on 10th March 2012 to MNRE's sub-committee on Official Language.
- ◆ “Small Wind Turbine Testing and Hybrid System” in the Workshop on Renewable Energy organized by Sai Ram Engineering College, Chennai on 24th February 2012.
- ◆ Power Point presentation on C-WET activities and Hindi implementation works carried out in C-WET at Taj Coramandal Hotel, Chennai, on 14th February 2012 for the Parliamentary Sub-Committee on Official Language – Hindi.
- ◆ “C-WET Perspective - Wind Power in India and Way-forward for Offshore Development” in the 3rd Annual Conference organized by Power line, at Mumbai on 21st & 22nd November 2011.
- ◆ “Optimization of Wind Turbine Lattice Towers” in the International Conference: on WEIT-2011 organized by National Institute of Technical Teacher Training and Research (NITTTR), Bhopal on 13th October 2011 at Bhopal.
- ◆ “Small Wind Turbine Testing - Need and Knowhow” for the training programme on “Small Wind Turbines and Hybrid Systems: Opportunities and Challenges” organized by WISE, Pune on 12th October 2011.
- ◆ “Testing and Empanelment of Small Wind Aero-generator” and attended the “Interaction with Stakeholders” as Special Invitee organized by WISE, Pune on 12th October 2011.

- ◆ “Indian Experience on Small Wind Turbine Testing and Empanelment” at an International conference “Wind Power India 2011” organized by WISE/IWTMA at Chennai on 8th April 2011.

Deepa Kurup, Scientist

- ◆ “Grid Integration of Wind Turbines” at Hindustan University, Chennai on 25th January 2012.

Wind Resource Assessment Unit

Dr. E. Sreevalsan, Scientist & Unit Chief

- ◆ “Wind Energy” in INSPIRE Internship programme Sponsored by Department of Science and Technology at Sacred Heart College, Thevara, Ernakulam, Kerala on 12th January 2012.
- ◆ “Wind Resource Assessment” for PG Diploma - WRA students in Amrita Vishwa Vidyapeetham, Coimbatore on 24th November 2011.
- ◆ “Wind Energy” at a seminar on “Creating awareness on green energy in Railway” at Southern Railway Head Quarters Office, Chennai on 26th May 2011.

K.Boopathi, Scientist

- ◆ “Social Impact of Wind Energy Technology” in the National Symposium held at Davangere University, Karnataka on 20th March 2012.
- ◆ Chief Guest for Technical Symposium STROKE 2011 and presented a paper on “Emerging Trends in Wind Energy at Arulmigu Meenakshi Amman College of Engineering, Kanchipuram on 23rd September 2011.
- ◆ “Wind Energy Applications” to Southern State Polytechnic Lectures at NITTTR, Taramani, Chennai on 9th August 2011.
- ◆ “Wind as an alternative source of energy” at Indian Metrological Department (IMD), Chennai on 23rd May 2011.

Wind Turbine Testing Unit

S.A.Mathew, Scientist & Unit Chief

- ◆ Prospects of Wind Energy in India to the visitors from Bureau of Energy Resources, Department of State Washington D.C and had a brief discussion on the subjects at the seminar hall of C-WET on 1st March 2012.
- ◆ “Quality Aspects of the Testing Unit” during the meeting of the Sub-Group on 'Wind Power' of the working group on New and Renewable Energy for the 12th Five Year Plan (2012-2017) held on 6th June 2011 under the Chairmanship of Joint Secretary, MNRE.
- ◆ “Wind Turbine Testing” for the two Research Scholars from Scotland under the Indo-Scotland Students Exchange programme held at Conference Hall of the C-WET, Chennai during 4th to 17th April 2011.
- ◆ “Overview for Wind Turbine and Applications” at Pondicherry Engineering College, Pondicherry on 21st March, 2011.

M.Anvar Ali, Scientist

- ◆ “Instrumentation in a Wind Turbine” conducted by a Science Club during their 122nd Science Club Meet at Chemical Sciences Auditorium, University of Madras AC Tech Campus, Chennai on 11th June, 2011.

Wind Turbine Research Station

A. Mohamed Hussain, Scientist & Unit Chief

- ◆ “Recent Trends in Renewable Energy Sources and its Applications” in the one day National Seminar organized by KLN Engineering College, Shivaganga on 30th March 2012.

Standards & Certification Unit

A. Senthil Kumar, Scientist & Unit Chief

- ◆ “Wind Turbine Certification Experience in India” during the workshop on “Design, Testing and Certification of Wind Turbines” in the “Wind Power India 2011-International Conference and Exhibition” at Chennai on 9th April 2011.

S. Arulselvan, Assistant Engineer

- ◆ “Wind Turbine Technology” at International Conference on “Renewable Energy Technologies”, jointly organized by Solar Energy Society of India, Coimbatore local Chapter and Department of Electrical and Electronics and School of Energy of PSG College of Technology, Coimbatore in association with W2E, USA at Coimbatore on 15th December 2011.
- ◆ “Wind Turbine Technology” as part of the one day seminar on “Green Energy for Empowering India” held at United Institute of Technology, Coimbatore on 14th September 2011.
- ◆ “Requirement of Control and Protection System for Wind Turbines” at Hindustan University, Kelambakkam, Chennai on 25th January 2012.

Information Training &

Commercial Services Unit

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

- ◆ “Wind Energy: at a glance” in the One day seminar on Non- Conventional Energy Sources “SUN AIRGETIC 2012” organized by Social Science Department of Mohammed Sathak College of Arts and Science, Sholinganallur, Chennai on 29th February 2012.
- ◆ “Role of C-WET for Wind Power

Development” in the Regional Phase of the International training course on “Wind Power Development and Use” organized by LIFE Academy, Sweden at C-WET, Chennai on 29th February 2012.

- ◆ “Wind Energy System” in the “Kurukshetra 2012”, the International Techno Management Fest organized by College of Engineering, Guindy, accredited by UNESCO, organized by the Institute of Energy Studies, Anna University, Chennai on 4th February 2012.
- ◆ “Overview of the Development of Renewable Energy in India” in the Regional Phase of the International training course on “Wind Pwer Development and Use” organized by LIFE Academy, Sweden at Hotel Raj Park Chennai on 17th October 2011.
- ◆ Word Wind Energy Research Growth Analysis: A Scientometric Study in the 2nd International Conference on Wind Energy - Trends and Issues (WETI) - 2011 held at NITTTR, Bhopal during 12th - 14th October 2011.
- ◆ “Energy & Environment for Knowledge Society” in the UGC Refresher Course organized by UGC Academic Staff College and co-ordinated by the Department of Library & Information Science, Bharathidasan University, Trichy at UGC Academic Staff College, Kahajamalai Campus, Bharathidasan University, Tiruchirapalli on 19th September 2011.

Solar Radiation Resource Assessment Unit

Dr. G. Giridhar, Scientist & Unit Chief

- ◆ Application of Solar Energy for Institutions by Thermax Limited, at

Hotel Benz Park, Chennai on 2nd March 2012.

- ◆ “Solar Energy” at Mohammed Sathak College, Chennai on 29th February 2012.
- ◆ “Solar Power Systems” International Techno-Management Fest, College of Engineering, Guindy, Chennai on 4th February 2012.
- ◆ “Solar Energy Application” in the Conference on Marketing of Renewable Energy Products by NERD Society at Madurai during 15th - 18th December 2011.
- ◆ “Indian Solar Thermal Market – Policies and Incentives” Inter Solar Meet at Mumbai on 13th December 2011.
- ◆ “Brainstorming Meet on the Establishment of National Centre for Atmospheric Technology” at NIOT, Chennai on 12th December 2011.
- ◆ World Ozone Day at Tamil Nadu Science & Technology, Guindy, Chennai on 16th September 2011.
- ◆ International Conference on Bio-Medical Instrumentation, Engineering in Environmental Management at Karpaga Vinayaga College, Chennai on 22nd July 2011.
- ◆ “Scenario of Renewable Energy Resource in India”. Role of MNRE, GOI, at NIT Calicut on 10th June 2011.
- ◆ “National Level Seminar on Renewable Energy” at NEC, Kovilpatti by MNRE on 20th May 2011.

R. Sasi Kumar, Scientist

- ◆ Solar Radiation Resource Assessment in the 3rd CSP India Today submit at Gurgaon on 14th March 2012.

The following staff delivered lectures(s) in National and International Training courses organized by C-WET

**10th National Training Course on “Wind Energy Technology”
held during 25th - 27th May 2011**

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

11th National Training Course on “Wind Energy Technology” held during 28th - 30th December 2011

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

7th International Training course on “Wind Turbine Technology and Applications” held during 03rd - 26th August 2011

No	Title	Speakers
1	• Wind Energy Conversion Technology and Power Generation • Wind Turbine Tower Concept	Dr. S. Gomatinayagam Executive Director
2	• Wind Turbine Foundation • Small Wind Turbine Testing and Wind – Solar Hybrid Systems	Rajesh Katyal Scientist & Unit Chief, R&D
3	• Design principles of small wind turbines	J. C. David Solomon Scientist, R&D
4	• Grid Integration of Wind Turbine	Deepa Kurup, Scientist, R&D
5	• Wind Resource Assessment Techniques • Design and Layout of Wind Farms	Dr. E. Sreevalsan Scientist & Unit Chief, WRA
6	• Siting Guidelines for Wind Measurements • Monitoring Station Instrumentation and Installation	R. Sasikumar, Scientist. WRA
7	• Wind Resource Assessment by using Remote Sensing Instruments • Wind Turbine Components	K. Boopathi, Scientist, WRA
8	• Measurement parameters and Data Analysis	G. Arivukkodi Junior Engineer, WRA
9	• Wind Turbine Testing & Measurement Techniques • Power Curve Measurements	S. A. Mathew Scientist & Unit Chief, WTT
10	• Instrumentation for Wind Turbine Testing • Safety and Function Testing	M. Anvar Ali, Scientist, WTT
11	• Indian Government Policies, schemes and legal frameworks	A. Mohammed Hussain, Scientist & Unit Chief, WTRS
12	• Type Certification of Wind Turbines	A. Senthil Kumar Scientist & Unit Chief, S&C
13	• Design aspects of Wind Turbine Gearbox	N.Raj Kumar, Scientist, S&C
14	• Design aspects of Wind Electric Generators • Design requirements of Control and Protection System	S. Arulselvan Junior Engineer, S&C
15	• Environmental aspects of Wind Turbine Technology • Role of C-WET in Wind Energy Development	P. Kanagavel Scientist & Unit Chief i/c, ITCS
16	• Scenario of Solar Energy Resources in India	Dr. G. Giridhar Scientist & Unit Chief, SRRA

8th International Training Course on “Wind Turbine Technology and Applications’ Specially for African countries held during 01st – 24th February 2012

No	Title	Speakers
1	• Wind Energy Conversion Technology and Power Generation • Wind Turbine Tower Concept	Dr. S. Gomatinayagam Executive Director
2	• Wind Turbine Foundation • Small Wind Turbine Testing and Hybrid Systems	Rajesh Katyal Scientist & Unit Chief, R&D
3	• Drive Train Concepts	J. C. David Solomon Scientist, R&D
4	• Grid Integration of Wind Turbine	Deepa Kurup, Scientist, R&D
5	• Wind Resource Assessment Techniques • Design and Layout of Wind Farms • Offshore Wind Energy: An overview	Dr. E. Sreevalsan Scientist & Unit Chief, WRA
6	• Wind Resource Assessment by using Remote Sensing Instruments • Wind Turbine Components • Forecasting of Wind and Energy Production	K. Boopathi, Scientist, WRA
7	• Siting Guidelines for Wind Measurements • Monitoring Station Instrumentation and Installation	A. Hari Bhaskaran, Scientist
8	• Measurement Parameters and Data Analysis	G. Arivukkodi Junior Engineer, WRA
9	• Wind Turbine Testing & Measurement Techniques • Power Curve Measurements	S. A. Mathew Scientist & Unit Chief, WTT
10	• Safety and Function Testing	M. Anvar Ali, Scientist, WTT
11	• Instrumentation for Wind Turbine Testing	M. Saravanan, Scientist, WTT
12	• Indian Government Policies, Schemes and Legal Frameworks	A. Mohammed Hussain Scientist & Unit Chief, WTRS
13	• Type Certification of wind turbines and overview of Design Requirements as per IEC 61400 - 1	A. Senthil Kumar Scientist & Unit Chief, S&C
14	• Design aspects of Wind Turbine Gearbox	N. Raj Kumar, Scientist, S&C
15	• Wind Electric Generators & Types	A. G. Rangaraj, Scientist, S&C
16	• Design requirements of Control and Protection System for Wind Turbines	S. Arulselvan Assistant Engineer, S&C
17	• Wind Energy Development in India • Environmental aspects of Wind Turbine Technology • Role of C-WET in Wind Energy Development	P. Kanagavel Scientist & Unit Chief (i/c) ITCS
18	• Wind - Solar Hybrid Systems	Dr. G. Giridhar Scientist & Unit Chief, SRRA Cell

SEMINARS / CONFERENCES / TRAININGS / MEETINGS ATTENDED BY C-WET STAFF

Dr.S.Gomathinayagam

Executive Director

- ◆ Chief Guest for the Work Shop on Recent Trends in RE organized by Institute for Energy Studies, Anna University, Chennai on 3rd March 2012.
- ◆ Chaired the Technical Committee on Offshore held at C-WET on 2nd March 2012.
- ◆ Discussion on Parliamentary Standing Committee Meeting and Detailed plan for reassessment of WRA at 100 m at MNRE on 1st March 2012.
- ◆ TEDA Press Meet on RENERGY 2012 Conference at Chennai on 29th February 2012.
- ◆ Offshore Technical Committee meeting at C-WET on 21st February 2012.
- ◆ Tamil Nadu Scientists Awards Committee at Directorate of Technical Education (DOTE), Chennai on 20th February 2012.
- ◆ “Environment Control-Action Plan” meet organized by Tamil Nadu Pollution Control Board, Chennai on 17th February 2012.
- ◆ 60th Governing Body Meet - TEDA at Chennai on 16th February 2012.
- ◆ Chaired the Session on “WTG Technology” in the 3rd International Wind Conference and Exhibition WE20 by 2020 at Codissia Trade Fair Complex, Coimbatore during 5th - 7th February 2012.
- ◆ Clean Energy Ministerial Conference meet at India Habitat Centre, Delhi on 1st February 2012.
- ◆ Keynote Address in the International Conference on Wind Energy Trends and Issues WETI-2011, NITTTR, Bhopal on 12th October 2011.
- ◆ Discussion at CSIR-SERC, Chennai on NMITLI project review meeting on “The next generation wind power technology: Contra-Rotor Wind Turbine (CRWT) system” on 3rd November 2011.
- ◆ 12th Clean Energy Plan at Secretariat, Government of Tamil Nadu on 28th October, 2011 and in Sub Group Committee on Wind at Tamil Nadu Energy Development Agency (TEDA), Chennai on 4th November 2011.
- ◆ VII Executive Committee of Centre for Energy Studies at Anna University, Chennai on 8th November 2011.
- ◆ Invited Panelist from India, for NREL - IRENA workshop in Renewable Energy Technology in Golden, Colorado in USA during 21st - 23rd November 2011.
- ◆ Industrial Exemption Committee meeting by Land Reforms Department Tamil Nadu Government at Chennai on 2nd December 2011.
- ◆ Invited Panelist Power Summit-2011 Wind Session on “Vision to Reality 65.2 GW Wind power installed by 2020” at New Delhi conducted by Bloomberg UTV.
- ◆ Doctoral Committee Meeting (Ph.D.) for Shri. P. Saravanan at Madras Institute of Technology Campus, Anna University, Chennai on 17th December 2011.
- ◆ Invited member in the “Clean Energy – Policy Formulation Meeting” at Secretariat, Chennai organized by

Government of Tamil Nadu on 15th July 2011.

- ◆ Inaugural speech in the 2nd International Conference on Sustainable Energy and Intelligent System SEISCON-2011” organized by Dr. MGR Educational and Research Institute – University, Chennai on 20th July 2011.
- ◆ Chaired as moderator (Panel discussion) in the National Energy Investment Summit at New Delhi organized by M/s. Naseba, Bangalore on 21st July 2011.
- ◆ Member in the 1st Steering Committee Meeting of “NMITLI Projects” organized by CSIR-SERC, Chennai on 2nd August 2011.
- ◆ Preliminary discussion on “the New Business Proposal” had with officials from Indo-Japan Chamber of Commerce on 4th August 2011.
- ◆ 4th Executive Committee Meeting of “CASR” organized by Anna University, Chennai on 9th August 2011.
- ◆ Chaired as distinguished Chairperson in the 5th Renewable Energy India 2011 – Expo and “Wind Resource Assessment and Forecasting: backbone to return on investment – Panel Discussion” at New Delhi on 10th August 2011.
- ◆ “Working Group Meeting” organized by Indo-Japan Chamber of Commerce on 17th August 2011.
- ◆ Participated as member in the “Indo-Mauritius Joint Working Group Meeting on Energy” at MNRE, New Delhi on 1st April 2011.
- ◆ Chief Guest in the “10 Graduation Day” organized by Park College of Engineering, Coimbatore on 2nd April 2011.
- ◆ Invited member in the “Clean Energy - Policy Formulation Meeting” at Secretariat, Chennai organized by Government of Tamil Nadu on 5th April 2011.
- ◆ “Indo-Denmark Joint Working Group Meeting” at C-WET on 6th April 2011.
- ◆ Chaired as Panel Member in the “Wind Power India – 2011” and delivered a lecture on “HR Challenges & Employment Creation - Panel Discussion” at Chennai Trade Centre, Chennai on 9th April 2011.
- ◆ First Meeting of the “Sub-Group on Wind Power – for preparation of 12th Five Year Plan” at MNRE, New Delhi on 23rd May 2011.
- ◆ Chief Guest in the “Diploma Award Function” organized by PSG College of Engineering & Technology, Coimbatore on 26th May 2011.
- ◆ 2nd Meeting of the “Sub-Group on Wind Power – for preparation of 12th Five Year Plan” at MNRE, New Delhi on 6th June 2011.
- ◆ Special address in the “Global Wind Day - 2011 Celebration” organized by C-WET and participated in the inaugural function of “Flagged-off the Signature Campaign – Awareness of Wind Energy” at Marina Beach, Chennai organized by IWTMA on 15th June 2011.
- ◆ 3rd Meeting of the “Sub-Group on Wind Power – for preparation of 12th Five Year Plan” at MNRE, New Delhi on 18th June 2011.
- ◆ One day Workshop on “*Revitalizing Wind Energy Potential: Technology, Economics and Policy*” organized by C-STEP, Bangalore on 22nd June 2011.

- ◆ Parliamentary Standing Committee on Energy & a meeting on “Re-assessment of wind potential in India” at MNRE, New Delhi on 27th June 2011.

Research & Development Unit

Rajesh Katyal, Scientist & Unit Chief

- ◆ 28th Governing Council Meet at MNRE, New Delhi on 15th March 2012.
- ◆ Selection Committee for consideration of appointment of Project Scientific Assistant and Project Technician at NIOT, Chennai on 13th March 2012 as a Member of the Committee.
- ◆ Steering Committee meeting on MNITLI 25 kW “Contra Rotor Wind Turbine at SERC, Chennai on 13th March 2012.
- ◆ Offshore Technical Committee meeting at C-WET on 2nd March 2012.
- ◆ Chief Guest for the Engineers Day celebration at KCG College of Technology, Chennai on 15th September 2011
- ◆ Scotland Research Scholar meeting at C-WET on 4th April 2011.
- ◆ Joint Working Group of Indo-Danish Cooperation held at C-WET on 6th April 2011 and briefed the forum on the Grid Integration issues related to Indian context.

J.C.David Solomon, Scientist

- ◆ 3rd International Wind Conference and Exhibition held at CODISSIA Trade Fair Complex, Coimbatore during 5th - 7th February 2012.

Wind Resource Assessment

Dr. E. Sreevalsan, Scientist & Unit Chief

- ◆ Parliamentary Standing committee meeting held at Ernakulam, Kerala on 6th January 2012.

- ◆ Scientists from Lawrence Berkeley National University, USA regarding issues on “Wind power development in India” at MNRE, New Delhi on 6th February 2012.
- ◆ Work shop on “Action Plan for Comprehensive Renewable Energy development in Tamil Nadu” organized by WISE, Pune” at Narmada Hall, Hotel Courtyard Marriott, Chennai on 18th November 2011.
- ◆ “Establishment of wind monitoring stations in Orissa” at OREDA, Bhubaneswar on 16th November 2011.
- ◆ “Renewable Energy Generation data management” at MNRE, New Delhi on 4th November 2011.
- ◆ Group discussion on the topic of “Wind Resource Assessment - An Indian Experience” in Dhaka, Bangladesh in a workshop sponsored by USAID/SARI/ Energy on “Wind Power Project Development Practical Approaches to Launching Sustainable wind projects” on 17th - 20th October 2011.
- ◆ Wind farm development at Guledagudda in Karnataka at NTPC, New Delhi on 11th October 2011.
- ◆ Governing Council meeting at MNRE, New Delhi on 23rd September 2011.
- ◆ “Wind farm project in Kerala” along with M/s. NTPC, New Delhi and ANERT, Trivandrum at Secretariat, Trivandrum on 2nd August 2011.
- ◆ Training Program for Mi-Power software has been conducted by M/s. PRDC, Bangalore at Power Research and Development Consultants Pvt. Ltd. (PRDC), Bangalore during 11th - 15th July 2011.

- ◆ First meeting of the Sub-Group on 'Wind Power' of the Working Group on New and Renewable Energy for the 12th five year plan (2012-17) held at MNRE, New Delhi on 23rd May 2011.
- ◆ Meeting with Dr. Balakrishnan Nair in connection with preparation of offshore Wind Resource Map of India held at INCOIS, Hyderabad on 16th May 2011.
- ◆ Review meeting of the progress of implementation of solar and wind energy activities in Andhra Pradesh held at NEDCAP, Hyderabad on 16th May 2011.

K.Boopathi, Scientist

- ◆ Governing Council meeting at MNRE, New Delhi on 15th March 2012.
- ◆ Research Council meeting (RC) at C-WET on 8th March 2012.
- ◆ 2nd Off-shore Technical Committee meeting held at C-WET on 2nd March 2012.
- ◆ Wind Farm Development at Idukki district in Kerala organized by ANERT, Trivandrum at Idukki on 14th October 2011.

A. Hari Bhaskaran, Scientist

- ◆ 2nd Off-shore Technical Committee meeting held at C-WET on 2nd March 2012.
- ◆ High level meeting held at OREDA, Bhubaneswar, Orissa to discuss on the proposed project "WRA in Orissa" on 18th October 2011.

Wind Turbine Testing Unit

S. A. Mathew, Scientist & Unit Chief

- ◆ "The Challenges and Emerging Technologies in Steel for Wind Turbine Towers" organized by IWTMA and ESSAR held at

Mumbai, Hazira on 26th August, 2011.

- ◆ "Wind Energy Grid Integration" organized by TNEB and PR & DC "held at TNEB office, Chennai on 12th October 2011.
- ◆ "Finance for Non Finance Officials / Managers" organized by Jaipur Productivity Centre at Hotel Delmon, Goa from 14th -18th November 2011.
- ◆ Workshop in collaboration with International Energy Agency (IEA) /MNRE on "Grid Interaction of Variable Renewable" held at Magnolia Hall, India Habitat Centre, New Delhi on 9th September 2011.

M.Anvar Ali, Scientist

- ◆ "Wind Energy Grid Integration" organized by TNEB and PR & DC "held at TNEB office, Chennai on 12th October 2011.
- ◆ "Sustainable Energy for Economic Development" conducted / organized by the Southern India Chamber of Commerce & Industry (SICCI) held at Hotel Le Royal Meridian, Chennai on 26th August 2011.

Scientists & Unit Staff

- ◆ 2 MW variable speed wind turbine training conducted by M/s. Kenersys at the Conference Hall of C-WET on 9th June 2011.
- ◆ One day Knowledge Sharing Seminar / Lectures on "The Challenges and Opportunities in Indian State Grid System for RE Penetration" organized by C-WET- IWTMA at Conference Hall, C-WET on 8th July 2011.
- ◆ "Application of Matlab for Data Analysis" presented by Executive Director, C-WET

at Seminar Hall, C-WET on 27th July 2011.

Standards & Certification Unit

A. Senthil Kumar, Scientist & Unit Chief

- ◆ “Wind Power India 2011 - International Conference and Exhibition” held at Chennai on 9th April 2011.
- ◆ RENERGY 2012 (International Conference & Expo on Renewable Energy, organized by Tamil Nadu Energy Development Agency) at Chennai Trade Center, Chennai on 12th March 2012.
- ◆ Sub-Group meeting on 'Wind Power' of the Working Group on New and Renewable Energy for the 12th Five Year Plan organized by MNRE, New Delhi and made a presentation on the “Revised List of Models and Manufacturers of Wind Turbines (RLMM)” in the Sub-Group Meeting on 18th June 2011.
- ◆ Parliamentary Standing Committee Meeting on Energy held at Cochin on 6th January 2012.
- ◆ 2nd Technical Committee Meeting on “Off-shore Wind Energy Development in India” held at C-WET, Chennai on 2nd March 2012.
- ◆ Short term training / Awareness course on 2 MW variable speed wind turbine provided by M/s. Kenersys India Pvt. Ltd. at C-WET, Chennai on 9th June 2011.
- ◆ One day Knowledge Sharing Seminar / Lecture on “The Challenges and Opportunities in Indian State Grid Systems for RE penetration” organized by C-WET and IWTMA on 8th July 2011.
- ◆ Lecture delivered by Ms. Nicola Haertel, Division Director, TUV Rheinland on “Challenges in Testing and Certification

in Developing Countries” organized by IWTMA at Chennai on 23rd August 2011.

N. Raj Kumar, Scientist

- ◆ RENERGY 2012 (International Conference & Expo on Renewable Energy organized by Tamil Nadu Energy Development Agency at Chennai Trade Center, Chennai on 12th March 2012.
- ◆ Second Technical Committee meeting on “Off-shore Wind Energy Development in India” held at C-WET, Chennai on 2nd March 2012.
- ◆ Short term training / awareness course on 2 MW variable speed wind turbine provided by M/s. Kenersys India Pvt. Ltd. at C-WET, Chennai on 9th June 2011.
- ◆ Physical demonstration on 2 MW variable speed wind turbine provided by M/s. Kenersys India Pvt. Ltd, at WTRS, Kayathar on 10th June 2011.
- ◆ Lecture delivered by Ms. Nicola Haertel, Division Director, TUV Rheinland on “Challenges in Testing & Certification in Developing Countries” organized by IWTMA at Chennai on 23rd August 2011.
- ◆ Seminar on “Enhance Business Value with Analysis Lead Design” organized by SIMULIA and EDS Technologies Private Limited at Chennai on 8th September 2011.

A. G. Rangaraj, Scientist

- ◆ Two days training on “Internal Auditor's Course – ISO 9001:2008” conducted by Det Norske Veritas at Chennai on 22nd & 23rd September 2011.
- ◆ One day Knowledge Sharing Seminar / lecture on “The Challenges and Opportunities in Indian State Grid Systems for RE penetration” organized by C-WET and IWTMA on 8th July 2011.
- ◆ Seminar on “Drives with Intelligence”

organized by M/s. Bharat Bijlee Limited at Chennai on 24th February 2012.

- ◆ Short term training / awareness course on 2 MW variable speed wind turbine provided by M/s. Kenersys India Pvt. Ltd. at C-WET, Chennai on 9th June 2011.
- ◆ Physical demonstration on 2 MW variable speed wind turbine provided by M/s. Kenersys India Pvt. Ltd. at WTRS, Kayathar on 10th June 2011.
- ◆ Lecture delivered by Ms. Nicola Haertel, Division Director, TUV Rheinland on “Challenges in Testing & Certification in Developing Countries” organized by IWTMA at Chennai on 23rd August 2011.

S. Arulselvan, Assistant Engineer

- ◆ International Conference on “Renewable Energy Technologies” jointly organized by Solar Energy Society of India, Coimbatore local chapter and Department of Electrical and Electronics and School of Energy of PSG College of Technology, Coimbatore in association with W2E, USA on 15th December 2011.
- ◆ Short term training / awareness course on 2 MW variable speed wind turbine provided by M/s. Kenersys India Pvt. Ltd. at C-WET, Chennai on 9th June 2011.
- ◆ One day Knowledge Sharing Seminar / lecture on “The Challenges and Opportunities in Indian State Grid Systems for RE penetration” organized by C-WET and IWTMA on 8th July 2011.
- ◆ Lecture delivered by Ms. Nicola Haertel, Division Director, TUV Rheinland on “Challenges in Testing and Certification in Developing Countries” organized by IWTMA at Chennai on 23rd August 2011.
- ◆ Seminar on “Drives with Intelligence”

organized by M/s. Bharat Bijlee Limited at Chennai on 24th February 2012.

C. Stephen Jeremias, Junior Engineer

- ◆ Training on “Basic Fire Safety and Basic life support and First aid skills for Government organization” organized by M/s. Usha Fire Safety Equipments (P) Ltd on 22nd July 2011.

Information Training & Commercial Services

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

- ◆ One day seminar on RTI Act organized by Institute of Secretariat Training & Management, New Delhi on 26th March 2011
- ◆ “A Scientometric Assessment of Wind Energy Research Productivity: A Global Perspective” in connection with the 7th International conference on Webometrics, Informatics and Scientometrics and 12th COLLNET Meeting held at Istanbul Bilgi University, Turkey during 20th – 23rd September 2011.

Gunasekaran. M.R., Senior Stenographer

- ◆ 3 day Training Programme on “Introduction to Computer Networks” organised by Anna Institute of Management, Chennai during 9th - 11th November 2011.

Solar Radiation Resource Assessment Unit

Prasun Kumar Das, Scientist

- ◆ “International Congress on Renewable Energy 2011” at Tezpur University, Assam organized by Solar Energy Society of India during 2nd to 4th November 2011.

R. Karthik, Scientist

- ◆ One day conference on National Centre for Atmospheric Technology at NIOT, Chennai on 12th December 2011.
- ◆ One day conference on “Application of Nano Materials in Manufacturing” conducted by CII, Chennai on 12th September 2011.

Finance & Administration

D. Lakshmanan, General Manager

- ◆ Training program on “Residential Special Modular Programme on Contract Labour (Regulation & Abolition) Act, 1970 at Goa during 2nd – 3rd June 2011 organized by The Institute of Public Administration, Bangalore.
- ◆ Management Development Programme on “Internal Auditing for Effective Management Control” at Port Blair during 6th – 9th September, 2011 organized by The Institute of Cost and Works Accountants of India, New Delhi.
- ◆ Training Programme on “Advance Tax, TDS and Tax Planning” at Hyderabad during 15th – 18th November, 2011 organized by The Institute of Cost and Works Accountants of India.

G. Rajan, Admin. & Accounts Officer

- ◆ Training Programme on “Contract Management” at Manali from 8th – 11th June 2011 organized by The Institute of Cost and Works Accountants of India, New Delhi.
- ◆ Special Workshop on “Foreign Procurement – Procedures and Formalities” at Bangalore on 24th June 2011 organized by Parsam Institute of Statutory Rules, Bangalore.

- ◆ “Advance Microsoft Excel 2007” at Chennai on 18th – 19th November 2011 organized by Global Academy.
- ◆ Training on “Central Public Information Officers and Appellate Authorities” in the Ministry of New and Renewable Energy on 15th December 2011 organized by Institute of Secretariat Training and Management.

R. Girirajan, Section Officer

- ◆ Special Workshop on “Foreign Procurement – Procedures and Formalities” at Bangalore on 24th June 2011 organized by Parsam Institute of Statutory Rules, Bangalore.
- ◆ Training Programme on “Advance Microsoft Excel 2007” at Chennai on 18th & 19th November, 2011 organized by Global Academy.
- ◆ “Workshop on revised Schedule VI” at Chennai on 23rd November, 2011, conducted by Confederation of Indian Industry.
- ◆ “One day Interactive Conference on Tax Deduction from Salary and other payments, Tax Planning for Retirement Benefits, Remuneration Planning and DTC” at Courtyard Marriott, Chennai on 18th February 2012 conducted by Princeton Academy.
- ◆ “One day Seminar on Right to Information Act, 2005” at New Delhi on 26th March 2012 organized by The Institute of Secretariat Training and Management.

K. Tamil Selvi, Section Officer

- ◆ Special Workshop on “Foreign Procurement – Procedures & Formalities” at Bangalore on 24th June 2011 organized

by Parsam Institute of Statutory Rules, Bangalore.

- ◆ “Advance Microsoft Excel 2007” at Chennai on 18th & 19th November, 2011 organized by Global Academy.
- ◆ “Workshop on revised Schedule VI” at Chennai on 23rd November, 2011, conducted by Confederation of Indian Industry.
- ◆ “One day Interactive Conference on Tax Deduction from Salary and other payments, Tax Planning for Retirement Benefits, Remuneration Planning and DTC” at Courtyard Marriott, Chennai

on 18th February 2012 conducted by Princeton Academy.

- ◆ One day Seminar on “Right to Information Act, 2005” at New Delhi on 26th March 2012 organized by The Institute of Secretariat Training & Management.

Anuradha Babu, Private Secretary

- ◆ “Advance Microsoft Excel 2007” at Chennai during 18th - 19th November 2011 organized by Global Academy.

B. Muthulakshmi, Senior Stenographer

- ◆ “Advance Microsoft Excel 2007” at Chennai during 18th - 19th November 2011 organized by Global Academy.



PUBLICATIONS

- ◆ Rajesh Katyal & S. Gomathinayagam, "Optimization of Wind Turbine Tubular Towers", Journal of Wind and Renewable Energy (IJWRE) Vol. 1 Issue 2 (98-104) [ISSN 2277-3975], March 2012.
- ◆ Rajesh Katyal & S. Gomathinayagam, paper "Wind Variability and Power Capacity Assessment for a Complex Wind Farm Project in India" in International Journal of Multidisciplinary Research and Advances in Engineering (IJMRAE), vol.4, No.1, [ISSN 0975-7074], January 2012.
- ◆ Rajesh Katyal & S. Gomathinayagam, "Parametric Optimization of Wind Turbine Lattice Towers", Journal of Ultra Scientist of Physical Sciences, vol.24, No.1, ISSN [0970-9150], January 2012.
- ◆ Rajesh Katyal & S. Gomathinayagam, "Optimization of Wind Turbine Lattice Towers" at the Second International Conference on Wind Energy: WETI-2011 organized by National Institute of Technical Teachers Training and Research (NITTTR), Bhopal during October 2011.
- ◆ Rajesh Katyal, "Testing of Small Wind Turbines – The Need and Knowhow", Journal of Engineering, Science and Management Education, Special Issue on Wind Energy, Vol. 4, Issue IV (293-297).
- ◆ Rajesh Katyal, "Modeling of Wind-Solar with Diesel / Grid Hybrid System", Journal of Engineering, Science and Management Education, Special Issue on Wind Energy, Vol. 4, Issue IV (293-297).
- ◆ Dr. E. Sreevalsan, "Identifying optimal wind zones across the country and applying the appropriate level of R&D to ensure cost-effective power generation" at RENEWCON India Conference 2011 held at Mumbai on 29th September 2011.
- ◆ P. Kanagavel & S. Gomathinayagam, "World Wind Energy Research Growth Analysis: A Scientometric study", Journal of Engineering, Science and Management Education, (A Quaterly Research journal) Vol. 4 Issue 4, (308 - 311) [ISSN 0976-0121], Oct – Dec 2011.
- ◆ Prasun Kumar Das, "An analytical study of solar radiation data for Gwalpahari; Communicated to Mausam".
- ◆ Prasun Kumar Das, "Predicting monthly mean daily diffuse radiation for India; Applied Energy", Volume 91, Issue 1, March 2012, Pages 412-425.
- ◆ Prasun Kumar Das, "Diffuse Radiation Models for Indian Climatic Conditions"; International Journal of Ambient Energy, Volume 33, Issue 2, 2012, Pages 75-86.
- ◆ Prasun Kumar Das, "Correlation for prediction of monthly mean daily diffuse radiation for North- East India"; Proceedings of ICORE 2011, Pages 225-233.



VISITS ABROAD

Dr. G. Giridhar, Scientist, Unit Chief,
R. Sasikumar, Scientist, SRRA and
D. Lakshman, GM (F&A)

- ◆ Training program on Testing, Inspection, and Calibration of Equipment/ Instrument at Original Equipment Manufacturer (OEM) at Madrid, Spain during the period 19th to 24th March 2012.

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

- ◆ To provide training on Wind Energy to Mauritius Nationals under the Indo-Mauritius joint Working Group on Renewable Energy during 12th to 18th February 2012.

A.R. Hasan Ali, Assistant Engineer, WTRS

- ◆ 1st phase of the International training

course on “Wind Power Development and use” organized by LIFE Academy/ SIDA, Sweden held at China during 12th - 17th February 2012.

Dr. S. Gomathinayagam
Executive Director

- ◆ Invited Panelist from India, for NREL - IRENA workshop in Renewable Energy Technology in Golden, Colorado in USA during 21st - 23rd November 2011.

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

- ◆ 2nd phase of the International training course on “Wind Power Development and Use” held at Sweden during 18th March to 16th April 2011.



IMPORTANT VISITORS TO THE C-WET CAMPUS

Shri. Tarun Kapoor, Joint Secretary (Wind Energy), MNRE visited C-WET

The Joint Secretary (Wind Energy), MNRE, Shri. Tarun Kapoor visited C-WET on 16 of February 2012. He had a meeting with the Executive Director and all Unit Chiefs. All the Unit Chiefs made presentations highlighting their respective unit's activities and progress since the beginning of C-WET and later the Joint Secretary visited various infrastructure & facilities available in the campus. He has also visited Solar Radiation Resource Assessment (SRRA), expressed his appreciation for C-WET's effort so far and offered his valuable suggestions towards the future development.



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. Gireesh B. Pradhan, 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., Special Secretary & Financial Adviser, MNRE, New Delhi	Member
4.	Shri. A.S. Bakshi, 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, Secretariat, Chennai	Member
6.	Dr. Shyam Chetty, 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., Special Secretary & Financial Adviser, MNRE, New Delhi	Chairman
2.	Shri. Ramesh Kumar Khanna, I.A.S., Secretary to Government, Energy Department, Tamil Nadu Government	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 (Wind Energy), 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, Senior 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 manufacturers of small wind
energy system and their recommendations for empanelment of MNRE / CWET
approved manufacturers)**

1	Executive Director, C-WET	Chairman
2	Director, MNRE – dealing with SWES Programme	Member
3	Outside Expert - Shri. K.P. Sukumaran, Ex Adviser, MNRE	Member
4	Outside Expert – Shri. M. P. Ramesh Former Executive Director C-WET and Presently President, Energy India Ltd	Member
5	Representatives from Industries	Invitee
6	Rajesh Katyal, 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	Chairman
2.	Shri. G. Upadhyay, Director (Wind Energy), MNRE	Member
3.	Shri. D. V. Giri, Chairman, IWTMA, Chennai (upto 2011)	Member
4.	Shri. Ramesh Kymal, Hon. Chairman, IWTMA, Chennai (from 2012)	Member
5.	Shri. K. Kasthurirangaian, Chairman, IWPA, Chennai	Member
6.	Shri. A. Senthil Kumar, Unit Chief, S&C, C-WET	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.	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.	Admin & Accounts Officer, C-WET	Member
5.	Shri. P. Kanagavel, Scientist & Unit Chief i/c, ITCS, C-WET	Member

Vigilance Awareness Week

Vigilance awareness week for the year 2011 was observed in C-WET from 31st October 2011 to 5th November 2011 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 security personnel at C-WET followed by Flag hosting and concluded with distribution of sweets.



Official Language Act

C-WET has been an active member in the Town Official Language Implementation Committee, Chennai. The Hindi version of "PAVAN", the Quarterly Newsletter of

C-WET is considered a standard communication in Hindi.

Hindi fortnight was celebrated in C-WET from 14th to 28th September 2011. Various competitions were conducted and prizes distributed. Hindi Workshop for 40 days was organized in C-WET to all staff to inculcate rudimentary knowledge in Official Language. The following staff members are being deputed for Hindi classes through Hindi Teaching Scheme

No	Name of the Staff	Class
1.	T. Ganeshamoorthi Steno-Typist, ED Office	Pragya
2.	R. Girirajan Section Officer, F&A	Praveen
3.	K. Tamilselvi Section Officer, F&A	Praveen
4.	M. Saravanan Scientist 'B', Testing	Prabodh
5.	V. Shanmugam Assistant, F&A	Prabodh

Right to Information Act

During the year 2011-12, twelve applications were received seeking information under RTI Act, 2005 and requisite details have been provided. No appeal has been preferred against the decision of CPIO.

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 18th April 2011. No complaints received during the year 2011-12.

Parliamentary Standing Committee Visit

- On-the-spot study visit of the Standing Committee on Energy (2011-12) held at Cochin, during 6th – 11th January 2012.
- Second Sub-Committee of Parliamentary Committee on Official Language visited Chennai during 14th – 15th February 2012.
- MNRE Sub-Committee on Official Language visited C-WET's WTTS / WTRS, Kayathar during 10th – 12th March 2012.

Implementation of Persons with Disabilities Act 1995

The following facilities are being available to Persons with Disabilities

- Though C-WET is functioning in a two storey building (where lift is not mandatory) a lift has been provided for the convenience of physically challenged.
- A separate ramp has been provided to enable use of crutches / wheel chairs.

- Low level steps laid by the side of the lift for easy access.
- Post reservation for physically handicapped as per Government of India rules.

CAG Audit Paras

- There are no outstanding CAG audit paras for C-WET till 31st March 2011.

Trainings Organized by F&A

- Organised a One day in-house training programme on “Advance Tax, Tax Deduction at source and possible impact of Direct Tax Code” by Prof. S. Sampath on 19th December 2011.
- Organised a One-day in-house training programme on “Imports and Letter of Credit Payments” by Shri V. Sridharan on 28th February 2012

For both the trainings, participants from other Government Organizations like CSIR, SERC, NIOT, IIITDM, CAG Auditor's Office, etc were also invited and have attended the training.



HUMAN RESOURCES

Sl.No.	Name	Cadre
Office of Executive Director		
1.	Dr. S. Gomathinayagam	Executive Director
2.	Ms. Anuradha Babu	Private Secretary
3.	Shri. T. Ganeshamoorthi	Steno-Typist
Finance & Administration		
1.	Shri. D. Lakshmanan	General Manager (F&A)
2.	Shri. R. Girirajan	Section Officer
3.	Ms. K. Tamilselvi	Section Officer
4.	Ms. B. Muthulakshmi	Senior Stenographer
5.	Shri. V. Shanmugam	Assistant
6.	Ms. J. Rekha	Steno-Typist
7.	Shri. M. Selvakumar	Daftary
8.	Shri. M Malaravan	Senior Driver
9.	Shri. S Maruthanayagam	Driver
Research & Development		
1.	Shri. Rajesh Katyal	Scientist & Unit Chief
2.	Ms. Deepa Kurup	Scientist
3.	Shri. J.C. David Solomon	Scientist
4.	Shri. R. Naveen Muthu	Technician
Wind Resource Assessment		
1.	Shri. K. Boopathi	Scientist & Unit Chief
2.	Ms. G. Arivukkodi	Assistant Engineer
3.	Shri. T. Suresh Kumar	Junior Engineer
4.	Shri. B. Krishnan	Junior Engineer
5.	Shri. R. Vinod Kumar	Technician
6.	Shri K.A. Haji Abdul Ibrahim	Daftary
Information, Training & Commercial Services		
1.	Shri. P. Kanagavel	Scientist & Unit Chief (i/c)
2.	Shri. M.R. Gunasekaran	Senior Stenographer

Sl.No.	Name	Cadre	
Wind Turbine Testing			
1.	Shri. S.A. Mathew	Scientist & Unit Chief	
2.	Shri. M. Anvar Ali	Scientist	
3.	Shri. M. Saravanan	Scientist	
4.	Shri. Bhukya Ramdas	Scientist	
5.	Shri. M. Karuppuchamy	Assistant Engineer	
6.	Shri. A.R. Hasan Ali	Assistant Engineer	
7.	Shri. Y. Packiyaraj	Assistant Engineer	
8.	Shri. S. Paramasivan	Junior Engineer	
Standards & Certification			
1.	Shri. A. Senthil Kumar	Scientist & Unit Chief	
2.	Shri. N. Rajkumar	Scientist	
3.	Shri. A.G. Rangaraj	Scientist	
4.	Shri. S. Arulselvan	Assistant Engineer	
5.	Shri. C. Stephen Jeremias	Junior Engineer	
CONTRACT STAFF IN SRRA			
1.	Shri. R. Sasi Kumar	Scientist	
2.	Shri. Prasun Kumar Das	Scientist	
3.	Shri. R. Karthik	Scientist	
EMPLOYEES ON DEPUTATION FROM MNRE			
1.	Shri. A. Mohamed Hussain	Scientist & Unit Chief, WTRS	
2.	Dr. G. Giridhar	Scientist & Unit Chief, SRRA	
3.	Shri. A. Haribhaskaran	Scientist, WRA	
NEW RECRUITMENTS			
Sl.No	Name	Cadre	Date of Joining
1.	Shri. M. Saravanan	Scientist	28.04.2011
2.	Shri. Bhukya Ramdas	Scientist	31.10.2011
3.	Shri. T. Ganeshamoorthi	Steno-Typist	01.11.2011
4.	Shri V. Shanmugam	Assistant	01.12.2011

PROMOTIONS DURING THE YEAR 2011-12

No	Name	Previous Cadre and pay band	Promoted Cadre and Scale of pay	Date of Promotion
1.	Ms. Deepa Kurup	Scientist 'B' Rs. 15,600- Rs.39,100/- + G.P. Rs.5,400/-	Scientist 'C' Rs. 15,600- Rs. 39,100/- + G.P. Rs. 6,600/-	01.01.2012
2.	Shri. R. Girirajan	Assistant Rs. 9,300- Rs. 34,800/- + G.P. Rs. 4,200/-	Section Officer Rs. 9,300- Rs. 34,800/- + G.P. Rs. 4,800	12.11.2011
3.	Ms. K Tamilselvi	Assistant Rs. 9,300- Rs. 34,800/- + G.P. Rs. 4,200/-	Section Officer Rs. 9,300- Rs. 34,800/- + G.P. Rs. 4,800/-	12.11.2011
4.	Ms. G Arivukodi	Junior Engineer Rs. 9,300 – Rs. 34,800/- + G.P. Rs. 4,200/-	Assistant Engineer Rs. 9,300 – Rs. 34,800/- + G.P. Rs. 4,800/-	01.01.2012
5.	Shri. S. Arulselvan	Junior Engineer Rs. 9,300 – Rs. 34,800/- + G.P. Rs. 4,200/-	Assistant Engineer Rs. 9,300 – Rs. 34,800/- + G.P. Rs. 4,800/-	01.01.2012
6.	Shri. A. R. Hasan Ali	Junior Engineer Rs. 9,300 – Rs. 34,800/- + G.P. Rs. 4,200/-	Assistant Engineer Rs. 9,300 – Rs. 34,800/- + G.P. Rs. 4,800/-	01.01.2012
7.	Shri. M.Karuppuchamy	Junior Engineer Rs. 9,300 – Rs. 34,800/- + G.P. Rs. 4,200/-	Assistant Engineer Rs. 9,300 – Rs. 34,800/- + G.P. Rs. 4,800/-	01.01.2012
8.	Shri. Y. Packiyaraj	Junior Engineer Rs. 9,300 – Rs. 34,800/- + G.P. Rs. 4,200/-	Assistant Engineer Rs. 9,300 – Rs. 34,800/- + G.P. Rs. 4,800/-	01.01.2012

C-WET OFFICIALS ON EXTERNAL COMMITTEES, BODIES AND MEMBERSHIP OF ASSOCIATIONS

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)”, Member.

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.

P. Kanagavel

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

AUDITOR'S REPORT

The Chairman
Governing Council
Centre for Wind Energy Technology
Chennai – 600 100

Sir,

We have audited the attached Balance Sheet of Centre for Wind Energy Technology (C-WET), Velachery – Tambaram Main Road, Pallikaranai, Chennai as at 31.03.2012 and also the Income & Expenditure Account and the Receipts and payments account for the year ended on that date annexed thereto. These financial statements are the responsibilities of the management of 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 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 the management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion. Certain changes in accounting policies have been incorporated based on the suggestion of CAG Audit in the report for the period 2010-2011.

Attention is invited to the Note No.18 & 19, which are reproduced below:

1. Because of the change in accounting policy to show grant received from MNRE as unutilized grant under current liabilities as against the practice of showing it as Capital Fund and also Earmarked project as unutilized grant under Current liability instead of showing it as Ear-marked projects separately:

- (i) The Current liability is more by Rs.7,53,78,627/- as compared to last year. This increase is represented by regrouping of MNRE grant and Earmarked project under current liabilities:

(Amount in Rs.)	
Central Finance Assistance MNRE (Grants-in-Aid)	3,73,79,115
Earmarked Projects	3,79,99,512
TOTAL	7,53,78,627

- (ii) The Capital Fund is more by Rs.20,10,27,513/- as compared to last year as detailed below:

(Amount in Rs.)		
Capital Fund (Unutilised MNRE grant in the current year classification)		
O/B	13,65,36,012	
Add		
Grants	5,00,00,000	
Profit on sale of Assets	37,999	18,65,74,011
Less		
Grants for revenue expenses	2,55,92,332	
In house project expenses	2,41,49,090	
Deffered Income	3,47,88,017	8,45,29,439
Capital fund as per last year method		10,20,44,572
Capital fund as per current year method equal to closing WDV of fixed assets		30,30,72,085
Excess of fund over last year		20,10,27,513

2. Due to change in accounting policy of not showing depreciation charge to Income and Expenditure account and not transferring from MNRE grant as deferred income:
- The total of income is less by Rs.3,47,88,017/- as compared to last year represented by depreciation on assets purchased from MNRE Central Financial Assistance not transferred as deferred income to income and expenditure account.
 - The Total of expense is less by Rs.6,54,48,189/- as compared to last year represented by depreciation on assets purchased not charged through income and expenditure account.
 - The surplus is more by Rs.3,06,60,172/- as compared to last year being the depreciation on assets purchased out of internally generated fund not charged to income and expenditure account.
 - The General Reserve Fund is less by Rs.2,42,91,503/- as compared to last year as detailed below:

	Amount in Rs.)
Transfer to Capital Fund	5,49,51,675
Less: Increase in surplus as per item	
(iii) above	3,06,60,172
Balance	2,42,91,503

Subject to the above, We report that:

- We have obtained all information and explanations which, to the best of our knowledge and belief, were necessary for the purpose of our audit;
- In our opinion, proper books of account have been kept by the above mentioned Centre so far as appears from our examination of the books;
- The Balance Sheet, Income & Expenditure Account and Receipts and Payments Accounts referred to in this report are in agreement with the books of accounts;
- In our opinion the Balance Sheet and Income and Expenditure Account and Receipts and Payments Accounts dealt with by this report are prepared in accordance with the applicable Accounting Standards issued by the Institute of Chartered Accountants of India.
- In our opinion and to the best of our information and according to the explanations given to us, the said accounts, including the Balance Sheet, Income and Expenditure Account and Receipts and Payments Account dealt with by this report read together with schedules, accounting policies and notes thereon give a true and fair view in conformity with the accounting principles generally accepted in India:
 - in the case of Balance Sheet, of the state of affairs of the above mentioned Centre as at 31st March, 2012 and
 - in the case of Income & Expenditure account of the Excess of Income over expenditure of this Centre for the year ended on that date.
 - in the case of receipts and payments accounts of the receipts and payments of this Centre for the year ended on that date.

FOR R.JANAKIRAMAN & CO
 CHARTERED ACCOUNTANTS
 FRN: 001263S

Place: CHENNAI
 Date: 28-09-2012

J.Chandrasekaran.
PARTNER
M.NO.027861

BALANCE SHEET AS AT 31ST MARCH 2012

CENTRE FOR WIND ENERGY TECHNOLOGY

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

Chennai - 600 100

CAPITAL FUND AND LIABILITIES	Schedule	31 st March 2012	31 st March 2011
CAPITAL FUND	1	30,30,72,085	1,23,01,057
RESERVES AND SURPLUS	2	25,88,87,391	26,98,06,636
CURRENT LIABILITIES AND PROVISIONS	3	15,19,05,234	39,10,01,757
TOTAL		71,38,64,710	67,31,09,450
ASSETS			
FIXED ASSETS			
(a) Created out of Central Governments Grants	4	25,50,77,871	9,84,39,407
(b) Out of Internal Generation Grants		4,79,94,214	5,49,51,675
CURRENT ASSETS, LOANS AND ADVANCES	5	41,07,92,625	51,97,18,368
TOTAL		71,38,64,710	67,31,09,450
SIGNIFICANT ACCOUNTING POLICIES	13		
NOTES ON ACCOUNTS	14		

For Centre for Wind Energy Technology

As per our Report attached
for **R. Janakiraman & Co.**,
Chartered Accountants
Firm Regn No.001263S

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

Sd/-
Dr S.Gomathinayagam
Executive Director

Sd/-
President/
Chairman

Sd/-
J. Chandrasekaran
Partner
Membership No.027861

RECEIPTS AND PAYMENTS ACCOUNT

CENTRE FOR WIND

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

RECEIPTS	31 st March 2012	31 st March 2011
I. Opening Balances		
(a) Cheques in hand	24,89,082	15,59,242
(b) Bank balances		
i) In Current Account	1,58,52,922	6,62,29,859
ii) In Savings Bank Account	14,72,51,261	
iii) In Deposit Accounts	26,88,00,000	23,30,00,000
(c) Stamps on hand	50	1,967
	43,43,93,315	30,07,91,068
II. Grants Received		
(a) From Government of India	5,00,00,000	8,00,00,000
(b) Sale of Fixed Assets	37,999	2,06,456
(c) From Government of India for execution of various projects		1,90,00,000
(d) From Government of India for SRRA Project	6,90,00,000	12,00,00,000
III. Income on Investments		
IV. Interest Received		
(a) On Bank deposits	2,99,39,142	1,80,05,906
(b) On Bank deposits SRRA	27,67,670	
V. Other Income		
(a) Fees for services	3,84,40,888	9,05,99,557
(b) Income from publications	2,44,100	8,44,600
(c) Energy receipts	1,65,73,615	58,25,577
(d) Misc. Income (including SRRA Income)	1,76,67,508	1,27,74,354
VI. Amount borrowed		
VII. Any other receipts		
(a) Fees received in advance on Consultancy projects	4,81,02,295	5,98,25,157
(b) Security deposit received	3,99,618	11,83,605
(c) Security deposit received SRRA	1,59,700	
(d) Earnest money deposit received	1,50,34,550	1,42,000
(e) Earnest money deposit received SRRA	32,500	
(f) Service tax realised	59,31,987	77,15,292
(g) TDS to be remitted (Including)	6,75,402	3,67,767
(h) Advances and Deposits	95,34,691	1,23,35,532
	30,45,41,665	42,88,25,803
TOTAL	73,89,34,980	72,96,16,871

FOR THE YEAR ENDED 31ST MARCH 2012

ENERGY TECHNOLOGY

New & Renewable Energy, Government of India)
600 100

Amount in Rs.

PAYMENTS	31 st March 2012	31 st March 2011
I. Expenses		
(a) Employee related Expenses	2,27,91,316	2,62,69,338
(b) Administrative Expenses	2,53,43,371	2,63,29,065
II. Payments made against funds for various projects		
Out of CFA		
(a) In house R&D project expenses	2,17,65,830	91,22,031
(b) Seminar & Information dissemination	19,01,596	27,50,896
(c) Accreditation fee	25,411	36,548
Out of Grants for projects		
(a) WRA Lakshadeep	3,05,900	2,93,466
(b) Wind Profile Measurement - Dhanushkodi	14,75,925	24,04,596
(c) WRA Kargil	7,72,536	7,07,953
(d) Wind Shear Assessment expenses 120Mast	25,23,854	49,32,773
(e) North-Eastern Project 2006-07	7,02,115	12,81,451
(f) Study on Uncovered/New areas (2003-04 to 2010-11)	1,23,99,325	1,56,73,510
(g) Wind forecasting	2,56,677	6,20,122
(h) Solar Radiation Resource Assessment	18,53,63,475	
III. Investment and Deposits made		
IV. Expenditure on Fixed assets & Capital Work-in-Progress		
(a) Purchase of Fixed assets	3,65,32,323	1,80,22,800
(b) Expenditure on Capital Work-in-progress	3,57,767	5,92,56,779
(c) Advance on capital account (including imports)	7,99,954	30,74,749
V. Refund of Surplus Money		
(a) Balance of Grants-in-aid to Government of India	1,71,608	13,000
VI. Other Payments		
(a) Refund of Security deposits	51,64,328	14,12,552
(b) Refund of Security deposits SRRA	1,49,900	
(c) Refund of Earnest Money Deposits	67,07,050	6,81,250
(d) Refund of Earnest Money Deposits SRRA	32,500	
(e) Expenditure on Consultancy Projects	2,38,79,198	1,53,75,071
(f) Advance & Deposits	1,50,13,997	43,41,916
(g) Payment of TDS	3,50,517	95,568
(h) Service tax remittances	59,31,987	77,15,292
(i) Receivable from Debtors/other payments	95,18,252	19,14,758
(j) Festival advance paid		2,700
(k) Transfer of fees received in advance	3,90,96,000	9,28,95,372
VII. Closing Balances		
(a) Cheques in hand	3,05,397	24,89,082
(b) Bank Balances		
i) In Current Account	96,16,883	1,58,52,922
ii) In Savings Bank Account	3,96,79,366	14,72,51,261
iii) In Deposit Accounts	27,00,00,000	26,88,00,000
(c) Stamps on hand	622	50
TOTAL	73,89,34,980	72,96,16,871

For Centre for Wind Energy Technology

As per our Report attached
for **R. Janakiraman & Co.,**
Chartered Accountants, Firm Regn No.001263S

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

Sd/-
Dr.S.Gomathinayagam
Executive Director

Sd/-
President/
Chairman

Sd/-
J. Chandrasekaran
Partner, Membership No.027861

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH 2012

CENTRE FOR WIND ENERGY TECHNOLOGY

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

Chennai - 600 100

INCOME	Schedule	31 st March 2012	31 st March 2011
Income from Scientific & Technical			
Consultancy Services	6	6,87,33,744	10,77,15,044
Income from publication	7	24,19,598	45,09,600
Interest Earned	8	2,99,21,314	1,72,90,365
Other Income	9	1,55,93,680	96,81,407
Grants from Government of India allocated for Revenue expenditure during the year	11	2,55,92,332	2,46,81,011
Grants from Government of India allocated for In house project expenditure during the year		2,41,49,090	64,39,625
Deferred Income transferred from Capital Fund (vide note no.4)	4		2,28,27,009
Closing stock		16,12,384	9,84,537
TOTAL (A)		16,80,22,142	19,41,28,597
EXPENDITURE			
Opening stock		9,84,537	12,10,085
Establishment Expenses	10	2,53,58,286	2,32,13,262
Other Administrative Expenses	11	4,95,97,356	4,02,78,181
In house project expenditure		2,41,49,090	64,39,625
Depreciation	4		2,29,38,548
TOTAL (B)		10,00,89,269	9,40,79,701
Balance being excess of Income over Expenditure (A-B)		6,79,32,873	10,00,48,897
Prior period adjustment	12	1,97,732	
Transfer to Capital Fund	4		2,37,02,711
BALANCE BEING SURPLUS TRANSFERRED TO GENERAL RESERVE FUND		4,40,32,430	10,00,48,897
SIGNIFICANT ACCOUNTING POLICIES	13		
NOTES ON ACCOUNTS	14		

For Centre for Wind Energy Technology

As per our Report attached for **R. Janakiraman & Co.,**
Chartered Accountants
Firm Regn No.001263S

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

Sd/-
Dr S.Gomathinayagam
Executive Director

Sd/-
President/
Chairman

Sd/-
J. Chandrasekaran
Partner
Membership No.027861



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, पल्लिकरनै, चेन्नई - ६०० १००, तमिलनाडु, भारत
Velachery - Tambaram Main Road, Pallikaranai, Chennai - 600 100, Tamil Nadu India

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