वार्षिक रिपोर्ट

Annual Report 2014-15

नीवे NIWE

राष्ट्रीय पवन ऊर्जा संस्थान

NATIONAL INSTITUTE OF WIND ENERGY

An Autonomous R & D Institution, Ministry of New and Renewable Energy, Government of India

नवीन और नवीकरणीय ऊर्जा मंत्रालय, अनुसंधान एवं विकास स्वायत्त संस्थान, भारत सरकार

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NATIONAL INSTITUTE OF WIND ENERGY

An Autonomous Research & Development Institution
Ministry of New and Renewable Energy, Government of India
Chennai - 600 100 - India

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Director General's Report

National Institute of Wind Energy (NIWE) [formerly Centre for Wind Energy Technology] proactively plans and executes various programmes within the objectives of the Institute, in the development of wind power sector in the country. Year after year, NIWE's experience has been gainfully sought after by the Industry and all the new Stakeholders including the independent power producers, for NIWE's value added services towards Wind / Solar Resource Assessment, feasibility report for wind power / solar power projects, wind turbine design evaluation and renewal of certification, wind turbine testing as per the International standards, multi-institutional research programmes in wind energy development and deployment in the Industry, apart from Human Resource Development through National and International organized courses.

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 through single window due diligence of safety and quality features of WTG models by the ' time to time' release of Revised List of Models and Manufacturers of Wind Turbines (RLMM), empanelment list of Small Wind Energy Systems (SWES) and their field performance testing are some of the highlights of NIWE's activities. Significant efforts have been initiated by NIWE through research proposal as well as National and International training programmes sponsored by Indian Technical & Economic Cooperation / Special Commonwealth Assistance for Africa Programme (ITEC / SCAPP) of Ministry of External Affairs (MEA), Government of India in imparting the much needed training and human resource development for the wind energy industry of India. With the SRRA mission mode project executed by NIWE, it contributes to research in other renewable energy areas as assigned by Ministry of New and Renewable Energy (MNRE); concerted NIWE efforts towards initiation of Indian Offshore Wind Resource Assessment Project at Dhanushkodi, finalizing Offshore Policy, modernizing resource assessment merging latest Information Technology and Communication techniques along with research infrastructure development at Kayathar and Chennai are special developments in this year.

During the year 2014-15 the significant activities by the various Units are as under:

Research and Development

As wind power penetration in the overall electrical energy mix is increasing in India, there is a need for developing techniques of seamless grid interfacing of wind power ensuring power quality in the grid. It needs to be mentioned that gradually Research and Development has been

extended to all the units of NIWE boosting the scientific rigour and temper among all Scientific & Technical staff.

NIWE has initiated a project on Novel hybrid energy system for supplying isolated loads with FPGA based Energy Management Scheme aimed at design and development of a micro grid system based on hybrid renewable energy sources, specially using the wind-solar resources.

Active research is being pursued at NIWE on initiation of phasor measurement at Wind Turbine Research Station(WTRS) Kayathar, along with SRLDC, Bengaluru, remote health monitoring of 2 MW Research Wind Turbine, studies on weak grid connected matrix converter for DFIG, indigenous design and development of photonic system for real time monitoring of wind and other air parameters, effective integration of satellite imagery and data product with good interaction with NRSC/ISRO, research on improved / effective O&M techniques (operation and maintenance) at WTRS, initiation of online GIS user interfacing for wind and solar resource at anywhere in India, developments on wind power forecasting, research motivational activities such as knowledge forum, 'Technology-Think-Tank series lectures' and creation of educational aids and practical display of various RE technologies and their integration with grid power by all the Scientific and Technical staff with specific focus and goal of 'capacity / skill building/development' in India, at NIWE, now with a larger role and vision.

Wind Resource Assessment

Wind resources have been measured at 800 locations till 31.03.2015 cumulatively and 237 stations have been found to have wind power density (WPD) in excess of 200 W/m^2 at 50 m above ground level. Over 108 consultancy projects involving micro-siting, verification of data collection procedure and preparation of due diligence reports. 11 new monitoring stations have been installed under various consultancy projects. As on March 2015, 108 wind monitoring stations are in operation in 16 States and 1 Union Territory (including 11 stations currently commissioned). All the commissioned stations have been connected to a real time network for wind data, which is updated once in every two seconds in NIWE server.

NIWE is currently involving in the preparation of Micro Level Indian Wind Atlas on GIS platform with land suitability estimation to help the Government in policy making and will encourage industry & academic community to move forward.

The process of replacing the first-generation small-capacity wind-turbines with modern multimegawatt wind-turbines is known as Re-Powering. Initially the details of lower capacity machines in Tamil Nadu are being collected to carry out Repowering. Under the Assessment of Wind Power Potential at 100m level in India, out of 75 wind monitoring stations, 74 stations have been successfully commissioned and data acquisition is in progress. For effectively implementing the wind power projects and Renewable Energy Technologies in India, a special training was organized for SNA Officials on Wind Resource Assessment at NIWE. 30 participants from 13 States and 1 Union Territory have attended the training.

Wind Turbine Testing

NIWE's testing facility at WTTS, Kayathar where Wind Turbine can be tested according to international standards IEC 61400-12-1, 13.1 is equipped to undertake type testing and testing of wind turbines. The Inter Laboratory Comparison with NREL, USA and with 18 accredited

Laboratories in Power Curve Measurements as per the requirements of IEC 61400-12-1 has been completed. An indigenous data acquisition equipment for Type Testing and In-Situ Testing using National Instruments and indigenous interface software CWETDAQ using Labview have been developed. Received Leadership Appreciation for the Testing Services from a member of the Indian Wind Industry. Scientist participated as a member in the ET 42 Sub Committee of the Bureau of Indian Standards.

Wind Turbine Research Station

NIWE owned R&D infrastructure machines at WTRS Kayathar comprises of first generation 9 WTGs of 200 kW capacity (24 year old & in operation) and one latest generation WTG of 2000 kW (variable speed) capacity are kept in operation with continuous monitoring for research on experimental techniques and measurements. Complete renovation of nine 200 kW MICON WEG's was successfully completed for the un-interrupted operation of the machines during the windy seasons. An experimental research wind farm a hybrid study on grid integration of 75 kWp Solar PV power plant with one of the 200 kW first generation MICON WEG for maximum utilization of connected grid load during season / off-season periods by utilizing the existing facilities is under progress at WTRS, Kayathar. This solarisation (wind-solar grid connected hybrid) of wind farm is first of its kind effort in India. A gear oil cooler with air ventilator and increased radiated air fins is put into operation at WTRS.

Standards and Certification

NIWE is implementing TAPS 2000 (amended) for certification of Wind Turbines and completed renewal of certificates for three Wind Turbine models, 2 of M/s. RRB Energy and 1 of M/s Southern Wind Farms Limited. 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 Director General of NIWE. Based on the contributions, four draft Indian Standards have already been accepted by ET 42 committee of BIS for publishing the same. Based on the MNRE guidelines, three RLMM lists have been issued after thorough scrutiny of the documentation supplied by the manufacturers for various models marketed in India. NIWE is also permitted to recommend new proto-type wind turbine models 'for grid connection' as per the revised guidelines dated 22-05-2012 and addendum dated 20-09-2012 by MNRE. For the purpose of type testing of three prototype wind turbine models and for the purpose of development works, three wind turbines of one prototype wind turbine model, recommendation letters in connection with grid synchronization was issued.

Information, Training and Commercial Services

NIWE had organized two National training courses (during July'14 & Mar'15) and four International courses: May 2014, September 2014, November - December 2014 and February - March 2015 specially sponsored by MEA, GOI under ASEAN- India Cooperation Fund Programme, ITEC/SCAAP programme and Africa India Forum Summit – II supported by MNRE. Global Wind Day was celebrated on June 15, with a special address by Dr. Malleshappa, I.F.S., Director Environment, Department of Environment, Govt. of Tamil Nadu.

Engineering Service Division

NIWE facilitates the hi-tech needs of managing ever increasing Information Technology infrastructure involving several Internet / Intranet nodes connected to networked servers, cyber security and reliable uninterrupted power supply for the computational infrastructure; the civil infrastructure of building premises, air-conditioning and features of renewable energy penetration in day-to-day demand of energy at NIWE, energy auditing and bringing energy efficiency. NIWE had successfully completed the task of converting 15 kW off-grid systems to grid-tie system and installed surveillance system in NIWE campus. NIC emailing facilities has been provided to all NIWE regular staff along with 'NKN' (National Knowledge Network) internet connectivity. Solar blinkers tri-lingual (Tamil, Hindi & English) name board has been installed on the road side for easy identification of office location and safe entry during heavy traffic. Solar water heater has been installed at NIWE guest house.

Solar Radiation Resource Assessment

The operation and commissioning of 51 dedicated automatic SRRA stations, the solar data collection and analysis, including data quality check have been well established and more than two years processed data is available for public for development of solar projects. During the financial year 2014-15, 27 solar developers have purchased solar data of 74 SRRA Stations. Under Phase II program 20 SRRA stations have been commissioned. Intensive short (2 days) training courses, calibration of sensors, soiling experiments, improved data analysis and checking algorithm, solar atlas development with GIS platform are in progress.

Delivering invited lectures in National/International Conferences / Seminars, workshops are being sought after from the Scientific and Technical staff of NIWE all over the Country. Scientists also proactively involve themselves in guiding / pursuing post graduate research, in addition to international collaborative research. There is an ever increasing interest from schools and colleges to visit NIWE as an industry, to gain an overview of practical RE technologies, specifically wind and solar.

Recognitions / Initiations

- Director General, NIWE has been awarded "Distinguished Alumnus Award" for excellence in Scientific / Industrial Research in the Golden Jubilee Celebrations of the National Institute of Technology (NIT), Tiruchirappalli, in the presence of President of India His Excellency Dr.Pranab Mukherjee.
- NIWE stall at 102nd Indian Science Congress "Pride of India 2015" Exhibition has been awarded as "Best Stall Design"
- NIWE received Century International Quality ERA Award under Golden Category at Geneva, Switzerland.

Dr. S. Gomathinayagam
Director General

THE CHARTER

The National Institute of Wind Energy (NIWE) serves as the technical focal point for wind energy technologies and was established at Chennai during 1998 by the Ministry of Non-Conventional Energy Sources (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 Danish International Development Agency (DANIDA), Denmark.

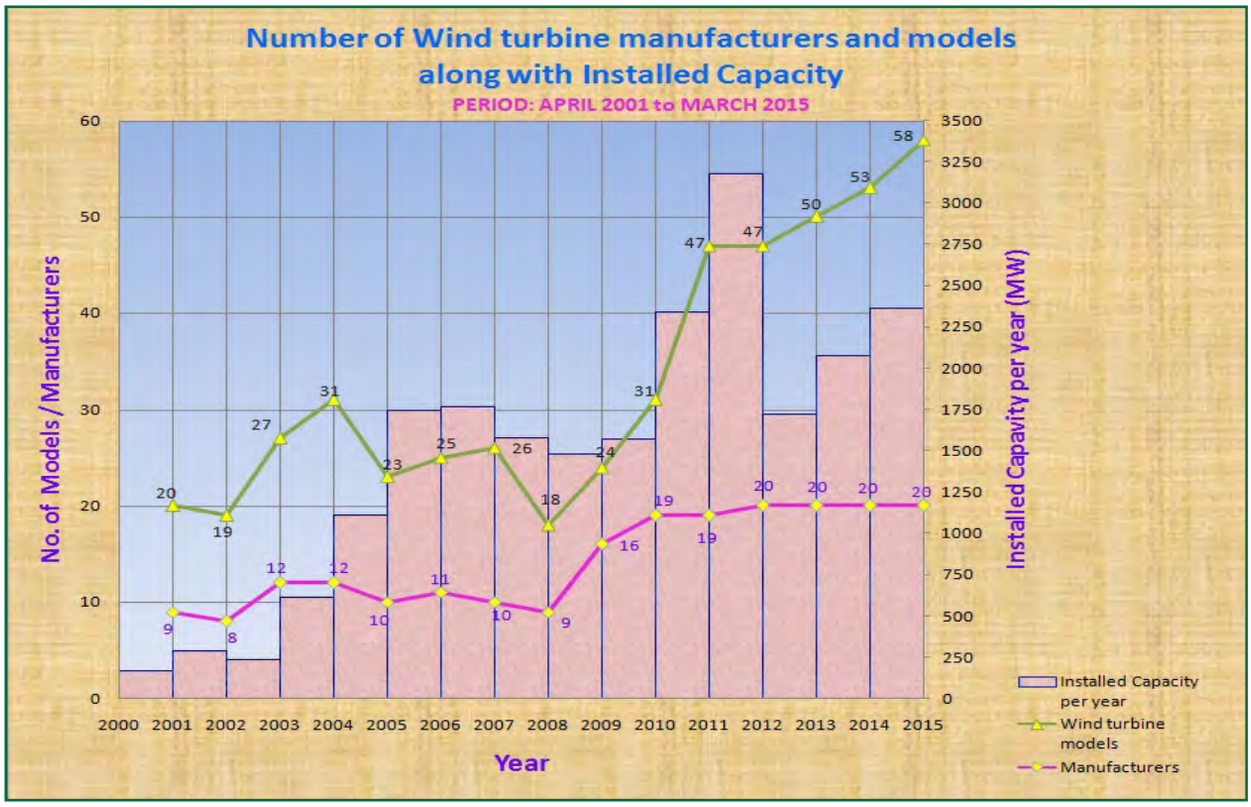
Mission

NIWE, a 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. NIWE will strongly support the wind energy industry in developing the know-how and know-why and promoting export of products and services.

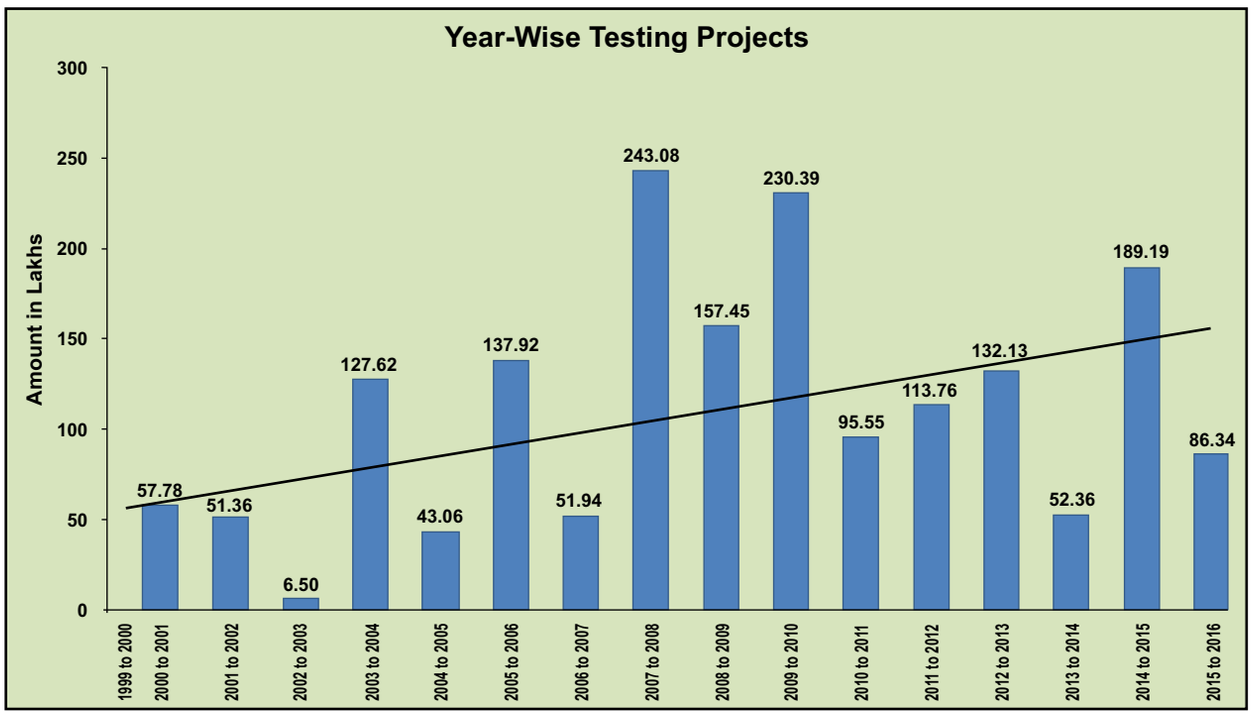
Objectives

- 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.

NIWE'S MISSION HIGHLIGHTS



Wind turbine models / Manufacturers RLMM list



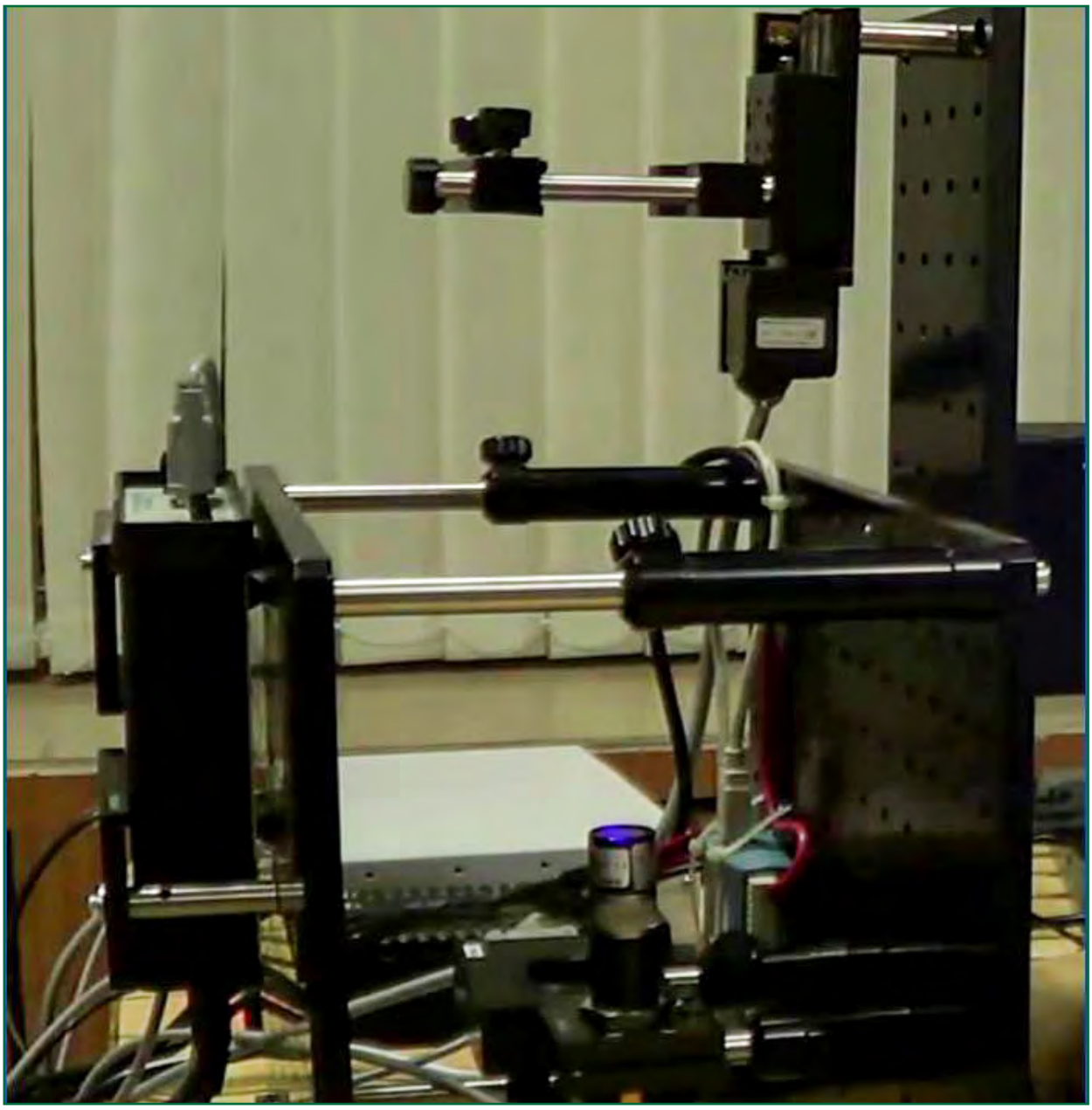
Testing Unit Projects

National Training Courses

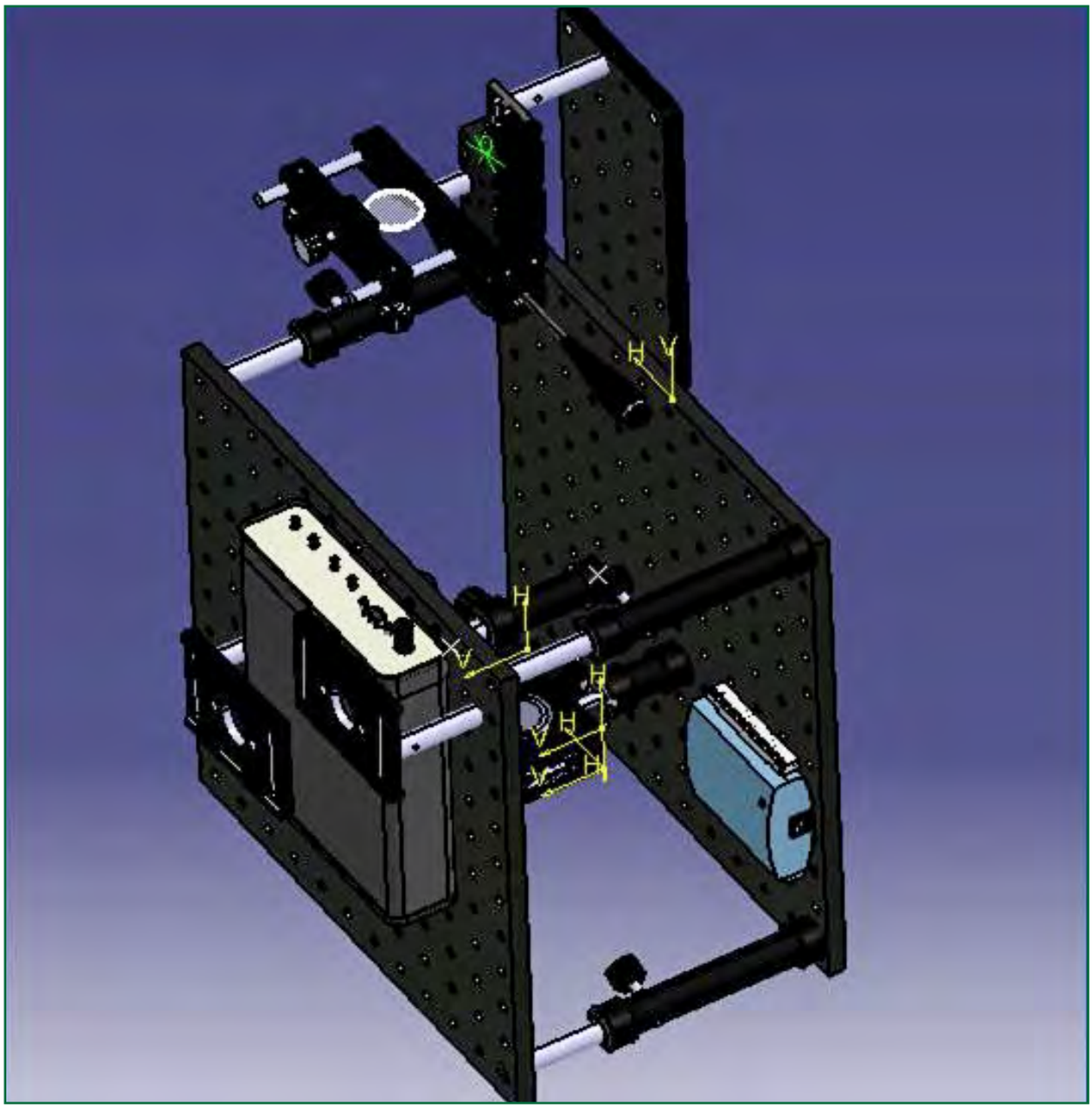
International Training Programmes

Wind Turbine Installed Capacity - India

Innovations



SAMIRA – Indigenous Design: Photonic System



SAMIRA – Indigenous Design: Photonic System (LIDAR)

Towards Mission and objectives

Research & Development

Wind Resource Assessment

Wind Turbine Testing

Wind Turbine Research Station

Standards & Certification

Information, Training and Commercial Services

Engineering & Services Division

Solar Radiation Resource Assessment

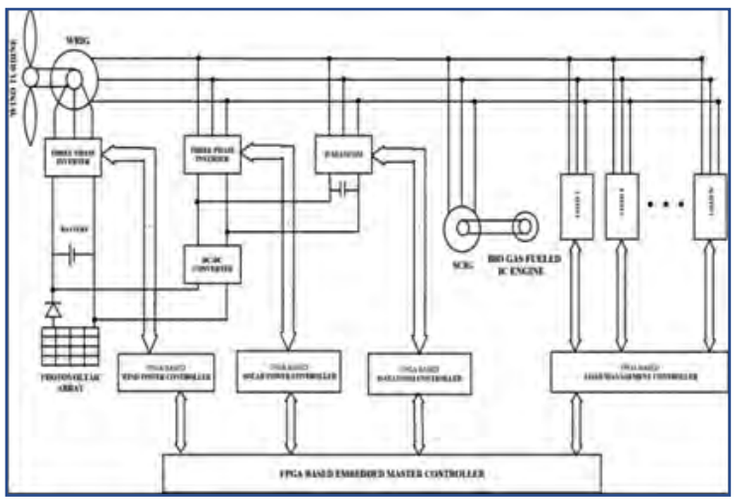
Research & Development

R&D at NIWE supports time bound and mission oriented Research & Development programmes to achieve world class, reliable and cost effective technology in wind power systems. The efforts continue to improve its knowledge and skills through continuous learning to keep pace with state-of-the-art technology and excels through its effective networking with other Academic & Research Institutions. NIWE carries out in-house R&D through networking in research relevant areas with a mutually beneficial interdisciplinary approach for most of the projects. 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. NIWE undertakes R&D projects which are having deliverables useful to the wind Industry in India. The brief of the work executed during the year 2014-15 are detailed as under:

I. R&D Projects

1. A novel hybrid energy system for supplying isolated loads with FPGA based Energy Management Scheme

The Unit has initiated a project in association with National Institute of Technology (NIT), Tiruchirappalli aimed at design and development of a micro grid system based on hybrid renewable energy sources such as wind, solar and biomass / biogas for reliable power supply at remote locations. Through this, energy management using various renewable energy sources in remote



Micro Grid of hybrid energy sources with FPGA based embedded control

locations will be demonstrated with the help of advanced digital controllers such as FPGA. The experimental study on a wound rotor induction generator and algorithm for FPGA based inverter control has been completed.

2. Installation of Phasor Measurement Unit at WTRS , Kayathar

NIWE has initiated work on the installation of Phasor Measurement Unit at WTRS, Kayathar in association with SRLDC, Bangalore. As a part of this, laying of dedicated optical fibre link to WTRS, Kayathar is in process. The Phasor Measurement Unit will enable synchronised recording of phasors at the rate of 25-50 frames per second in a centralised server and thus identify power system disturbances.

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

Matrix converter unit

NIWE in association with SSN College of Engineering is working on study and control of weak grid connected matrix converter based 5 kW DFIG system. The simulation of the system has been completed. The matrix converter for the control of power flow in the DFIG has been developed. Presently, performance study of the DFIG unit interfaced with the power converter is in progress. The project is underway.

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

Health / condition monitoring system installed for the drive train and blades on the 2 MW Experimental / Research Wind Turbine at NIWE's Kayathar WTRS facility has produced data

2 MW Research Turbine Model drive train

and work has been started on the fault prediction algorithm that would help identify defects on the drive train & the 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 activity that the wind industry would need to perform. The preparation of Fault prediction algorithm work is nearing completion.

II. Commercial Services to the Stakeholders

1. Measurement of Power quality

NIWE in association with Power Research and Development Consultants Private Limited had initiated a project for measurement of power quality on a 225 kW wind turbine as per the requirements of IEC 61400-21. The measurements were carried out during July 2014. The measurements mainly cover voltage fluctuations, flicker, harmonic measurements and reactive power measurements. The data has been analyzed and the report has been submitted to the client.

Power Quality Measurement in progress

2. Testing of Small Wind Turbine (SWT) at WTRS

NIWE has completed three SWT testing assignments ranging from 2.1 kW to 3.6 kW at the Wind Turbine Research Station, Kayathar as per the requirements of IEC-61400-2 together with IEC 61400-12-1. Presently four SWTs are under test in WTRS, Kayathar ranging from 600 W to 10 kW. NIWE has also completed the review of three models, including the documents for grid connected vertical axis wind turbine of 15 kW capacity.

Small wind turbine testing at WTRS, Kayathar

Further NIWE, in accordance with the Modified Scheme for the Programme on "Small Wind Energy and Hybrid Systems (SWES)" released by MNRE / NIWE and in

Dismantling process of the Model UE42 at WTRS, Kayathar

pursuance to the models submitted for empanelment / provisional empanelment has released the 12th List of Empanelment of Small Wind Turbines during the year. The list is hosted in the NIWE's Website.

Achievements

Publication of Research Reports in NIWE's Website for public

As a part of serving the larger wind stakeholder community, it was decided at NIWE Research & Development Council that research reports of the completed RFP mode projects would be uploaded in NIWE website for public information. As a start to this initiative, the following reports have been uploaded:

1. Final Report of "Power Evacuation Studies for Grid Integrated Wind Energy Conversion System"
2. Final report of "Study on Power quality issues in grid connected wind farms and identification of remedial measures"
3. Final report of "Experimental Characteristics of Wind Turbine Blading over full 0 to 360 degree angle of attack".

Wind Resource Assessment

NIWE has been involving in the realization of Nationwide Wind Resource Assessment (WRA) program sponsored by the Government of India, in association with State Nodal Agencies. Further, in order to extend support to the industry and developers, the unit takes up various projects such as validation studies, technical due diligence studies, micrositing exercises, Detailed Project Report preparation, Repowering analysis, etc., The Ministry of New and Renewable Energy [MNRE], Government of India has been sponsoring the WRA programs to measure, analyze and publish wind data in our country for the last two decades. Under these programs, wind has been measured at 800 locations for periods ranging from one to five years. As on 31st March 2015, 108 stations are in operation in 16 States and one Union Territory. During 2014-15 a total number of 11 wind monitoring stations have been commissioned. Details of new wind monitoring stations installed and in operation are given in the following table

Status of Wind Monitoring Stations (2014-15)

S.No.	State	No. of Stations	
		Installed (new) during 2014-15	In operation as on 31.03.2015
1.	Andhra Pradesh	0	10
2.	Arunachal Pradesh	0	2
3.	Assam	0	1
4.	Bihar	0	1
5.	Gujarat	0	13
6.	Karnataka	0	14
7.	Chhattisgarh	4	4
8.	Madhya Pradesh	0	7

S.No.	State	No. of Stations	
		Installed (new) during 2014-15	In operation as on 31.03.2015
9.	Maharashtra	0	13
10.	Manipur	0	3
11.	Puducherry	2	2
12.	Odisha	1	6
13.	Rajasthan	1	13
14.	Tamil Nadu	0	15
15.	Uttar Pradesh	3	3
16.	Uttarakhand	0	1
	Total	**11**	**108**

Of the cumulative total of 800 stations established till 31.03.2015, 237 stations have been found to have Wind Power Density (WPD) in excess of 200 W/m^2 at 50 m Agl. Summary of these 237 stations are given in the below table.

WPD Distribution at the 237 Stations

WPD range [W/m^2]	No. of stations
200-250	107
251-300	61
301-350	27
351-400	17
>400	25
	237**

** arrived this figure from the met mast height 20m to 50m only and has not been included 80m -120m height met mast

WRA in the uncovered area

State wise details of the wind monitoring stations commissioned during 2014-15 in the country under various WRA programmes are given in the following table. The wind monitoring stations are of 50m, 80m, 100m and 120m height and sensors are placed at 10m, 30m, 50m (in the 50m height masts), 20m, 50m, 78m, 80m (in the 80m height masts) 10m, 50m, 80m,100m - 2 level (in the 100m height masts) 10m, 30m, 60m, 90m,120m (in the 120m height masts) levels. [All the heights are above ground level].

State wise installations of Wind Monitoring Stations established during 2014-15

S. No.	Station	District	State	Commenced On	Height of the mast
1.	Parharganj	Puri	Odisa	07.03.2015	80m
2.	Baderan	Bikaner	Rajasthan	09.01.2015	100m
3.	Raikot	Bastar	Chattisgarh	05.01.2015	100m
4.	Burgum	Bastar		06.01.2015	
5.	Gaurghat	Gariyaband		08.01.2015	
6.	Bangaura	Kabirdham		09.01.2015	
7.	Killayur	Karaikal	Puducherry	25.05.2014	80m
8.	Narambai	Puducherry		06.11.2014	50m
9.	Choukonia	Siddharta Nagar	Uttarpradesh	16.08.2014	80m
10.	Ahiranpurwa	Gonda		13.08.2014	
11.	Nageshwarijoth	Balarampur		19.09.2014	

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

Fund released for State Nodal Agencies to install WMS during 2014-15

S. No.	State	No. of stations sanctioned	Mast height (m)	Amount (Rs. in Lakhs)
WRA in uncovered / new areas 2008-09				
1.	Bihar	3	50m	5.50
2.	Maharashtra	18	50m	9.93
WRA in uncovered / new areas 2010-11				
1.	Tamil Nadu	3	80m	7.70
2.	Andhra Pradesh	15	80m	16.60
Long Term Data Collection				
1.	Karnataka	10	80m	23.35
2.	Andhra Pradesh	14	80m	41.23
3.	Kerala	2	80m	4.67
4.	Tamil Nadu	2	80m	2.84

S. No.	State	No. of stations sanctioned	Mast height (m)	Amount (Rs. in Lakhs)
WRA in new / uncovered areas during 2013-14				
1.	Uttar Pradesh	3	80m	10.00
2.	Chhattisgarh	4	80m	35.46
3.	Jharkhand	2	25m	0.50
4.	Kerala	2	25m	0.50
5.	Jammu & Kashmir	2	25m	0.50
Estimation & Validation of Wind Power Potential at 100m level in 7 States of India				
1.	Rajasthan	12	100m	16.64
2.	Madhya Pradesh	8	100m	1.00
3.	Tamil Nadu	12	100m	2.05
	Total			**178.47**

Consultancy Projects

In addition to the wind monitoring projects funded by MNRE, NIWE has carried out 133 consultancy projects during the year 2014-15 towards supporting the industry and developers. These short-term projects were to provide Micrositing services, Repowering services, preparation of Detailed Project Report and preparation of due diligence reports. In addition, technical services like verification of data collection procedure adopted by private firms were undertaken under the direction from the Ministry and 2 wind monitoring stations have been commissioned under consultancy projects.

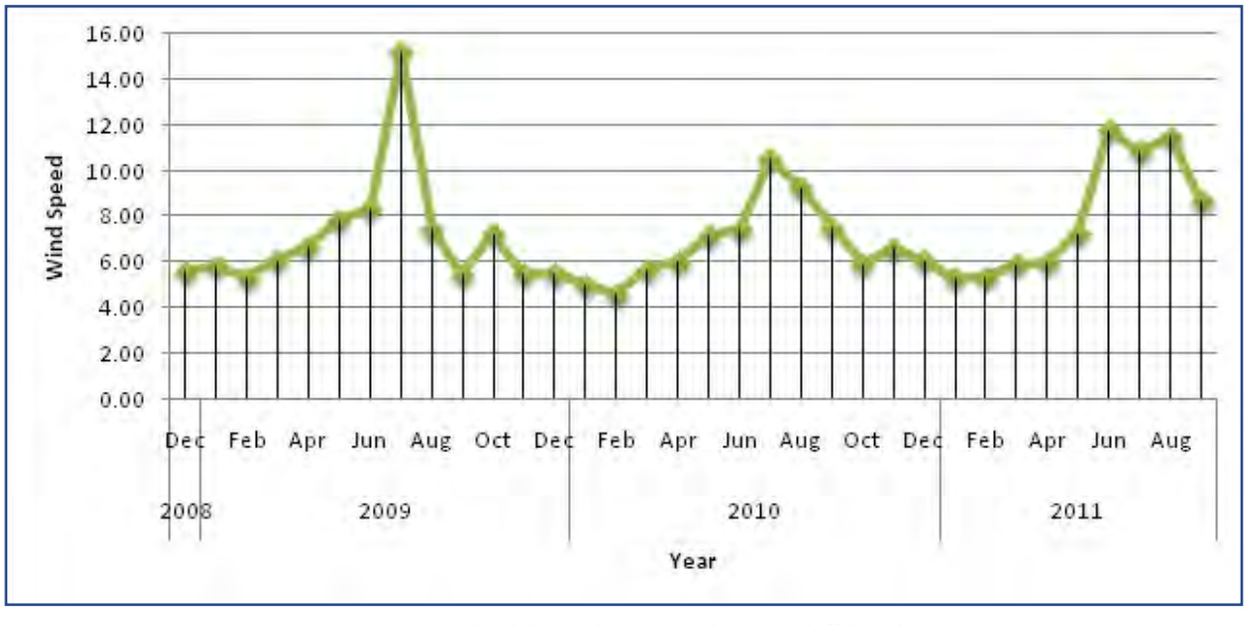
Design and Development of a Photonic System for Real Time Remote Monitoring of Wind and other Air Parameters

As a R&D project, Memorandum of Understanding (MoU) has been signed between NIWE and Gayatri Vidya Parishad – Scientific and Industrial Research Centre (GVP-SIRC) for "Design and Development of a Photonic System for real time remote monitoring of Wind and other Air Parameters". The project involves demonstration of concept, proto-type development and field evaluation at NIWE's test site and a project monitoring committee has been constituted for reviewing the progress of the project. GVP-SIRC has designed and developed a photonic system and the same is being validated with the 120m met mast and other remote sensing instruments results. Validated the model designed by GVP-SIRC at Kayathar by NIWE scientists. The work is under healthier progress and the preliminary prototype of the model has been developed. The field evaluation of the prototype is planned to be carried out in the month of June 2015.

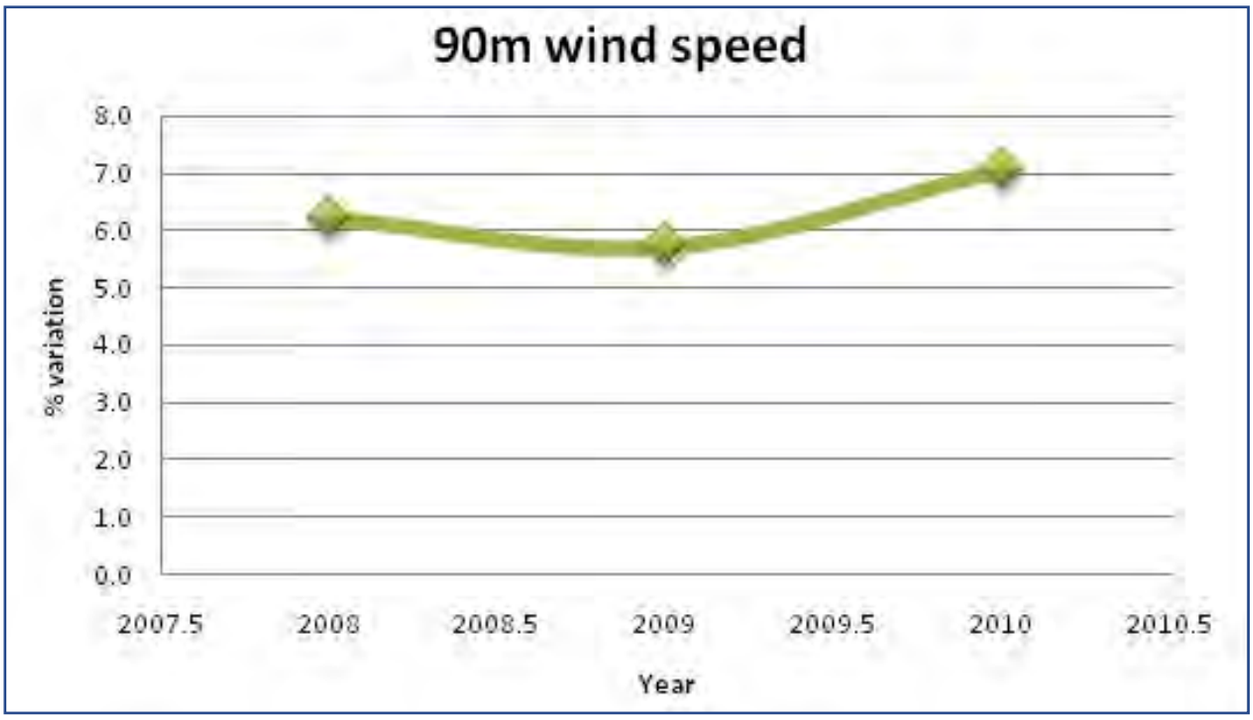
Photonic system validated with the 120m met mast and other remote sensing instruments results at Kayathar

Wind Measurement at 120m level

To understand wind shear profile and collect longterm wind profile for assisting wind power forecasting, five numbers of 120m tall guyed wind monitoring stations have been installed are operational at Lamba (Gujarat), Akal (Rajasthan), Jagmin (Maharashtra), Jogimatti (Karnataka) and Kayathar (Tamil Nadu). Measurements are being carried out at 10m, 30m, 60m, 90m & 120m levels above ground level. The measured data will also be useful in wind resource mapping & wind atlas, understanding inter annual variation of the wind speed in those region and for wind farm forecasting.



Inter annual variations at 120m mast at Jagmin site in Maharashtra



Based on 90m level analysis, Inter-annual variation (%) would be lying between 5.7 to 7.1%

Micro Level Indian Wind Atlas

NIWE is currently involving in the preparation of Micro Level Indian Wind Atlas on GIS platform with land suitability estimation. Under the work, through meso-micro coupled modelling technique, the vector layers for wind speed, wind power density, air density, per cent of CUF (Capacity Utilization Factor) will be prepared for the whole country, including the Island with the resolution of 500m at different industrial interested heights like 80m, 100m, 120m and 150m. Post map preparation, the results will be combined with the land use land cover map of NRSC / ISRO, Hyderabad to estimate the suitable land availability for utility scale wind farm development. Moreover, the resultant maps will be fine-tuned with actual measurements and other available data sources such as electrical substations details, protected areas, etc., to enhance the usability. The work is under progress and the results are expected to help the government in policy making and will encourage industry and academic community to move forward.

Repowering of Existing Wind Farms

Commercial wind farms were established in India in early 1990s. During this period, the rating of Wind Electric Generators (WEG) available was 225 - 250 kW, tower / hub height was about 30m and rotor diameter of approximately 30m. The energy generation per kW rating of these WEGs or Capacity Utilization Factor (CUF) was also less, at around 15-20 per cent. In present scenario, much larger capacity WEGs are available with taller tower, higher

rotor diameter and advanced design features. Consequently the CUF now available is almost double. Therefore, efforts have been initiated to remove old WEGs of lower rating and install larger WEGs having vastly improved design features and much taller towers to substantially increase energy generation per hectare of land area used. This process is known as "RE-POWERING", which is the replacement of first-generation small-capacity wind-turbines with modern multimegawatt wind-turbines. It is a process with which half the infrastructure, will double the installed capacity and triple the generation.

In order to carry out repowering of wind farm, initially in Tamil Nadu details of the lower capacity machines are being collected at various locations. Few of the wind farm analysis have been completed.

S. No.	Site Name	Existing Wind Farm Capacity MW	Repower-ing Capacity MW	Repower-ing Ratio	Turbine capacity considered for Repower-ig analysis	Layout Configu-ration
1	Site A	2.75	14.0	1:5.1	1000 kW	3D x 5D
			7.0	1:2.5		5D x 7D
2	Site B	5.75	17.0	1:3.0	1000 kW	3D x 5D
			8.0	1:1.4		5D x 7D
3	Site C	4	4.8	1:1.2	800 kW	3D x 5D
4	Site D	2	5.6	1:2.8	800 kW	3D x 5D
5	Site E	2	6.0	1:3.0	1000 kW	3D x 4D
6	Site F	4.95	10.0	1:2.0	2000 kW	> 4D
7	Site G	5.63	12.0	1:2.1	2000 kW	> 4D

Assessment of Wind Power Potential at 100m level in India

As per the Indian Wind Atlas, installable wind power potential has been estimated as 49 GW at 50m about ground level and 102 GW at 80m level with the assumption of 2 per cent land availability in the wind farm potential area. In order to validate 80m level, MNRE has sanctioned the projects to carry out wind measurement upto 100m level in 75 locations in 7 States of India.

Under this project, 75 numbers of 100m tall lattice wind monitoring stations were planned to be commissioned in the 7 windy States of the country. As on date, out of 75 Wind Monitoring Stations, 74 stations have been successfully commissioned and data acquisition

is in progress. The details are tabulated in the following table.

S.No.	State	Details of WMS commissioned at 100m level		
		Total No. of WMS sanctioned	Total No. of WMS commissioned	WMS's having one year data
1	Andhra Pradesh	10	10	9
2	Gujarat	12	12	8
3	Karnataka	13	13	12
4	Maharashtra	8	8	4
5	Madhya Pradesh	8	7	2
6	Rajasthan	12	12	8
7	Tamil Nadu	12	12	11
	Total	**75**	**74**	**54**

Special Training Course

In order to create awareness among the SNA officials regarding the importance of Wind Resource Assessment, a special Training Course on "Wind Resource Assessment & Wind Energy Technology" was organized by NIWE during 10th to 18th November 2014 at NIWE campus.

The prime objective of this training course is to transfer knowledge and needed skills to the officials from State Nodal Agencies / Departments for effectively implementing the wind power projects and Renewable Energy technologies in their respective States and also, to provide an invaluable platform for exchange of professional and cultural experiences amongst diverse participants from all parts of the country.

The training course was attended by 30 participants from 13 States (Andhra Pradesh, Telangana, Kerala, Karnataka, Arunachal Pradesh, Jammu & Kashmir, Chhattisgarh, Sikkim,

Shri.Ajay Shukla, Director, MPUVNL inaugurating the training

Course Material Release

Rajasthan, Mizoram, New Delhi, Madhya Pradesh and Uttar Pradesh) and 1 Union Territory (Lakshadweep) across the country and the course was highly appreciated by the participants for its intellectual level and the way of organization. The 9 days programme included class room lectures, field & factory visits and practical training sessions to provide complete knowledge transfer to the participants.

The participants were provided with Course Material which is a compilation of the write-ups of all the presentations / lectures submitted by the lecturers. This would be a ready reference study material for the participants to revise their studies. The book was also a tool for the participants to prepare themselves in advance during the training course and to prepare for the next day classes.

The training addressed the following aspects:

- Wind Resource Assessment and Techniques
- Wind Measurement and Instrumentation
- Software tools in WRA
- Indian Wind Atlas Methodology and its Application
- Wind Data Measurement and Analysis
- Forecasting and Scheduling of Wind Power
- Overview of Wind Turbine Components
- Wind Turbine Generators
- Small Wind Turbine and Hybrid System
- Micrositing of Wind Farm and issues
- Economic analysis wind farm practical issues
- Offshore wind energy-An overview
- Solar Radiation Resource Assessment
- Solar Photovoltaics technology-An overview

As part of the training course, the practical training with Wind Resource Assessment and Instrumentation, was arranged apart from the factory visit to M/s. Leitwind Shriram Pvt. Limited at Gummidipoondi, where they had a chance of listening from the industry experts who are actually in the process of making wind turbines and visiting the manufacturing facilities.

Further, the participants also travelled to southern part of Tamil Nadu to visit Wind Turbine Test / Research Station at Kayathar and got to know about large and small wind turbine testing process and they also had opportunity of visiting wind farms in and around

Chief Guest Shri.Karl Friedrich distributing the Certificates to the participants

Kanyakumari, where wind turbines are installed in large numbers like coconut trees.

The 9 days training session was concluded on 18th November 2014 with the Valedictory function chaired by Mr. Karl Friedrich, TUV Rheinland, Germany and distributed course Certificates to the participants.

The intellectual level of the course was rated by 46 per cent of the participants to be Excellent and the rest felt that it was good. Therefore, the selection of topics has been good and well received. The range of the selected topics for the training course was well appreciated and 100 per cent of the participants had rated it excellent and good. The suggestions of the participants may be considered in the upcoming trainings. The participants were very much satisfied by the quality of lectures and hospitality arranged and the feedback from the participants need for more number of training courses like this frequently.

SNA /Stakeholders / Wind Turbines Manufacturers Meeting

A stakeholders meeting was convened on 11th February 2015 in the Conference Hall of NIWE with State Nodal Agencies (SNAs), Wind Turbine Manufacturers, Developers, IWPMA, IWPA, MNRE and NIWE officials to understand the bottlenecks in the implementation of the 500 numbers of 100m level wind monitoring stations under NCEF scheme and to determine the next course of action to be initiated in implementing the scheme. This would facilitate to understand the actual requirements of both stakeholders & SNA to implement the scheme more effectively.

Totally, 18 participants from wind turbine manufacturer / developers / Association, 8 participants from State Nodal Agencies, 1 representative from MNRE and 11 participants from NIWE have attended the meeting.

Dr. S. Gomathinayagam, Director General (DG), NIWE welcomed all the participants and

NIWE & MNRE officials during the SNA / Stakeholders meeting

explained the advantages of the scheme and briefed about the issues faced by NIWE in implementing the MNRE guidelines. In addition, DG, NIWE informed that MNRE would like to speed up the WRA project throughout the country and explained the purpose of PPP mode to collect the bankable wind data in unexplored areas across the country. He further informed that the main intention of the scheme is to study the Wind Power Potential at 100m level in 500 locations across the country. Initially, the cost sharing ratio of the scheme is 40 per cent from National Clean Energy Fund, 30 per cent from SNAs and 30 per cent from manufacturers. However, based on the financial constraint faced by SNAs, government provided relaxation to decide 60 per cent cost sharing by concerned SNA / Private developer itself.

Mr. A. Hari Bhaskaran, Scientist 'B', MNRE explained about the importance of the scheme and re-iterated that the scheme was framed after due consultation with Wind Turbine Manufacturers, Developers, SNAs and Stakeholders. He also informed to all the stakeholders that the Ministry was decided to expedite the wind monitoring stations establishment process by involving more private people and stakeholders so that the government shall know the exact or close to exact figure of Wind Power Potential of 100m level. He requested all the participants to offer frank feedbacks so that MNRE may carry out suitable amendment in the guidelines.

Mr. K. Boopathi, Additional Director & Head, WRA, NIWE made a detailed presentation about the scheme.

During the meeting, many Private entities, Stakeholders and SNAs raised various queries on

MNRE guidelines. DG, NIWE and the Head, WRA clarified all the queries raised by SNAs and Private developers. DG, NIWE directed Head, WRA and MNRE representative to take up requirements of Industry to the higher authorities of MNRE so that MNRE shall incorporate suitable amendment in the guidelines.

Technical Committee Meeting

- Committee Meeting 1st, 2nd & 3rd for selection of suitable vendor for supply of satellite images and processed output Map layers in Vector format for the States of Andhra Pradesh and Telangana has been convened at NIWE, Chennai on 14th October 2014, 13th November 2014 and 9th December 2014 respectively.
- 1st, 2nd, 3rd & 4th Technical Committee Meeting has been convened to finalize the specification of the data set to be procured before floating the global tender for procurement of Basic Wind Parameters map for the Re-assessment of wind potential in India at NIWE, Chennai on 29th October 2014, 11th December 2014, 19th February 2015 and 18th March 2015 respectively.
- Committee Meeting for design and development of a Photonic System for Real Time Remote Monitoring of wind and other air parameters has been convened at NIWE, Chennai on 14th November 2014.
- Technical Committee Meeting to evaluate the purchase of Data Loggers, Pressure Sensors & Solar Radiation Sensors for establishment of WMS in Assam for M/s. Oil India Limited has been convened at NIWE, Chennai on 13th January 2015.
- Meeting on finalization of the study report for the project "Repowering & Techno economic feasibility study" for M/s. TNPL has been convened at NIWE, Chennai on 16th February 2015.
- Second Project Monitoring Committee Meeting to review the report submitted by M/s. G.V.P. Scientific and Industrial Research Centre on SAMIRA "Vertical Wind Profiling System Automated Collimation, Translation and Data Acquisition" convened at NIWE, Chennai on 25th March 2015.

Other Programmes

- Memorandum of Understanding has been executed between NIWE & BITS, Pilani for the purpose of academic / research / training / socio economic activities and interaction on 19th February 2015 at NIWE, Chennai.
- A six minutes Video documentary about NIWE with voice over, sound effects & background music for uploading in the MNRE / NIWE website / youtube has been completed.
- Installation and commissioning of 10m Wind Monitoring Station at NIWE premises.

Wind Turbine Testing

NIWE'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 75m and 50m for acquiring meteorological data at the hub heights of the test turbines.
- Two control rooms, one for each Test Bed with state-of-art data acquisition systems and one office building.
- 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 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, training calibration etc.

Detailed Work / Contribution

NIWE has established a test facility at Wind Turbine Test Station (WTTS), Kayathar, where wind turbines can be tested according to 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.

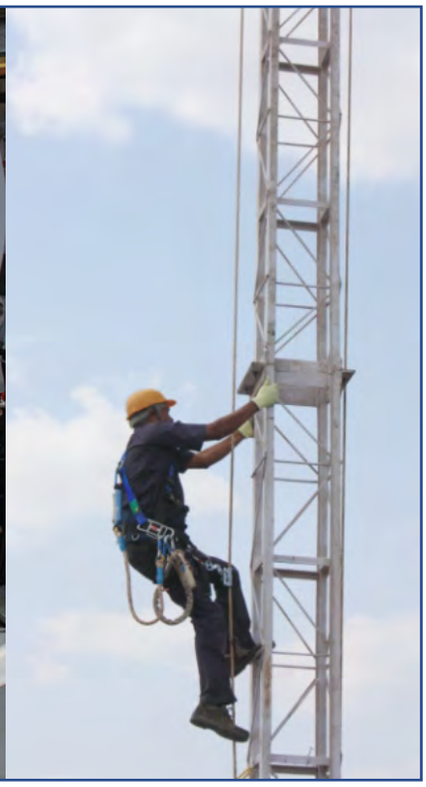
The testing facilities are certified as per the requirements of ISO 9001:2008 and accredited as per the requirements of ISO / IEC 17025:2005.

Important Events

- Measurements for Power Curve of Garuda 700 kW Wind turbine at Melamaruthappapuram Village, V. K. Pudur Taluk, Tirunelveli District has been completed.
- Measurements for INOX 2000 kW wind turbine at Veraval (Bhadla) village (Survey No.8), Jasdan Taluk, Rajkot District, Gujarat has been completed.
- Measurements for Power Curve of GWPL 2500 kW Wind turbine at Vzhaspeth, Sangli District, Maharashtra has been completed.
- Measurements for Type Testing of XYRON 1000 kW wind turbine at Richadewda, Ratlam District, Madhya Pradesh of M/s. XYRON Technologies Limited are expected to start during windy season of 2015.
- Measurements for Type Testing of GVSL 1700 kW wind turbine at Kampaneari Pudhukudi (Village), Tenkasi (Taluka), Tirunelveli District, Tamil Nadu of M/s. Garuda Vayu Shakti Limited are expected to start during windy season of 2015.

- The Inter Laboratory Comparison with NREL, USA in Power Curve Measurements as per the requirements of IEC 61400-12-1 has been completed.
- The Inter Laboratory Comparison with 18 accredited Laboratories in Power Curve Measurements as per the requirements of IEC 61400-12-1 has been completed.
- An Indigenous data acquisition equipment for Type Testing and In-Situ Testing using National Instruments have been developed.
- An Indigenous interface software CWETDAQ using Labview has been developed.

Factory Instrumentation of Garuda 1700 kW WT



Met Mast Instrumentation of Xyron 1000 kW WT

Achievements

- The re-certification of the services as per the requirements of ISO 9001:2008 has been achieved and is valid till August of 2016.
- The re-accreditation Audit as per the requirements of ISO/IEC 17025-2005 was held and completed successfully on 1st and 2nd December 2014 at WTTS, Kayathar.
- Received Leadership Appreciation for the Testing Services from a member of the Indian Wind Industry in 2014.
- Participated and member in the ET 42 Sub Committee of the Bureau of Indian Standards.

Innovation / New Facilities / New Infrastructure

- The designing of a proposal for Wind Power Forecasting under the Indian-Spanish joint calls for research which is currently under progress.
- The implementation of new instrumentation techniques with embedded Data Acquisitions Systems.
- The establishment of a surveillance system to monitor measurements at remote sites and also to carry out tests from NIWE, Chennai.

Future Plans

- Improve skill sets and qualifications of personnel in the Unit.
- Continual improvement on measurement techniques and equipment with strengthening of the Quality Management System.
- Improved focus on research related work beneficial for the wind industry.
- Inter laboratory comparison in the area of Mechanical loads as per the requirements of IEC 61400-13 and its improvement before the next re-accreditation as per the requirements of ISO/IEC 17025:2005.
- Inclusion of noise, power quality, LVRT and blade tests in the accreditation scope.

Wind Turbine Research Station

NIWE established Experimental Wind Turbine Research Station at Kayathar, Thoothukudi District, Tamil Nadu about 600 kms away from the State Capital Chennai towards south of Tamil Nadu. The Experimental Research Station was established in one of the Windy Pass Area namely Senkottai Pass which is considered as best windy area in Tamil Nadu. This station was spread over approximately 100 acres of land with total Wind Electric Generators installed capacity of 4400 kW which comprising 24 years old nine 200 kW Wind Electric Generators (WEG), one 600 kW WEG and one 2000 kW Variable Speed WEG for conducting various R&D related activities in addition to Type Testing Facilities of Large WEG and Small Wind Turbine performance testing facilities at the Test Beds created with all infrastructure facilities at the Research Station. This NIWE owned R&D infrastructure machines at Kayathar comprises first generation (200 kW) WEG`s and latest generation (2000 kW variable speed) WEG. Various Strategic efforts were being experimented to improve the machines' overall efficiency for the first generation WEG`s (200 kW) after complete renovations of the machines.

Regular Operation & Maintenance and Machine efficiency improvement methods carried out on nine 200 kW WEG at WTRS, Kayathar

After a complete renovation of nine 200 kW MICON WEG`s, regular Operation & Maintenance works like torque of towers, gear oil replacement, conditioning of control panel & power panel, inspection / replacement of various sensors, replacement of defective spares, conditioning of nine 400 / 11 kV Transformers, transmission line maintenance are being successfully completed for the un-interrupted operation of the machines during the windy seasons.

WTRS Unit successfully carried out a experimental study by introducing suitably fabricated improved version of gear oil cooler with provision of Air Ventilator and Increased Radiator

Gear Oil Cooler with Air Ventilator and Increased Radiated Air fins

Fins at the Nacelle itself for the cooler in one of the 200 kW MICON WEG for better Gear Oil Temperature reduction. WTRS analyzed better results in gear oil temperature reduction which reduced the breakdown of the machine during peak wind season.

Solarisation of Wind Farm at WTRS, Kayathar

In the experimental research wind farm at WTRS, Kayathar a hybrid study on grid integration of 75 kWp Solar PV power plant with one of the 200 kW first generation MICON WEG for maximum utilization of connected grid load during season / off-season periods by utilizing the existing land, transformer, transmission lines etc. is under progress. This solarisation (wind-solar grid connected hybrid) of wind farm is first of its kind effort in India. The research knowledge and experience on the field performance of large scale integration of Solar PV with Wind Farm (wind energy) will throw new light to maximize full load grid connected capacity for increasing the net (wind – solar) capacity utilization factor (CUF) of the plant during season / off-season periods.

Industrial Visit to R&D facilities at WTRS, Kayathar

Over view of Testing / R&D facilities at WTRS / WTTS, Kayathar and field exposure training were imparted to the students on safety measures on WTG`s, O&M / met masts measurements / demonstration on small aero-generators.

- 6 M.Tech students from Periyar Maniyammai College of Engineering, Vallam, Tanjore visited on 2nd April 2014.
- 36 Students and 2 staff from V. V. College of Engineering, Thesayanvilai, Tirunelveli visited on 2nd August 2014.

- 30 Students and 3 staff from Shri K. Ramakrishna College of Engineering, Samayapuram, Trichy visited on 21st August 2014.
- 9 M.Tech (Energy) students & 1 staff from Centre for Energy & Environment, Rajasthan Technical University visited on 9th December 2014.
- 200 students and 8 staff from Three Higher Secondary Schools around Kayathar visited as part of celebration of "National Science Day" on 27th February 2015.

Special Dignitaries visit to R&D Facilities, Kayathar:

- 22 delegates of 13th International Training Programme on "Wind Turbine Technology and Applications" visited on 23rd March 2014 .
- 16 delegates of 14th International Training Programme on "Wind Turbine Technology and Applications" visited on 11th September 2014.

14th International Training Course Participants visiting Small Wind Turbine testing

- 7 delegates from Korean Consulate, Chennai visited on 19th September 2014.
- 29 officials from various State Nodal Agencies visited on 14th November 2014.
- 4 officials from Central Electro Chemical Research Institute (CECRI), Karaikudi, Tamil Nadu visited on 24th November 2014.

- 4 officials from National Aeronautics Laboratory, Bangalore.
- 21 delegates of 12th International Training Course on "Wind Turbine Technology and Applications" Specially for African Countries visited on 5th December 2014.
- Ms. Varsha Joshi, I.A.S., Joint Secretary alongwith MNRE officials visited on 18th October 2014 and inspected the various R&D / Testing facilities at WTRS.

Smt. Varsha Joshi, I.A.S., Joint Secretary, MNRE inaugurated the Fitness Centre for staff at WTRS, Kayathar

- 3 officials from GIZ (Indo German Energy Program), Green Energy Corridors visited on 7th January 2015.
- 21 delegates of 15th International Training Course on "Wind Turbine Technology and Applications" visited on 26th February 2015.

Standards & Certification

Wind Energy Sector is continuously growing in India with the introduction of more new wind turbine models and more installed capacity. 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 Ministry of New and Renewable Energy. The Scheme has been prepared in line with the requirements of International standards viz., IEC standards while taking into account of Indian external conditions. Standards & Certification (S&C) Unit of NIWE is implementing TAPS-2000 (amended) for certification of wind turbines.

S&C Unit has completed three projects on renewal of certificates of wind turbine models during the year.

Certification - Renewals Completed / Ongoing (2014-15)

S.No.	Manufacturer's Name	Wind Turbine Model / Capacity	Validity
1.	M/s RRB Energy Limited	V 39 – 500 kW with 47m rotor diameter / 500 kW	03.04.2015
2.	M/s RRB Energy Limited	Pawan Shakthi- 600 kW / 600 kW	04.07.2015
3.	M/s Southern Wind Farms Limited	GWL 225 / 225 kW	05.01.2016

NIWE has signed a Memorandum of Understanding (MoU) with M/s. TUV Rheinland Industrie Service GmbH, Germany & M/s. TUV Rheinland (India) Private Limited, Bangalore in connection with cooperation in the area of Type Certification of wind turbines.

Standards

S&C Unit is involved in the preparation of Indian Standards on wind turbines by supporting Bureau of Indian Standards (BIS). A Committee viz., Wind Turbines Sectional Committee (ET 42) has been formulated by BIS for the preparation of Indian Standards for the

Issuing renewed Certificate to M/s. RRB Energy Limited

Issuing renewed Certificate to M/s. Southern Wind Farms Limited

Signing MoU with M/s. TUV Rheinland Industrie Service GmbH & M/s. TUV Rheinland (India) Private Limited

preparation of Indian standards on wind turbines, under the Chairmanship of Director General, NIWE. S&C Unit, which is also part of BIS ET 42 Committee, provides the technical support in all the standards related works.

NIWE formulated a Working Group on standards consisting of experts from various stakeholders to assist NIWE in the standards related works. Based on the contributions, following four Indian Standards on wind turbines have been finalized so for and accepted by BIS, for publishing the same.

Document No.	Title of Indian Standard
ET 42 (6421)	Wind turbines Part 13: Measurement of Mechanical Loads
ET 42 (6422)	Wind turbines – Part 21: Measurement and assessment of power quality characteristics of grid connected wind turbines
ET 42 (6423)	Wind turbines – Part 24: Lightning protection
ET 42 (6424)	Electro technical Vocabulary – Part 415: Wind Turbine Generator Systems

During this year, works on the following two draft Indian Standards for finalization are under progress.

Document No.	Title of Draft Indian Standard
ET 42(6717)	Wind turbines - Part 4: Design requirements for wind turbine Gearboxes.
ET 42(6718)	Wind turbines - Part 11: Acoustic noise measurement techniques

India is a P-member (Participating member) in IEC TC 88 committee, which is responsible for issue of IEC standards for wind turbines. S&C Unit reviews draft IEC standards periodically forwarded by IEC through BIS. Based on the review & contributions from NIWE working group, S&C Unit provides the technical support to BIS on the voting of draft IEC standards at IEC TC 88 Committee. Additional Director & Head, S&C along with Director General, NIWE attended 5th meeting of Wind Turbines Sectional Committee, (ET 42) of BIS held at BIS, New Delhi on 11th August 2014.

Recently, IEC has formulated a separate system for the renewable energy sector viz., "IEC System for Certification to Standards relating to Equipment for use in Renewable Energy Applications (IECRE system)". IECRE system includes three sectors, namely – Solar PV Sector, Wind Energy Sector and Marine Energy Sector. Additional Director & Head, S&C

participated in the "IECRE Management Committee (REMC) and Forum meeting - Wind Energy" held at Boulder, Colorado, USA from 16th to 18th September 2014.

Based on the request provided by NIWE through MNRE, BIS has obtained the membership for India in IECRE system (IEC System for Certification to Standards relating to Equipment for use in Renewable Energy Applications).

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

Ministry of New and Renewable Energy (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 directives from MNRE, list of models and manufacturers is being issued by S&C Unit, NIWE.

The type certification involves multidisciplinary activities and requires the knowledge to understand and interpret the information on type certification scheme and other technical information provided in the type certificate. Hence, S&C unit provides the technical support to the RLMM committee constituted by MNRE, in the verification of the documentation provided by various wind turbine manufacturers and their manufacturing facilities to finalize the list. As a part of RLMM process, Additional Director & Head, S&C and S&C Engineer carried out the verification of the manufacturing facilities of various wind turbine manufacturers.

Three Revised List of Models and Manufacturers of Wind turbines (RLMM) lists dated 02.06.2014, 11.09.2014, 09.01.2015 have been issued by S&C Unit during the year. Nine new wind turbine models and one new wind turbine manufacturer have been included in the said lists in addition to various update on the existing wind turbine models (more than 50) and wind turbine manufacturers. In addition, consolidated lists of wind turbine models and manufacturers have been hosted in NIWE website. The works in connection with issue of next RLMM lists are under progress.

Prototype Wind Turbine Models

MNRE guidelines dated 22.05.2012 & addendum dated 20.09.2012 for installation of prototype wind turbine models in India are being implemented by S&C Unit. It facilitates the installation of Prototype wind turbine models in India to carry out the Type Testing for obtaining Type Certificate and to carry out the developmental works. The guideline document stipulates various requirements to be complied for obtaining the recommendation letter. NIWE has formulated a committee to take the suitable decision on issuing the recommendation letters. S&C, unit provides the technical support to the committee in the

verification of the documentation on the prototype wind turbine models provided by various wind turbine manufacturers. Recommendation letters are being issued by NIWE in connection with allowing the installation of a maximum number of 5 (five) wind turbine(s) of a specific prototype wind turbine model in India and synchronize with the Indian grid system.

During the year, the Unit has issued recommendation letters in connection with grid synchronization for three prototype wind turbine models for the purpose of type testing. In addition, recommendation letter in connection with grid synchronization has been issued for three wind turbines of one prototype wind turbine model for the purpose of developmental works.

MNRE - Committee on exemption of Special Additional Duty (SAD)

MNRE has constituted an advisory Committee for the recommendation of Wind Turbine Components in connection with exemption of "Special Additional Duty (SAD)", appointing Director General, NIWE, as Chairman and Additional Director & Head, S&C as Member Secretary and other external experts. S&C Unit organized the Advisory committee meeting on exemption of Special Additional Duty (SAD) at NIWE, Chennai and recommendation / opinion of the Committee was sent to MNRE, upon approval of Director General, NIWE.

Quality Management System

Wind Turbine Certification services of NIWE are certified as per the requirements of ISO 9001: 2008 by Det Norske Veritas. S&C Unit has successfully undergone the first periodic audit conducted by Det Norske Veritas as per ISO 9001:2008 and recommended for continuation of certification. The continual improvement and maintaining the Quality Management System are ongoing.

Information, Training and Commercial Services

The Unit is providing excellent facilities for learning, training and also reaching out to the public as well as industries to promote wind energy in the country. The following are the activities of the Unit during 2014-15.

Training Programmes

Apart from collation, processing, preserving and dissemination of wind related information, the prime activities of this Unit are organizing training courses for National & International participants.The Unit has trained 983 National and 341 International professionals through its 18 National and 17 International training programmes, since 2004. During the year 2014-15, 5 training courses - 2 National and 3 International have been conducted successfully, with the lectures of the courses delivered by eminent scientists, engineers and other wind energy professionals with years of experience drawn from NIWE, wind turbine industries and academic institutions. As part of every training course, Course Material (compilation of write-ups of all the presentations / lectures) is provided, specially prepared for the benefit of the participants.

National Training Courses

National training courses are of 3 days duration designed to orient the participants towards Wind Energy Technology. The Unit had organized its 16th and 17th National training courses on “Wind Energy Technology” during July 2014 and March 2015. 84 participants from diverse background across the country participated in the National training and there have been many suggestions and requests demanding frequent and special training courses.

16th National Training Course

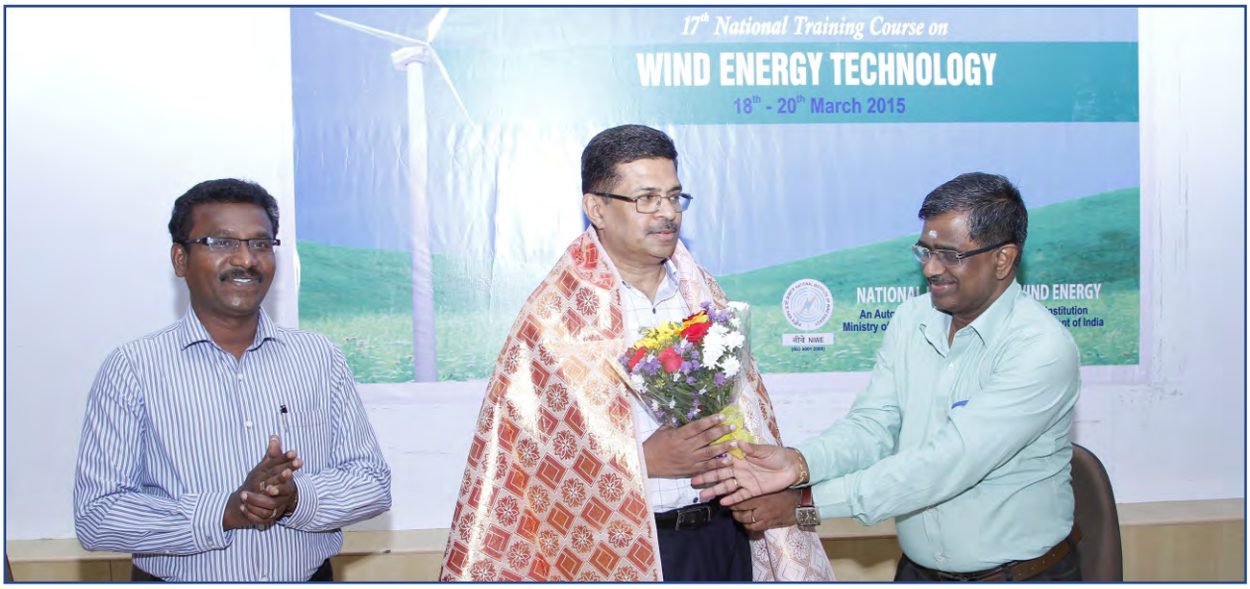
ITCS Unit had successfully organized the 16th National training course on “Wind Energy Technology” during 23rd-25th July 2014 to address all aspects of Wind Power starting from Wind Resource Assessment to project implementation and operations & maintenance in a

Dr. T. Ramasami releasing the Course Material

focused manner. The course was attended by 41 participants from wind turbine manufacturers, developers, investors, consultants and academia from 18 States of the country. There are 36 male and 5 female participants with diversed background participated in the course. The course was inaugurated by Dr. T. Ramasami, Former Secretary, Department of Science and Technology. As part of every training course, a course material, compilation of the write-ups of all the presentation / lectures submitted by the lecturers specially prepared for the particular content of the course for the benefit of the participants for a ready reference. The Course Material book was released by the Chief Guest. Mr. J.P. Singh, Director, MNRE was the Chief Guest for the Valedictory Function and distributed the Course Certificates to all the participants.

Shri. J.P. Singh distributing the Course Certificates

17th National Training Course (3 days)



Director General, NIWE honouring the Chief Guest Dr. E. Sreevalsan

17th National Training Course on "Wind Energy Technology" was successfully conducted during 18th-20th March 2015 to address all aspects of Wind Power starting from introduction to wind and its technology, wind resource assessment, installation, operation and maintenance aspects of wind farms along with financial analysis and CDM benefits. The course was attended by 43 participants from various organisations from 13 States of the country. The course was inaugurated by Dr. E. Sreevalsan, Assistant Vice President, Gamesa Wind Turbines Private Limited, Chennai. Dr. Purnima Jalihal, Chief Scientist, National Institute of Ocean Technology (NIOT), Chennai was the Chief Guest for the Valedictory Function and distributed the course certificates to all the participants.

Dr. Purnima Jalihal distributing the course certificate to the participant

Global Wind Day 2014 (NIWE - WWF Collaboration)

Since 2007, the Global Wind Day has been celebrated on 15th June to create awareness about the advantages and achievements of wind power. Since 2009, NIWE is celebrating the Day with various events among the School Children. To proactively reach the future kids, NIWE this year signed an MoU with World Wide Fund for Nature (WWF) – India. On the eve of Global Wind Day, NIWE - WWF jointly engaged over 100 School Children from various parts of the State at NIWE campus and shared basic knowledge about wind and renewable energy. As part of the celebration, Drawing and Elocution competitions on Wind Energy were conducted for the children and prizes were distributed to the winners. Dr. Malleshappa, I.F.S., Director Environment, Department of Environment, Government of Tamil Nadu was the Chief Guest and delivered special address to the students and their teachers. To create awareness in a bigger level, a book "Student Guide on Renewable Energy" was prepared and released on the day with lot of information about renewable energy including games that induce children to think on the Renewable energy. The Student Guide will be translated in different languages and distributed in larger community.

Glimpses of 2014's Global Wind Day Celebtration at NIWE

NIWE's Newsletter - PAVAN


pavan

ISSUE – 44 January - March 2015 Newsletter of NATIONAL INSTITUTE OF WIND ENERGY, Chennai http://niwe.res.in

EDITORIAL

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Thhe Unit has been regularly publishing the NIWE's bilingual (Hindi & English) Newsletter "PAVAN" every three months, which carries information about NIWE activities and services, wind energy news, technical articles and information on wind energy related events, and is very much useful for the wind industry. During this period, ITCS Unit had published four issues of PAVAN from 41st to 44th issue. The publication has received good feedback over the years. PAVAN aims to keep industry professionals, students and researchers updated about the progress in wind energy sector and NIWE activities & services. The following technical articles have been published in the 4 issues i.e., 41st to 44th : ■ 41 - Wind Power Forecasting For India by K. Boopathi, Unit Head, Wind Resource Assessment, National Institute of Wind Energy, Chennai, Jordi Ferror, Managing Director, VORTEX, Spain & Dr. S. Gomathinayagam, Director General, National Institute of Wind Energy ■ 42 - Quality Assurance & Quality Control For Wind Turbine by K. Muralidharan, Vice President (Quality), Leitner Shriram Manufacturing Ltd., Chennai ■ 43 - Repowering of Wind Farms : Issues and Proposals in India by Dr. S. Gomathinayagam, Director General, National Institute of Wind Energy ■ 44 - The Relevance of Wind Energy System in the Indian Energy Scenario by Dr. C. Sharmeela, Assistant Professor (Sr. Gr. in EEE), A.C. Tech, Anna University, Chennai & P. Thangavelu, Chief Engineer (Retd.), Tamil Nadu State Electricity Board (TNEB), Chennai, India.

Prof. Anna Mani Information Centre

ITCS Unit has established and is managing the state-of-art NIWE Library named after renowned meteorologist "Prof. Anna Mani" Information Centre, with about 2000 books on renewable energy in general and wind energy in particular with allied subjects. Prof. Anna Mani Information Centre plays a vital role in Wind Research and Development by way of providing necessary assistance in terms of facilitating important information resources in both printed and e-document form related to Wind Energy and its core subjects. It identifies, evaluates, procures, processes and then makes learning resources available to the Scientists,

Technical and Non-Technical Staff for their learning and research assignments. The information centre provides effective information support towards accomplishing different activities of NIWE. The centre is being strengthened regularly by adding more books, periodicals (Indian & foreign journals / magazines), standards, reports, etc. The collection covers the areas such as wind energy, renewable energy, sustainable energy and related subjects like electrical, electronics, mechanical, environmental sciences and computer disciplines. For easy and quick reference, the centre has been automated by using library automation software and made available Online Public Access Catalogue. The centre has subscription to membership with leading Libraries like IIT Madras, Anna University and American Library for reference purposes. Apart from NIWE staff, the Library is widely used by many industry professionals, students and research scholars for their project and research works.

Prof. Anna Mani Information Centre

NIWE - IWTMA Knowledge Forum

NIWE & IWTMA jointly has been conducting "Knowledge Forum" on various latest advancements in the field of Wind Energy as a platform to collectively develop the knowledge of the industry & NIWE. Similar to previous events, Knowledge Forum on "Virtual Simulation for Wind Energy" by MSC Software Private Limited, Bangalore was organized on 28th January 2015. Various professionals from Wind Industry, NIWE Scientists & other R&D institutions have attended the forum.

Participation in Exhibition

NIWE had established and mananged its Stall in the following exhibitions to create awareness and share the knowledge about NIWE activities & services to the visitors in various capacities.

- "Green Summit 2014" organized FKCCI at Bangalore during 5th to 7th June 2014.
- "Renergy 2014" organized by Tamil Nadu Energy Development Agency (TEDA) during 12th to 14th June 2014 at Chennai Trade Centre, Chennai.
- 102nd Indian Science Congress 'Pride of India 2015' Exhibition organized by Indian Science Congress Association at Mumbai University, Mumbai during 3rd to 7th January 2015. NIWE Stall has been awarded as "Best Stall design".

NIWE Stall | Award | Receiving Award

- 1st Renewable Energy Investment Meet & Expo "RE- INVEST 2015" Expo organized by Indian Renewable Energy Development Agency (IREDA) at New Delhi during 15th to 17th February 2015. Hon'ble Minister of State (I/C) for Power, Coal and New & Renewable Energy, Shri. Piyush Goyal inaugurated the NIWE Stall.

NIWE Stall | Hon'ble Minister inaugurating the Stall

Visitors to the Centre

To motivate the students towards awareness and research on wind energy, achieving the indigenization and also to explain about the activities and services of NIWE, the following visits were coordinated by ITCS Unit with a presentation on wind energy and its status along with NIWE activities & services. The campus renewable energy facilities were also explained / showcased in detail.

498 students from 11 educational institutions visited NIWE campus during the year were coordinated.

School Students Visit

S.No.	Name of the School	No.of Students	Date of Visit
1	RMK. Senior Sec School	92	08.10.2014
2	St. John's Public School	70	10.10.2014
3	Vel Tech Dr. R.R & Dr. S.R Mat School	68	07.11.2014
4	Akshayah Matriculation Hr.Sec.School	70	01.12.2014
5	M. S. Swaminathan Research Foundation	14	12.01.2015

College Students Visit

S.No.	Name of the Institutions / Organization / College	Department	No.of Students	Date of Visit
1	National Institute of Technical Teachers Training & Research, Polytechnic College	EE	22	28.10.2014
2	Loyola – ICAM College of Engineering and Technology (LICET)	EEE	63	29.01.2015
3	MARG Institute of Design and Architecture Swarnabhoomi (MIDAS)	B.Arch	34	11.03.2015

Special Visits

S.No.	Participants from	No.of Visitors	Date of Visit
1	University of Georgia, Athens, USA (Co-Ordinated by SRM University Students along with Faculty Members)	16	11.03.2015
2	National Institute of Technical Teachers Training Research (NITTTR)	25	11.03.2015

Special Visitor

Ms. Varsha Joshi, I.A.S., Joint Secretary (Wind Energy), MNRE has visited NIWE on 17th October 2014 and given inspiring address to NIWE Staff members. She also inaugurated the interdisciplinary work group facility at NIWE covering four major thrust areas of Aeromechanical design, Wind resource / farm plannig assessment, Electrical / Electronics with Grid quality power and computational analysis and simulation. The Director General explained all the activities and services of NIWE apart from showcasing the campus facilities.

Glimpses of Joint Secretary Visit

Engineering Services Division

In the modern resource assessment, Wind and Solar sectors requires sophisticated instrumentation and data acquisition systems interfaced with network servers using GPRS, which need to be maintained on 24x7 basis to facilitate resource data collection, storage, retrieval, analysis and processing.NIWE's infrastructure needs multi-disciplinary engineering services starting with Civil, Electrical, Information Technology including cyber security, planning, maintenance and management. Engineering Service Division (ESD) of NIWE caters to the above services. Details of some important works are as follows:

- The ESD Unit has completed the task of converting 15 kW off-grid systems to grid-tie system project work on 11th June 2014 and working in good condition.

- NIC e-mailing facilities has been provided to all NIWE regular staff.
- NIWE installed Surveillance system in the campus in phased manner, initially 12 cameras (7PTZ 5 Fixed zoom) were installed to monitor the entry and exits of main building. 2 PTZ cameras were installed one near sewage water treatment plant and other on the roof top to monitor SRRA calibration lab. Subsequently 7 cameras (IR Dome cameras) were installed in the ground floor and first floor of NIWE building. Hence NIWE campus is continuously monitored both inside the main building, Boundaries, Entrance and Exits with the help of 21 cameras.

- Solar blinker name board has been installed in the front side of the NIWE main gate, on the road side (both side) for easily identification of the office location and safe entry during heavy traffic.

- Installation of Solar water heater system at Guest House has been completed.
- Replaced the new NIWE name board at Reception hall dome.

- Installation of flood lights has been completed and working in good condition.
- Installation of 30 kW SPV power plant at roof top, technical comparison is under progress.
- Installation of 380 kVA Diesel Generator and 62.5 kVA Diesel Generator purchase work order has been issued.

- Constructed the horticultural signage of NIWE at front entrance of NIWE building.

- Solar water pump process has been completed.
- CPWD civil works (construction of NIWE compound wall at front side) is under progress.

Achievements

- ESD Unit successfully conducted the Networking Cyber Crime training at NIWE, Chennai during 8th & 9th August 2014. The training was useful and officials from NIWE and neighbouring government institutions attended the training.

New Infrastructure Developed

- 15 kW on grid SPV power project
- Surveillance system
- Solar water heater
- Video Conferencing System
- 2 Diesel Generator of 380 kVA & 62.5 kVA
- Restructuring of NIWE-LAN

Solar Radiation Resource Assessment

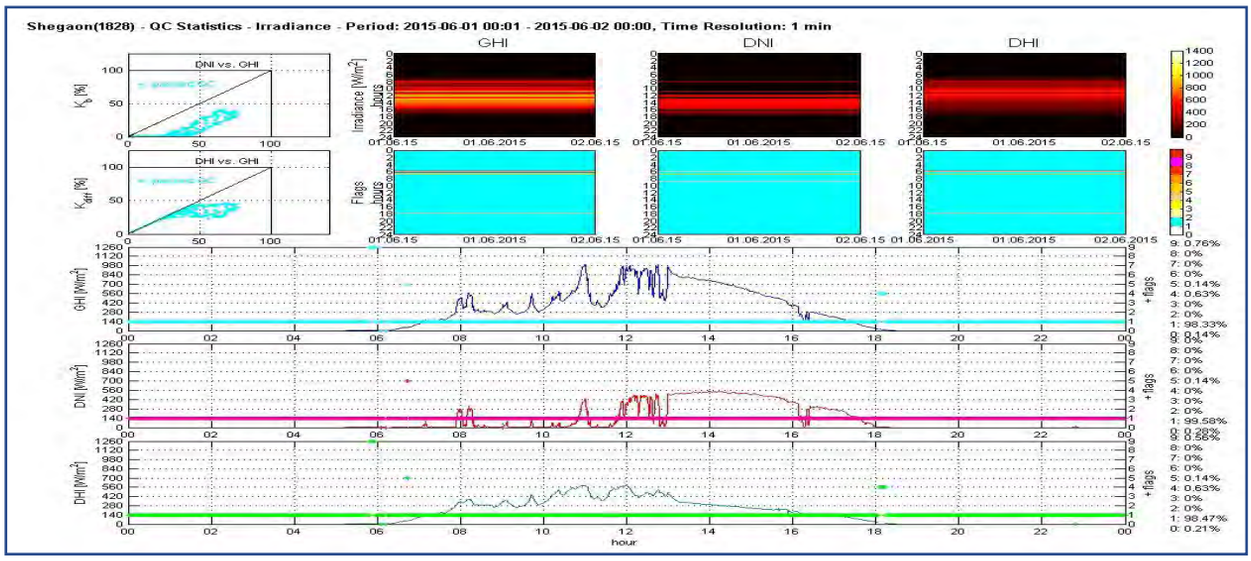
Ministry of New and Renewable Energy (MNRE), Government of India has sanctioned a project for the establishment of nation-wide network of Solar Radiation Resource Assessment (SRRA) stations to make available good quality measured solar radiation data to meet the specific challenges in the implementation of National Solar Mission(NSM). One of the major objectives of NSM is to establish India as a global leader in Solar Energy.

The SRRA project is implemented by National Institute of Wind Energy (NIWE) [formerly Centre for Wind Energy Technology C-WET)], Chennai, an autonomous R&D institution under MNRE, because of its rich experience in Wind Resource Assessment and development of Wind Atlas of the nation, an exclusive SRRA unit was established at NIWE to collect and analyze solar and other relevant meteorological data crucial for planning and implementation of solar power plants. The scope of the SRRA project is to assess and quantify the ground data of solar radiation, data processing & quality assessment of data collected, modeling and making of Solar Atlas of the country.

Contributions

The following are the details of the work done by the Unit during the period 2014-15.

- A quarterly Interim report based on data from the 4 MEDA SRRA stations prepared and sent to MEDA.
- A proposal for 100 numbers of Low cost SRRA stations prepared and submitted to MNRE for approval.
- Proposal for the merger of the Phase I & II submitted SRRA program to the Ministry.
- Revised quality control algorithm introduced in the data processing and analysis.
- A Technical committee meeting on "Expression of Interest" on HR and capacity building held on 29th April 2014 at NIWE, Chennai under the chairmanship of Dr. S. Gomathinayagam, Director General, NIWE.



- Micrositing for establishing two more SRRA stations in Maharashtra for MEDA was carried out at Washim & Latur.
- Relocated the Mandsaur SRRA station to Gwalior and Vellore SRRA station at VIT within the campus.
- Dr. G. Giridhar visited & discussed on making wind and solar atlas with the technical help from NRSC at Hyderabad on 16th October 2014.
- Procured satellite derived solar radiation data products from M/s 3 Tier R& D India Pvt. Limited.
- Quality Control of the procured Satellite data was carried out and quality control statistics report was generated.
- A delegation from U.S. Department of Energy (DoE) / National Renewable Energy Laboratory (NREL) visited and discussed on the SRRA activities in India at NIWE on 11th November 2014 .
- SRRA Mobile application on Android and Windows platform launched by Dr. Elena Berger, DOE, USA at Chennai on 11th November 2014.
- One day workshop on “Solar Resource Assessment and Solar Project Development” held at NIWE Chennai jointly with U.S. Department of Energy (DoE) / NREL on 12th November 2014.
- Dr. G. Giridhar participated in the discussion about SRRA project Phase I, II & III and establishment of NISE Calibration Lab with MNRE, NISE & SECI officials at New Delhi on 8th December 2014.
- Mr. R. Karthik visited and discussed with GIZ & Suntrace officials regarding assessment of satellite data and preparation of Solar Atlas at GIZ, New Delhi on 9th December 2014 .

- Micrositing was carried out for relocating the Neemuch SRRA station at Sitamau, Madhya Pradesh on 19th January 2015.
- Final report on SRRA based on the one year data collected from the 4 MEDA stations established under consultancy program sent to MEDA, Pune.

Achievements

- During the financial year 2014-15, 27 solar developers have purchased solar data of 74 SRRA stations amounting to Rs. 9,01,921/-
- Twenty SRRA stations have been commissioned under Phase II Program.

SRRA stations

S. No.	Site	State	Date of Commissioning
1.	Port Blair	Andaman & Nicobar (UT)	01.05.2014
2.	Itanagar	Arunachal Pradesh	19.05.2014
3.	Pasighat		24.05.2014
4.	Tezpur	Assam	12.05.2014
5.	Silchar		04.06.2014
6.	Kargil	Jammu & Kashmir	30.05.2014
7.	Katra		11.06.2014
8.	Mysore	Karnataka	20.05.2014
9.	Kannur	Kerala	26.05.2014
10.	Alappuzha		30.05.2014
11	Imphal	Manipur	26.05.2014
12.	Tura	Meghalaya	19.05.2014
13.	Aizawl	Mizoram	14.06.2014
14.	Kohima	Nagaland	02.06.2014
15.	Jaipur	Rajasthan	15.04.2014
16.	Gangtok	Sikkim	03.05.2014
17.	Thiruvallur	Tamil Nadu	16.04.2014
18.	Agartala	Tripura	14.06.2014
19.	Dehradun	Uttarakhand	28.04.2014
20.	Nainital		05.05.2014

- Three American Meteorological Society (AMS) stations have been commissioned under Phase II Program.

S. No.	AMS Stations	State	Date of Commissioning
1.	Thiruvallur	Tamil Nadu	21.04.2014
2.	Gandhi Nagar	Gujarat	19.05.2014
3.	Kolkata	West Bengal	06.05.2014

- Two SRRA stations in Maharashtra have been commissioned under MEDA Consultancy Program.

S. No.	Station Name	Date of commissioning
1.	Latur	10.12.2014
2.	Washim	19.12.2014

- 40 numbers of Pyranometers and 20 Pyrheliometers from the NIWE SRRA stations and 11 Pyranometers & 1 Pyrheliometer under consultancy program have been calibrated.
- SRRA officials visited Prathyusha Institute Technology & Management and microsited a location for the establishment of Calibration Laboratory.
- Soiling experimental studies extended to one more SRRA location at Thiruvallur.

- SRRA organized a training course on the "Importance of Measurement of Ground Solar Radiation Data in the Penetration of Solar Energy" for SNA officials in the North East region at Guwahati on 8th May 2014.
- A training course jointly organized with NISE, Gurgaon on "Functioning and Maintenance of SRRA stations" for the benefit of SRRA station in-charges of Northern States at NISE, Gurgaon on 2nd and 3rd June 2014 .
- A 2-days training course on "Functioning and Maintenance of SRRA station" was organised for the benefit of SRRA station in-charges of Madhya Pradesh, Maharastra, Dadra Nagar & Haveli at Wardha, MGIRI on 23rd and 24th June 2014.
- Micro-siting was carried out at Charanka solar park, Gujarat for relocating the Santalpur SRRA station.
- A 2-days training course on "Functioning and Maintenance of SRRA station" was organized for the benefit of the SRRA station in-charges of Jharkhand, Chhattisgarh, Odisha, West Bengal and Bihar at Central University of Jharkhand, Ranchi on 1st & 2nd July 2014.
- A 2-days training course on "Functioning and Maintenance of SRRA station" was organized for the benefit of the SRRA station in- charges of all NE states at Tezpur University, Tezpur on 3rd & 4th July 2014.
- Calibration Laboratory was commissioned at PITAM by NIWE, has been inaugurated by Dr.S. Gomathinayagam, DG, NIWE, Chennai on 11th November 2014.

Sensors	SRRA program	Consultancy Program
Pyranometer	40	11
Pyrheliometer	20	1

- Micrositing was carried out for relocating Belgaum and Bellary SRRA stations in Karnataka during the period 24th to 28th November 2014.
- Mr. R. Karthik visited Space Application Centre, (ISRO) Ahmedabad and held discussions on satellite data products & resource maps with Dr. Bhimal Bhattacharya during 26th to 28th November 2014.

Future Plans

- Solar Atlas for the country proposed to be released by June 2015 based on the measured SRRA data and ground truthed satellite data.
- Mobile calibration units for insitu calibration are proposed to be procured.
- More SRRA and AMS stations are proposed to be commissioned.
- Soiling experimental set up proposed to be increased.

Important Visitors to NIWE

- A delegation from DOE / NREL, USA led Dr. Elena Berger visited NIWE during 10th & 11th November 2014 for discussions on the possible cooperation in solar radiation resource assessment.
- On 8th January 2015 GIZ officials visited Kayathar WTRS with NIWE officials for a study tour to know the activities of WRA & SRRA.
- Dr. Richard Meyer, Managing Director of Suntrace visited NIWE, Chennai and discussed various quality aspects of solar assessment and satellite data during 8th to 20th February 2015.

Invited Lectures

delivered by NIWE staff in Trainings, Conferences and Seminars

Dr. S. Gomathinayagam, Director General

- Chief Guest for Technology day of IGCAR, DAE Kalpakkam Township on 9th May 2014.
- Attended the 500 W Wind-Solar Hybrid Product Launch of NAL, Bangalore and gave Key Note address on Renewable Energy Initiatives on 23rd May 2014.
- Participated in Conference of States' Principal Secretaries/Secretaries dealing with Renewable Energy and the Heads of SNAs for Renewable Energy on 10th June 2014.
- Participated in Panel discussions at RENERGY 2014 Conference at Chennai Trade Centre conducted by TEDA from 12th -14th June 2014 and Chaired the Session on "Towards 50 GW of Installed Wind Capacity – Opportunities And Challenges" on 12th June 2014.
- Inaugurated 2 days Training Programme on "Functioning and Maintenance of SRRA Stations" at Prathyusha Institute of Technology and Management, Tiruvallur, Tamil Nadu on 19th June 2014.
- Renewable World 2014 convention Keynote Session II-Wind power CEO's conclave with a theme "Fast Track out of Box Thinking to accelerate wind power development in the Country at Delhi on 3rd July 2014.
- Chaired Wind Energy Session on R&D conclave Meet at Vigyan Bhavan, New Delhi on 5th August 2014.
- Joint Secretary (WE) & Director General, NIWE Chaired Session VI of 5th World Renewable Energy on "Wind-New Technology & Offshore Wind Farming" on 22nd August 2014.
- Presentation on "To describe on the methodology and next steps" for the Revised Wind Power Potential in India meeting at MNRE, New Delhi on 22nd August 2014.
- FOWIND Stakeholders Sensitization workshop – ED Panalist for "Offshore Wind Development-Way Forward for India and TN" on 11th September 2014.

- Inaugurated & delivered the address on SRRA Station Advanced Measurement Station Calibration Laboratory at Prathyusha Institute of Technology and Management on 11th November 2014.
- 3rd Fraunhofer Innovation and Technology Platform- "Powering a Greener Future" Conference at Bengaluru during 21st & 22nd November 2014.
- Inauguration of new Business Centre of Romax at Pallavaram on 19th January 2015.
- Hon'ble Minister of State (I/C) for Power, Coal and New & Renewable Energy, Shri. Piyush Goyal, visited Tamil Nadu and had discussions with CMD/TEDA, Chairman/TANGEDCO & Secretary, Energy Department. DG along with Joint Secretary (WE)/MNRE, Ms.Varsha Joshi, reviewed and studied operation of SLDC/TANGEDCO and had discussion with IWPA along with TANGEDCO officials for 100% Wind Energy evacuation in the grid including possible sale of power to the neighboring States, such as Telengana during 6th & 7th March 2015.
- Mutual collaboration at AMET University on 13th March 2015.
- Special Chief Guest of National Level Workshop-cum-Conference at Jeppiar Institute of Technology on 26th March 2015.

Reasearch and Development

Rajesh Katyal, Deputy Director General & Head

- Chaired a conference on "Energy – Economy – Environment" at Madras Chamber of Commerce and Industry at Hotel Le Meridian, Chennai on 5th September 2014.

Deepa Kurup, Deputy Director (Technical)

- Delivered a presentation on "Wind and Solar Energy - Potential & Challenges" at one day seminar on "Exploring the current issues and challenges in sustainable energy" at IIT, Madras on 5th June 2014.

Wind Resource Assessment

K. Boopathi, Additional Director & Head

- Lecture delivered on Wind Resource Assessment during "One day Workshop on New Renewable Energy Sources" – WONRES 2014 at Aarupadai Veedu Institute of Technology, Paiyanoor, Chennai on 20th August 2014.
- Lecture delivered on Wind Resource Assessment Techniques at PSG college of Engineering, Coimbatore on 31st October 2014.
- Presentation about the activities of NIWE on special focus on "FOWIND" for European Union Delegation of Ambassadors at Hotel Leela Palace, Chennai on 8th December 2014.

- Lecture delivered on “Wind Energy potential in Andaman & Nicobar Island” in “Renewable Energy Potential in Andaman & Nicobar Islands” at Port Blair on 3rd January 2015.

A.G. Rangaraj, Assistant Director (Technical)

- Lecture delivered on "Wind Data Collection in India & Resources assessment of NIWE" to IREDA officials at New Delhi on 17th October 2014.
- Lecture delivered on “Wind Turbine Technology” at National Institute of Technical Teachers Training and Research (NITTTR), Chennai on 30th October 2014.

J. Bastin, Assistant Director (Technical)

- Lecture delivered on Wind Resource Assessment Techniques at PSG college of Engineering, Coimbatore on 31st October 2014.

G. Arivukkodi, Assistant Engineer

- Presented a Poster on “Studies on noise propagation of Wind Turbines from a Wind Farm in India” in the International Conference on Advancements in Materials, Health & Safety towards sustainable Energy & Environment organized by IJAA Conference (MHS-2014), Chennai during 7th & 8th August 2014.

Wind Turbine Testing

S. A. Mathew, Additional Director & Head

- Chaired R&D Meeting (Electrical & Electronics Engineering) where professors presented their innovative research proposals at Veltech Dr. RR & Dr. SR Technical University, Chennai on 25th May 2014.
- Guest Lecture on “Wind Energy Systems” to the students of Department of Electrical & Electronics Engineering at Valliammai Engineering College, Chennai on 27th August 2014.

Wind Turbine Research Station

Mohammed Hussain, Director & Head

- Lecture delivered on “Recent Development in Renewable Energy – special reference to Wind Energy” in "National Level Technical Symposium" at V.V. College of Engineering, Tisaiyanvilai, Tirunelveli, Tamil Nadu on 9th October 2014.

Information, Training and Commercial Services

P. Kanagavel, Additional Director & Head

- As Chief Guest inaugurated the “ICSECSRE – 2014, - First International Conference” organized by the Department of Electronics and Communication Engineering of

Arupadai Veedu Institute of Technology, Chennai, Vinayaka Mission University on 28th April 2014.

- Delivered Keynote address and inaugurated the National Conference on Innovative & Emerging Trends in Engineering and Technology (NCIETET' 14) organized by the Panimalar Institute of Technology on 6th May 2014.
- As Chief Guest Inaugurated the Faculty Development Programme on "Application of Soft Computing Methodologies for Innovations in Electricity Markets" organized by SRM University, Ramapuram, Chennai on 23rd June 2014.
- Lecture delivered on "Renewable Energy & Impacts of Climate Change" in Peniel Matriculation School at Pallikaranai on 22nd August 2014.
- Invited as Chief Guest, inaugurated & delivered lecture on "Wind Turbine Technology and Applications" in the three days National level faculty development programme on "Research Challenges in Smart Grid Technology" at Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai on 18th September 2014.
- Lecture delivered on "Importance of Wind Energy" organized by MTS Academy at Sri Karpagambal Higher Secondary School, Mylapore, Chennai on 13th December 2014.
- Lecture delivered on "Wind Energy Technology and Applications" at St. Joseph's Institute of Technology, Chennai on 23rd January 2015.
- Lecture delivered on "Wind Energy Technology and Applications" at National Institute of Technical Teacher Training and Research (NITTTR), Chennai on 18th February 2015.
- Lecture delivered on "Energy Efficiency in Library" for UGCASC refresher course at Academic Staff College of the Bharadithasan University, Thiruchirappalli on 24th February 2015.
- Lecture delivered on "Wind Energy Technology and Applications" at National Institute of Technical Teacher Training and Research (NITTTR), Chennai on 11th March 2015.
- Chief Guest for the Earth Hour Movement Programme conducted in association with WWF India at Sathyabama University, Chennai on 28th March 2015.

Solar Radiation Resource Assessment

Dr. G. Giridhar, Director & Head

- Lecture delivered on "Conceptualizing Framework for Solar Resource Data in India" at Federation of Indian Chambers of Commerce and Industry (FICCI), New Delhi on 29th May 2014.
- Chief Guest for the 4th National Level Technical Conference (EPSCCON'14) at Veltech Engineering College, Avadi, Chennai on 26th August 2014.

- Lecture delivered on Solar Radiation Assessment in India Activities of NIWE as a speaker of Training program "IREDA – Promotion of New Renewable Energy Projects-Components 2: Training" in association with the Adelphi Consult GmbH to train IREDA officials on solar & wind sectors at New Delhi on 19th September 2014.
- Lecture delivered on "Solar Radiation Measurements in India, and activities of NIWE" to IREDA officials at New Delhi on 19th September 2014.
- Lecture delivered on "Solar Radiation and weather monitoring" in the NCPRE course Solar PV Modules and systems training and characterization IIT, Bombay on 27th November 2014.
- Lecture delivered on "Approaches for Harnessing Technological Development for manufacture" at PSG College of Technology, Coimbatore during 25th - 26th February 2015.
- Lecture delivered in the International Conference on "Innovative Strategies in Renewable Energy and its Application –ISREA' 15" at Sona College of Engineering, Salem on 5th March 2015.
- Lecture delivered in the conference on "National Level Conference on Power Electronic and Drives (PED '15)" at Alagappa Chettiyar College of Engineering & Technology, Karaikudi on 11th March 2015.

R. Sasi Kumar, Consultant

- Lecture delivered on "Solar Radiation Resource Assessment in India" in the 2 day training program on "Functioning and Maintenance of SRRA stations" at NISE, Gurgaon on 2nd June 2014.
- Presentation on Solar Resource Assessment Study in India in the two days training program on "Functioning and Maintenance of SRRA stations" at Central University of Jharkhand, Ranchi during 1st & 2nd July 2014.
- Presentation on Solar Data collection in India, in a seminar on Recent Trends in Renewable Energy Sources at College of Engineering and Management, Alappuzha on 30th July 2014.
- Presentation on Solar Data collection in India, in a Seminar on Importance of Solar Radiation Data for Application and Research held at Government College of Engineering, Kannur on 31st July 2014.

R. Karthik, Assistant Director (Technical) Contract

- Lecture delivered on "Radiation (DNI) and Satellite Data" in CSP conference at New Delhi during 10th & 11th July 2014.
- Lecture delivered on “Solar Energy” for one day workshop on New & Renewable Energy Resources at Aarupadai Veedu Institute of Technology, Chennai on 21st August 2014.
- Lecture delivered on “Solar Radiation Resource Assessment and Solar PV & CSP Technologies at Coimbatore Institute of Technology, Coimbatore on 21st November 2014.
- Lecture delivered on Solar Radiation & Solar Technology at Sri Manakula Vinayagar Institute of Technology, Puducherry on 3rd March 2015.

Prasun Kumar Das, Assistant Director (Technical) Contract

- Lecture delivered on "Basics of Solar Radiation" in the training program on “Importance of Measurement of Ground Solar Radiation Data in the Penetration of Solar Energy” at Guwahati on 8th May 2014.
- Presentation on Solar Resource Assessment Study in India in the two days training program on “Functioning and Maintenance of SRRA stations” held at Tezpur University, Napaam, Tezpur during 3rd & 4th July 2014.
- Lecture delivered on "Solar Tech Indian Conference 2014" at New Delhi during 21st to 23rd July 2014.
- Lecture delivered on Solar Energy Systems for the benefit of LIC Engineers at Ambattur, Chennai on 28th February 2015.

Administration & Finance

D. Lakshmanan, Director

- Presentation on “Service Book, Leave Account, Travelling Allowance, Pay Fixation, GPF, Pension and NPS” in the “Skill Development Programme for Assistants and Stenographers” organized by CSIR-Human Resource Development Centre (HRDC), Ghaziabad at Structural Engineering Research Centre, Chennai and Central Leather Research Institute, Chennai on 18th & 19th August 2014.

The following NIWE staff delivered lecture(s) in the

13th, 14th, 12th, & 15th International Training Programme on
"Wind Turbine Technology & Applications" held during
7th to 30th May 2014, 3rd to 30th September 2014, 19th November to 12th December 2014
and 4th February to 3rd March 2015 respectively.

16th & 17th National Training Course on "Wind Energy Technology"
held during 23rd to 25th July 2014 and 18th to 20th March 2015 respectively.

Training Course on "Wind Resource Assessment and Wind Energy Technology"
held during 10th to 18th November 2014

Dr. S. Gomathinayagam

- Introduction and Status of Wind Energy Technology
- Wind Turbine Tower
- History of Wind Energy Conversion Technology and Power Generation

Mr. Rajesh Katyal

- Wind Turbine Foundation
- Small Wind Turbine Testing and Hybrid Systems

Mr. Mohammed Hussain

- Indian Government Policies, Schemes and Legal Frameworks
- Overview of Testing & R&D facilities at WTTS/WTRS, Kayathar

Dr. G. Giridhar

- Solar Energy and Solar Radiation Resource Assessment

Mr. S. A. Mathew

- Wind Turbine Testing & Measurement Techniques
- Power Curve Measurements

Mr. M. Anvar Ali

- Wind Turbine Generators

Mr. K. Boopathi

- Wind Resource Assessment and Techniques
- Wind Resource Assessment by Remote Sensing Instruments
- Forecasting of Wind Energy Production
- Overview of Wind Turbine Components
- Design and Layout of Wind Farms

Mr. P. Kanagavel

- Role of NIWE in Wind Energy Development
- Wind Energy Development in India
- Environmental Aspects of Wind Turbine Technology

Mr. A. Senthilkumar

- Type Certification of wind turbine and overview of
- Design Requirements as per IEC 61400 - 1

Mr. J. C. David Solomon

- Overview of Wind Turbine Components
- Drive Train Concepts
- Small wind turbine and Hybrid system
- Aerodynamic aspects of Wind Turbine

Mr. Joel Franklin Asaria

- Offshore Wind Energy: An Overview
- Role of Non Crimp fabric in Blade Manufacturing

Mr. S. Arulselvan

- Control and Protection System in Wind Turbine

Mrs. Deepa Kurup

- Grid Integration of Wind Turbine

Mr. A.G. Rangaraj

- Wind Measurement and Instrumentation
- Guidelines for Wind Measurements

Mr. N. Raj Kumar

- Wind Turbine Gear Box
- Overview of Wind Turbine Components
- Design Evaluation of Wind Turbine Gear Box

Mr. J. Bastin

- Guidelines for Wind Measurements
- Micrositing of Wind Farm & Issues
- Indian Wind Atlas : A Case Study
- Design and Layout of Wind farms

Ms. M. C. Lavanya * Software Tools for Wind Resource Assessment * Wind Measurements by Remote Sensing Instruments
Mr. M. Saravanan * Instrumentation for Wind Turbine Testing * Power Curve Measurements
Mr. Bhukya Ram Das * Safety and Function Testing
Mr. B. Krishnan * Guidelines for Wind Measurements * Wind Measurement and Instrumentation * Micrositing of Wind Farm & Issues
Mrs. G. Arivukkodi * Wind Data Measurements and Analysis
Mr. Prasun Kumar Das * Solar Photovoltaics Technology – An Overview * Solar Radiation Resource Assessment
Mr. R. Karthik * Solar Radiation Resource Assessment

Awards & Appreciation

Dr. S. Gomathinayagam
has been awarded
"Distinguished Alumnus Award" for excellence in Scientific /
Industrial Research in the
Golden Jubilee Celebrations of the
National Institute of Technology (NIT), Tiruchirappalli
in July 2014 in presence of Hon'ble President of India,
Hon'ble Governor of Tamil Nadu and
Hon'ble State Education Minister of Tamil Nadu.

102nd Indian Science Congress 'Pride of India 2015' Exhibition organized by Indian Science Congress Association at Mumbai University, Mumbai during 3rd to 7th January 2015. NIWE Stall has been awarded as "Best Stall design". The Award was given by Shri Ram Naik, Hon'ble Governor of Uttar Pradesh in presence of Shri Suresh Prabhakar Prabhu, Hon'ble Minister of Railways & Shri Vinod Sridhar Tawde, Hon'ble Minister of Higher & Technical Education, Marathi Basha, Cultural Affairs, Government of Maharashtra.

NIWE received Century International Quality ERA Award under Golden Category (March 21-22) at Geneva, Switzerland held during 20th to 24th March 2015 (Youtube link : https://www.youtube.com/watch?v=y1qzFfyE16c)

Meetings / Trainings / Seminars / Conferences attended by NIWE Staff

The following are the Seminars / Conferences / Trainings / External Meetings attended by the NIWE Staff:

Dr. S. Gomathinayagam, Director General

- Chaired Prototype Meeting at NIWE on 3rd April 2014.
- Operational Review Meeting at MNRE on 9th April 2014.
- Participated in the Inauguration of IGCS Research Programme for Sustainable Power Engineering at IIT Madras on 11th April 2014.
- 2nd Review Meeting of MNRE R&D Proposals at NIWE on 15th April 2014.
- Visited M/s.Vaata Infra Ltd., Factory at Red Hills regarding R&D of a new vertical axis small wind turbine during May 2014.
- Workshop on Forecasting, Balancing & Scheduling of Renewable Energy Sources in India organized by IGEF at New Delhi during 5th and 6th May 2014.
- GBI consultative Meeting at MNRE, New Delhi on 20th May 2014.
- Management Review Meeting at NIWE on 21st May 2014.
- Meeting in MNRE to discuss about MOA, Bye-law, name change of C-WET on 28th May 2014.
- Chairman of the RDSPAC- R&D Sectoral Project Appraisal Committee Meeting at MNRE on 5th June 2014.
- Follow up Meeting to review the status of action taken and recommend suggestions made during with Minister at MNRE, New Delhi on 7th July 2014.
- Review meeting on Discussions on development of business model for setting up of first pilot demonstration offshore wind power project at MNRE, New Delhi on 8th July 2014.
- Chaired the Committee Meeting on installation of prototype wind turbine models in India on 10th July 2014.

- Certification proposal discussion with Mr. M.P. Ramesh (Former ED) & Additional Director & Head, S&C on 11th July 2014.
- Technical Committee Meeting of SRRA at MNRE, New Delhi on 14th July 2014.
- 33rd Governing Council Meeting at MNRE, New Delhi on 15th July 2014.
- Discussion on setting up of first pilot demonstration offshore wind power project in the Country-Meeting at MNRE, New Delhi on 16th July 2014.
- Meeting on Green Power-2014 at ITC Grand Chola, Chennai on 17th July 2014.
- Workshop on Green Building at NIWE on 18th July 2014.
- Attended Session in "Opportunities and Challenges in WE Sector" at ITC Grand Chola, Chennai on 18th July 2014.
- SWT-Empanelment meeting at NIWE on 25th July 2014.
- 4th Scientific Committee Meeting of NAL at Bangalore on 28th July 2014.
- Purchase Committee Meeting for Land, Kayathar on 31st July 2014.
- Review Meeting for finalisation of MoU to be signed for Demonstration Offshore Wind power Project at MNRE, New Delhi on 6th August 2014.
- Meeting of the followup of actions committee on Wind Power at MNRE, New Delhi during 7th & 8th August 2014.
- Chaired ET-42 Committee at BIS, New Delhi on 11th August 2014.
- WRA Meeting at MNRE, New Delhi on 12th August 2014.
- NIWE Finance Committee Meeting at MNRE, New Delhi on 13th August 2014.
- Meeting to discuss action for registration of Association of State Nodal Agencies for Renewable Energy at MNRE, New Delhi on 20th August 2014.
- Chaired the RLMM Meeting on 5th September 2014.
- 34th Governing Council and 17th Annual General Meeting of NIWE at MNRE, New Delhi on 12th September 2014.
- First meeting of the Standing Committee on Energy Storage and Hybrid solutions at MNRE, New Delhi 15th September 2014.
- Valedictory Function of Hindi Fortnight and Prize Distribution at NIWE on 9th October 2014.
- Industry Institute Partnership Council Meeting (IIPC) at GKM College of Engineering and Technology on 14th October 2014.

- Standing Committee on Energy Meeting on – "Need for long term Renewable Energy Policy and Legal Reforms" on 16th October 2014.
- Small Wind Turbine Manufacturers Meeting at NIWE, Chennai on 28th October 2014.
- Committee Meeting to address the issues related to implementation of SWES progress on 29th October 2014.
- First Meeting of the Expert Committee to Study various RE Laws at MNRE, New Delhi on 7th November 2014.
- Consultative Committee Meeting for Ministry of Power and MNRE at Parliament House, New Delhi on 18th November 2014.
- 2nd Governing Council Meeting of NISE, New Delhi on 25th November 2014.
- Visited Loyola College for Energy Project Co-opertion on 27th November 2014.
- Standing Parliament Committee Meeting at Bhuj, Gujarat during 5th to 8th January 2015.
- 21st Finance Committee Meeting at MNRE New Delhi on 12th January 2015.
- R&D Project Appraisal Committee Meeting at MNRE, New Delhi on 13th January 2015.
- Meeting of Sub-Group 2 on RE-under the framework of the Indo-German Energy Forum at New Delhi 12th February 2015.
- Board of Research Meeting at Sathyabhama University on 28th March 2015.
- XIII Meeting of Academic Council at Kalasalingam University at Srivilliputhur on 30th March 2015.

Anuradha Babu, Executive Staff Officer

- Training Programme on "Purchase and Disposal Management" organized by Institute of Government of Accounts and Finance at Regional Training Centre, Rajaji Bhavan, Chennai during 8th & 9th January 2015.
- Disciplinary Proceedings and Conduct Rules at Regional Training Centre at Institute of Government of Accounts and Finance, Rajaji Bhavan, Chennai during 20th to 22nd January 2015.

T. Ganeshamoorthi, Joint Executive Assistant

- Excel Training in Macros on 15th December 2014.
- Purchase and Disposal Management at Regional Training Centre at Institute of Government of Accounts and Finance at Rajaji Bhavan, Chennai during 8th & 9th January 2015.

- Leave Rules and Maintenance of Service Books at Regional Training Centre at Institute of Government of Accounts and Finance, Rajaji Bhavan, Chennai during 27th to 28th January 2015.

Research & Development

Rajesh Katyal, Deputy Director General & Head

- "Small Wind Turbine and Hybrid system" workshop on Green Building organized by M/s. H. B. Management & Engineering Consultants Pvt. Ltd., Chennai, at NIWE on 18th July 2014.
- Land Procurement Committee meeting at WTRS, Kayathar on 31st July 2014.

J.C. David Solomon, Additional Director

- Training on E-procurement at NIWE during 7th & 8th April 2014.

R & D Team

- Workshop on Green Building organized by M/s H.B Management & Engineering Consultants Pvt. Ltd., Chennai held at NIWE office on 18th July 2014.
- Advisory Group Meeting at Ministry of Power, New Delhi on 19th July 2014.
- 2nd R&D Conclave on New and Renewable Energy and prepared the brief of the project highlights presented by the proponents and submitted to MNRE organized by MNRE held at Vigyan Bhavan, New Delhi on 5th August 2014.
- Small Wind Turbine and Hybrid Systems Meeting and provided the inputs on the status of Small Wind Energy and Hybrid Systems at MNRE, New Delhi on 8th August 2014.
- Finalisation of proposal for "Design and development of Dynamometer explicit test facility for generator of small wind energy systems up to 10 kW" at CSIO, Chennai on 10th October 2014.
- Meeting in connection with USAID at TEDA, Chennai.
- Meeting with Mr. Marrisamy on his "New Invention of AC current" at WTRS, Kayathar
- Stakeholders Small Wind Turbine Manufacture meeting on 28th October 2014.
- Committee meeting for proposing Road Map for promoting SWES in India on 29th October 2014.
- Town Official Language (TOLIC) meeting at Chennai on 21st November 2014.
- NABL re-certification audit pertaining to ISO/IEC 17025:2005 at WTRS, Kayathar during 1st to 2nd December 2014.

- Visited Aizwal, Mizoram, for preparation of pre-feasibility report for installation of SWT Hybrid system placed on 23rd February 2015.

Wind Resource Assessment

K. Boopathi, Additional Director & Head

- Training on E-procurement at NIWE during 7th & 8th April 2014.
- Pre-Bid meeting for Consultancy Services for the proposed 50 MW wind farm projects in Maharashtra / Tamil Nadu / Andhra Pradesh for M/s. NHPC during 15th - 16th April 2014.
- Wind Forecasting meeting at MNRE, New Delhi during 5th & 6th May 2014.
- Meeting of the Sub Group 2 on "Renewable Energies" under the framework of the Indo German Energy Forum at New Delhi on 7th May 2014.
- Offshore Review meeting at Ahmedabad, Gujarat on 13th May 2014.
- Attended 61st Annual General Body Meeting & National Seminar on "Energy Planning for the Sustainable Development of Kerala" organized by KSEB Engineers' Association on 1st June 2014.
- Meeting in connection with establishing Wind Monitoring Stations in Assam for M/s.Oil India Ltd., Noida at Guwahati, Assam on 28th July 2014.
- Purchase Committee meeting with regard to procurement of land at Kayathar for Testing / R&D / WRA and other related activities at Kayathar on 31st July 2014.
- Meeting on Repowering and Promotion of Small Wind Mills at Coimbatore on 10th September 2014.
- Training "Communication and Presentation Skills" organized by the Institute of Management Training & Research (IMTR) at Goa during 13th to 16th October 2014.
- Meeting with GIS's Appraisal Mission on Green Energy Corridors (GEC) at New Delhi on 30th October 2014.
- Prebid meeting for Southern Railways, Chennai on 21st November 2014.
- Standing Parliament Committee meeting at Bhuj, Gujarat during 5th to 8th January 2015.
- Meeting at MNRE, New Delhi on 10th February 2015.
- Meeting on Reassessment of Wind Power Potential in India at MNRE, New Delhi on 23rd February 2015.

- Wind Evaluation Committee meeting with Power Secretary, Kerala at ANERT, Trivandrum on 16th March 2015.

M. Joel Franklin Asaria, Additional Director

- Project Monitoring Committee meeting constituted by Government of Kerala for setting of Wind Power Projects in Kerala for M/s.NHPC on 7th May 2014.
- "Green Summit 2014" at Bangalore during 5th to 7th June 2014.
- "Green Power Conference" organized by CII, Chennai during 17th & 18th July 2014.
- Meeting in connection with establishing Wind Monitoring Stations in Assam for M/s. Oil India Limited, Noida at Guwahati, Assam on 28th July 2014.
- International Conference on "Emerging Environmental & Oxidation Technologies for Energy Environment and Sustainability" at Anna University, Chennai during 29th to 30th September 2014.
- Training on "Energy Management" at IIT, Mumbai during 24th to 28th November 2014.
- Visited Andaman & Nicobar to carry out Feasibility and logistical study for the proposed wind turbine locations (200 to 250 kW) for M/s. Andaman & Nicobar Administration during 2nd to 10th March 2015.

A.G.Rangaraj, Assistant Director (Technical)

- Training on E-procurement at NIWE, Chennai during 7th & 8th April 2014.
- MATLAB training at Prathyusha Institute of Technology and Management (PITEM), Tiruvallur during 21st to 23rd April 2014.
- Project Kick Off meeting for M/s.Oil India Limited, Noida at Guwahati, Assam on 2nd December 2014.

M.C.Lavanya, Assistant Director (Technical)

- MATLAB training at Prathyusha Institute of Technology and Management (PITEM), Tiruvallur during 21st to 23rd April 2014.

J.Bastin, Assistant Director (Technical)

- Discussion with the scientists regarding procurement of LULC data at NRSC, Hyderabad on 16th October 2014.

G. Arivukkodi, Assistant Engineer

- International Conference on "Emerging Environmental & Oxidation Technologies for Energy Environment and Sustainability" at Anna University, Chennai during 29th to 30th September 2014.

B. Krishnan, Assistant Engineer

- Attended Project Monitoring Committee meeting constituted by Govt. of Kerala for setting of Wind Power Projects in Kerala for M/s. NHPC on 7th May 2014.

WRA Team

- Training on Sensors & Instruments for WRA Project Assistants at NIWE during 4th & 5th September 2014.

Wind Turbine Testing

S. A. Mathew, Additional Director & Head

- Participated in the Industry Institute Interaction with National Board of Accreditation (NBA) committee at Vel Tech Dr. RR & Dr. SR Technical University, Chennai on 3rd May 2014.
- Meeting of Wind Turbines Sectional Committee, ET 42 at Bureau of Indian Standards (BIS), New Delhi on 11th August 2014.
- One day workshop on "Solar Resource Assessment & Solar Project Development" jointly with NREL, DoE and MNRE at NIWE, Chennai on 12th November 2014.

M. Karuppuchamy, Assistant Engineer **& A. R. Hasan Ali,** Assistant Director

- Training program on "Laboratory quality system, management & internal audit as per IS/ISO 17025" organized by Bureau of Indian Standards (BIS) at Hyderabad on 11th to 14th November 2014.

WTT Team

- ISO 9001-2008 - Seventeenth Management Review Meeting of Quality Management System at NIWE, Chennai on 21st May 2014.
- Training on Power Curve Data analysis (Data appending, Data binning, Pivot table, AEP calculation) and GNU plot organized by A.R. Hasan Ali, AE on 10th June 2014.
- DNV First periodic Audit – ISO 9001:2008 at WTTS, Kayathar on 12th June, 2014 and at NIWE, Chennai on 13th June 2014.
- Ninth Management Review Meeting for ISO/IEC 17025-2005 at NIWE, Chennai on 5th November 2014.
- "Safety & Rescue Training" both theoretical and practical training provided by M/s. Safecorp Safety Services Private Limited at WTTS, Kayathar during 6th to 7th November 2014.

- Re-accreditation audit ISO/IEC 17025-2005 at WTTS, Kayathar during 1st to 2nd December 2014.
- Training on "Mat Lab Fundamentals" organized by M/s. Math Works India Private Limited at Bengaluru during 2nd to 4th February 2015.

Standards & Certification

A. Senthil Kumar, Additional Director & Head

- Workshop on Addressing Challenges to Renewable (Wind) Energy manufacturing Industry in India: Horizon 2032 at WISE, Pune on 8th July 2014.
- Green Power International Conference & exposition on Renewable Energy 2014 at Chennai during 17th & 18th July 2014.
- Seminar on "Fixed & Floating Offshore Structures - SACS & MOSES applications" organized by M/s. Aryatech Marine & Offshore Services (P) Limited at NIOT, Chennai on 6th March 2015.
- Meeting on "Bill of Materials Committee" at MNRE, New Delhi during 16th to 17th March 2015.

S&C Engineers

- Workshop on "Changing paradigms in Energy Efficient Solar / Green Buildings" sponsored by Ministry of New and Renewable Energy jointly organized by SRRA & M/s. H B Management & Engineering Consultants (p) Limited at NIWE, Chennai on 18th July 2014.
- "MSC Software India User Conference 2014" at ITC Grand Chola, Chennai on 12th September 2014.
- 5th International Congress on Computational Mechanics and Simulation organized by CSIR – SERC, Chennai & IndCAM, Mumbai held at SERC, Chennai during 10th to 12th December 2014.
- Seminar on "Fixed & Floating Offshore Structures - SACS & MOSES applications" organized by M/s. Aryatech Marine & Offshore Services (P) Limited at NIOT, Chennai on 6th March 2015.

Information, Training & Commercial Services

P. Kanagavel, Additional Director & Head

- Meeting with MNRE & UN-ESCAP officials on ESCAP Phase-II Expert Group meeting at MNRE, New Delhi on 11th April 2014.

- "Green Summit 2014" at Bengaluru during 5th to 7th June 2014.
- Workshop on "Changing paradigms in Energy Efficient Solar / Green Buildings" sponsored by Ministry of New and Renewable Energy jointly organized by SRRA & M/s. H B Management & Engineering Consultants (p) Limited at NIWE, Chennai on 18th July 2014.
- One day workshop on Developing Strategy for Education & Vocational Training for the Renewable Energy Sector in India at New Delhi on 22nd August 2014.
- Training on "Communication and Presentation Skills" organized by the Institute of Management Training & Research (IMTR) at Goa during 13th to 16th October 2014.

Engineering Services Division

M. Anvar Ali, Additional Director & Head

- Training on E-Procurement at NIWE, Chennai on 7th & 8th April 2014.
- Committee meeting for new invention of "AC current generation without any consumption of diesel" at Kayathar on 8th October 2014.
- Training on "Energy Management" at IIT, Mumbai during 24th to 28th November 2014.
- Visited Andaman & Nicobar to carry out Feasibility and logistical study for the proposed wind turbine locations (200 to 250 kW) for M/s. Andaman & Nicobar Administration during 2nd to 10th March 2015.

C. Stephen Jeremias, Assistant Engineer

- Technical Workshop for Metasploit and Nexpose at Bangalore on 30th April 2014.
- Workshop on "National Knowledge Networks (NKN)" at IIT during 15th to 17th December 2014.

Solar Radiation Resource Assessment

Dr. G. Giridhar, Director & Head

- Indo-German Energy Forum meeting at New Delhi during 5th & 6th May 2014.
- Meeting on solar energy potential under the chairmanship of Joint Secretary, MNRE at MNRE, New Delhi on 3rd July 2014.
- Technical review meeting on SRRA Phase I & II program at MNRE, New Delhi on 15th July 2014.
- Technical Committee Meeting on "Grid Integration of Solar PV Power Plant at NIWE, Chennai on 19th August 2014.

- Project Advisory Committee Meeting held at New Delhi on 21st August 2014.
- Inauguration and inspection of SRRA station at Mahbubnagar on 27th August 2014.
- Standing Committee on Energy to discuss Demand for Grants 2014-15 at Parliament House, New Delhi on 23rd September 2014.
- Discussion on making Wind and Solar Atlas with the technical help from NRSC at NRSC Hyderabad on 16th October 2014.
- NRSC Meeting in MNRE, New Delhi on 10th November 2014.
- U.S. Department of Energy (DoE) / National Renewable Energy Laboratory (NREL) discussed on the SRRA activities in India at NIWE on 11th November 2014.
- Discussion about SRRA project Phase I, II & III and establishment of NISE calibration laboratory with MNRE, NISE & SECI officials at New Delhi on 8th December 2014.
- Workshop on Energy Efficient Solar/Green Building" conducted by HB Management & Engineering Consultants Private Limited at Madurai on 13th March 2015.

Prasun Kumar Das, Assistant Director (Technical) Contract

- Meeting on NREL projects in India with scientists from NREL and NISE at NISE, Gurgaon on 30th April 2014.
- Two day workshop on "Solar Resource Assessment" organized by NREL & NISE at NISE, Gurgoan during 20th to 21st November 2014.

Finance & Administration

D. Lakshmanan, Director (F&A)

- Two days Workshop on "Material Management & Purchase Policy & Procedure, E-Procedure in Govt. department, autonomous bodies" organized by M/s. National Council for Training & Social Research at Delhi during 9th-11th October 2014.
- Training on "National Convention on Reservation for the Persons with Disabilities" organized by M/s. Institute of Public Administration at Delhi on 21st November 2014.
- International Training Programme on "Budgeting, Accounting & Financial Management" organized by M/s. National Institute of Financial Management, An Autonomous Institute of Ministry of Finance, GoI 2 weeks at India & 1 week at Slovenia during 2nd -21stFebruary 2015.

V. Shanmugam, Executive Assistant

- Training Programme on "Purchase and Disposal Management" organized by Institute of Government of Accounts and Finance at Regional Training Centre, Rajaji Bhavan, Chennai during 8th & 9th January 2015.
- Disciplinary Procedures and Conduct Rules at Regional Training Centre organized by Institute of Government of Accounts and Finance, Rajaji Bhavan, Chennai during 20th to 22nd January 2015.

J. Rekha, Junior Executive Assistant

- Disciplinary Procedures and Conduct Rules organized by Institute of Government of Accounts and Finance at Regional Training Centre, Rajaji Bhavan, Chennai during 20th to 22nd January 2015.

SARAL TDS training

- R. Girirajan, Administrative & Accounts Officer, B. Muthulakshmi, Executive Secretary & J. Rekha, Junior Executive Assistant organized by Reylon Softech Limited at Chennai on 19th July 2014.

General Meetings

Peer Review Meeting

- All NIWE staff attended Peer Review Committee Meeting on review of the activities of NIWE covering the period 2009 to 2014 at NIWE, Chennai on 15th November 2014.

Training on RFD

- Finance and Administration Unit of NIWE has organized a training on Performance Monitoring & Evaluation System PMES / Results Framework Document (RFD) through Institute of Secretariat Training and Management (ISTM), Department of Personnel & Training, New Delhi, Government of India during 25th - 26th April 2014 successfully at NIWE, Chennai. All NIWE staff and staff from neighbouring Government Institutions attended the training.

RENERGY - 2014

- A. Senthilkumar, M. Anvar Ali, P. Kanagavel, M. Joel Franklin Asaria, J.C. David Solomon, Prasun Kumar Das, R. Karthik, A.G. Rangaraj, J. Bastin, M.C. Lavanya & N. Raj Kumar attended the International conference on "RENERGY - 2014" organized by Tamil Nadu Energy Development Agency (TEDA) at Chennai Trade Centre, Chennai during 12th to 14th June 2014.

Networking Cyber Crime Training

- Engineering and Services Division organized a training on Networking Cyber Crime at NIWE, Chennai during 8th & 9th August 2014 and the speaker was through Mr. Sachin Dedhia, Consultant, Skynet Secure. All NIWE staff & staff from neighbouring Government institutions attended the training.

Right to Information Act, 2005 Training

- Finance and Administration Unit organized a training on Right to Information Act - 2005 at NIWE, Chennai on 4th August, 2014 and the speaker was Mr. K. Govindarajulu, Joint Director, Institute of Secretariat Training & Management. All NIWE staff and staff from neighbouring Government institutions attended the training.

Reservation Policy

- Finance and Administration Unit organized a training on Reservation Policy at NIWE, Chennai during 12th & 13th September 2014 through Institute of Public Administration, Bangalore. All NIWE staff & staff from neighbouring Government Institutions attended the training.

Bladed Software Training

- Dr.S.Gomathinayagam, Rajesh Katyal, J.C. David Solomon, Deepa Kurup, R. Naveen Muthu, K. Boopathi, A.G. Rangaraj, J. Bastin, M.C. Lavanya, G. Arivukkodi, S.A. Mathew, M. Saravanan, Bhukya Ramdas, A.R. Hasan Ali & A. Senthil Kumar have attended the 5 days training on "Bladed Software" conducted by DNV & GL Experts from Europe organized at NIWE, Chennai during 15th to 19th December 2014.

Laboratory Quality Management System & Internal Audit as per ISO/IEC 17025:2005 Training

- Rajesh Katyal, S.A. Mathew & A. Senthil Kumar attended a training on "Laboratory Quality Management System & Internal Audit as per ISO/IEC 17025:2005 organised by Bureau of Indian Standards (BIS) / National Institute of Training and Standardisation (NITS) at Noida during 9th – 12th December 2014.

Smart Grid Concepts Workshop

- All the Unit Heads of NIWE have attended a one day workshop on Smart Grid concepts conducted by iPLON, Chennai at NIWE, Chennai on 20th January 2015.

IPMA Workshop

- M. Joel Franklin Asaria, J. Bastin, B. Krishnan & Bhukya Ramdas attended a Four Day Workshop on "Project Management Leading to Globally Recognized IPMA Level D

Certification" organized by International Project Management Association (IPMA) at Hotel Residency, Chennai during 28th to 31st January 2015.

Rooftop Solar Best Practices Workshop

- All the Unit Heads of NIWE have attended the Workshop on "Rooftop Solar Best Practices" organized by TEDA alongwith other senior officials and JS, MNRE at NIWE on 30th January 2015.

Grid-connected Solar Workshop

- All the Unit Heads of NIWE has participated in the Grid-connected Solar Workshop for "Association of Renewable Energy Areas of State (AREAS) at NIWE on 30th January 2015.

RE-INVEST 2015

- Dr. S. Gomathinayagam, Rajesh Katyal, David Solomon, Deepa Kurup, K.Boopathi, M.Joel Franklin Asaria, A.G.Rangaraj, J.Bastin, M.C.Lavanya, S.A. Mathew, M. Saravanan, Bhukya Ramdas, A. Senthil Kumar, N. Rajkumar, P. Kanagavel, M. Anvar Ali, Dr. G. Giridhar and R. Sasikumar have attended the 1st Renewable Energy Global Investors Meet & Expo "RE-INVEST 2015" organized by IREDA at New Delhi during 15th to 17th February 2015.

WindSIM Training

- S. Gomathinayagam, Rajesh Katyal, David Solomon, Deepa Kurup, Naveen Muthu, K.Boopathi, M.Joel Franklin Asaria, A.G.Rangaraj, J.Bastin, M.C.Lavanya, G.Arivukkodi, T.Sureshkumar, B.Krishnan, R.Vinodkumar, S.A. Mathew, M. Saravanan, Bhukya Ramdas and S. Paramasivan, C. Stephen Jeremias attended the 5 days training organized by Mr. Arne R. Gravdahl, CTO & Founder from M/s. WindSIM A/S at NIWE during 9th to 13th March 2015.

Technology Think Tank "T T T" Series

"TTT" - Lecture series on Thursdays at NIWE

In order to promote effective use of NIWE's Library, Computational, Experimental and other research infrastructural facilities, on Thursdays the "Technology, Think & Tank (TTT)" series lectures were organized to share knowledge / experience gained at NIWE. The following are the titles and speakers who have delivered lectures during the year.

Date	Dept.	Topic	Speaker
03-04-2014	ESD	Information Technology Security	Mr. C. Stephen Jeremias
10-04-2014	ITCS	National Action Plan on Climate Change	Ms. S.N. Vinusha Lakshmi
17-04-2014	SRRA	Energy Scenario & Solar Policies	Mr. M. Bala Vignesh
01-05-2014	WRA	Strategic Development of Software Application to assess wind resources	Mr. G. Vigna Prakash
05-06-2014	R&D	Wind - Solar Energy Storage based Smart Grid Hybrid System for the future and its challenges	Mr. J. Yuvaraj
12-06-2014	WTT	Operation & Maintenance (O&M) of Wind Turbines	Mr. N. Vijayaraj
19-06-2014	S&C	Advancements in Wind Turbine Technology	Mr. N. Rajkumar
26-06-2014	WTRS	Operation & Maintenance (O&M) of Wind Turbines	Mr. Nishanth
03-07-2014	ITCS	Resource & Services of NIWE Library	Mr. S. Rajadurai
10-07-2014	SRRA	Quality Control Mechanism of SRRA Data	Mr. B. Devanathan

Date	Dept.	Topic	Speaker
31-07-2014	WRA	Offshore Wind Technology - Overview	Ms. S. Mary
07-08-2014	R&D	Condition Monitoring in Wind Turbines	Mr. E. Shanmuga Sundaram
14-08-2014	WTT	Instrumentation for Wind Turbine Measurement	Mr. M. Karuppuchamy
21-08-2014	S&C	Applications of Electronic Components in Wind Turbines	Mr. R. Ranjith
28-08-2014	ESD	Power Line Communication & its Applications	Mr. T. Vignesh
09-10-2014	ITCS	Environmental Aspects of Wind Turbine Technology	Mr. S. Manikandan
16-10-2014	SRRA	Calibration and Aspects of Solar Radiation Instruments	Ms. M. Jaylakshmi
23-10-2014	WRA	Creation of Artificial downdraft for wind power plant	Mr. Satchidananda Behera
30-10-2014	WRA	Wind Energy - A potential resource for a sustainable future	Mr. M. Joel Franklin Asaria
01-01-2015	R&D	Optimising wind farms in cold climate	Mr. S. Sivakumar
08-01-2015	WTT	Equipment protection practices in wind turbine test and measurement	Mr. Y. Packiyaraj
22-01-2015	S&C	Supply Chain Management : An overview	Mr. S. Arunkumar
29-01-2015	ESD	National Knowledge Network (NKN) at NIWE	Mr. A. Ranjit Kumar
26-03-2015	ITCS	A case study of NIWE Library : Library resources and Services	Mr. R. Subramaniyam

Publications

Journals / Magazines / Newsletter

- **Gomathinayagam .S** (2015), Repowering of Wind Farms : Issues and proposals in India. Indian Wind Power, 1(2), 11.
- **K. Navin Sam, N. Kumaresan, N. Ammasai Gounden and Rajesh Katyal,** "Analysis and Control of Wind-Driven Stand-Alone Doubly-Fed Induction Generator with Reactive Power Support from Stator and Rotor Side", Wind Engineering, Volume 39, No.1, 2015, pp 97-112.
- **Rajesh Katyal,** Wind-Solar-Hybrid System, IWTMA newsletter "WINDPRO".
- **S.A. Mathew,** Wake Effects of Wind Turbines and its impacts on Power Curve Measurements, International Science Index, Vol 8,No 10, Part VI.
- **G. Giridhar, Prasun Kumar Das** and **S. Gomathinayagam,** Solar Radiation Resource Assessment project in India: A new initiative, Akshay Urja, a bi-monthly Newsletter of MNRE.

Conferences

- **K. Boopathi, J. Bastin, S. Gomathinayagam and B. Krishnan,** Comparison of Merra, Era-Interim Re-analysis wind profile data with Actual measurements in Semi Complex Terrain in India, International conference (RESUS 2015).
- **M. Joel Franklin Asaria, G. Arivukkodi, K. Boopathi & S. Gomathi - nayagam,** Wind Energy – A Potential Resource for a Sustainable Future, International Conference on "Emerging Environmental & Oxidation Technologies for Energy, Environment and Sustainability".
- **G. Arivukkodi,** Studies on noise propagation of Wind Turbines from a Wind Farm in India during International Conference on Advancements in Materials, Health & Safety towards sustainable Energy & Environment organized by IJAA Conference (MHS-2014), Chennai on 7th & 8th August 2014.

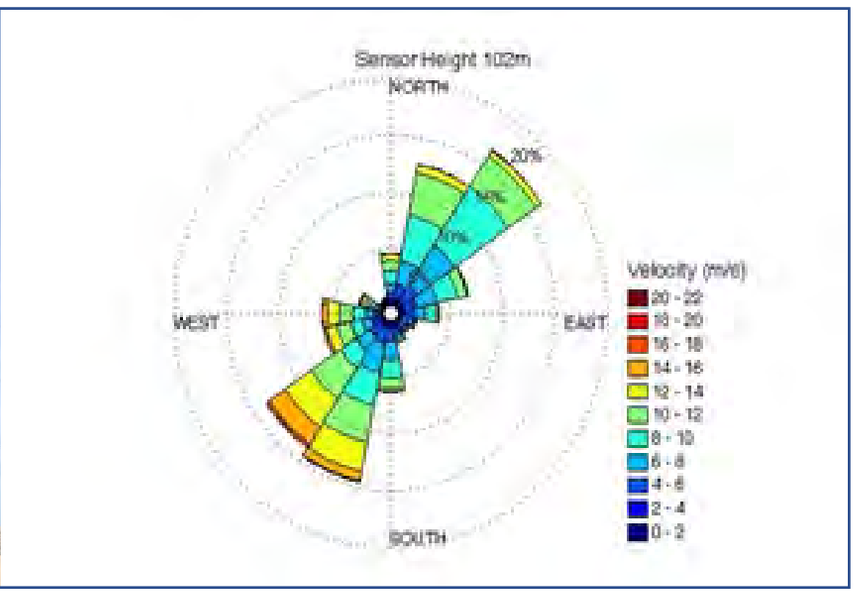
International Interaction

WRA Research Activities

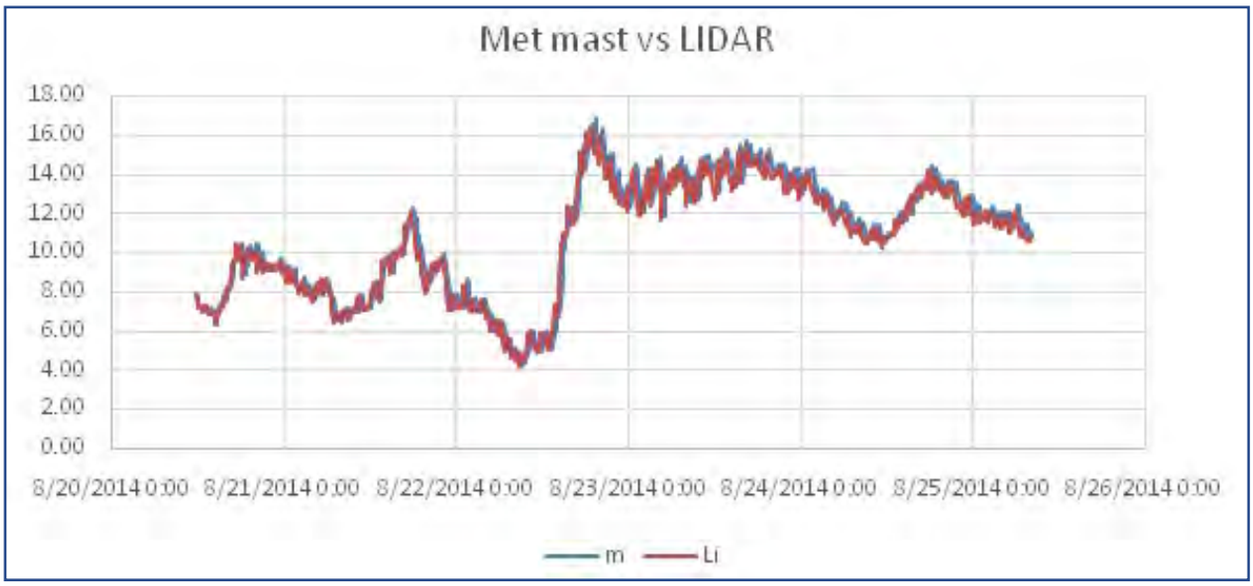
Offshore Wind Resource Assessment at Dhanuskodi

NIWE has carried out offshore wind energy potential pre-feasibility in South India in collaboration with RISO, DTU, for the area from 77° to 80° Eastern longitude and 7° to 10° Northern latitude using Advanced Synthetic Aperture Radar (ASAR) during the years 2002 to 2011. The ocean wind speed maps are retrieved and processed at RISO, DTU. The results shows wind energy density from 200 W/m^2 to 500 W/m^2 at 10 m height above sea level. In order to validate the satellite study, a 100m lattice wind mast was installed and commissioned at the tip of Dhanushkodi, Rameswaram. Data from this wind monitoring station at 10m, 50m, 80m, 100m and 102m has been collected. To validate the wind monitoring station data, LIDAR (Light Detection and Ranging) measurement was carried for a week of time and the results reveals good comparison.

Installation of 100m mast



Wind Rose – 102m (102 &98)



Comparison of LIDAR and MET MAST DATA

Monthly wind speed

Wind Power Forecasting

Collaboration with M/s. Vortex, Spain

NIWE has collaboration with VORTEX Factoria de Calculs, Spain for the purpose of scheduling and dispatching of electricity from wind turbine generators in Tamil Nadu. As per the MoU NIWE has identified a 50 MW wind farm in Tamil Nadu and obtained generation data. The data has been fed in to VORTEX model to do wind power forecasting. The forecasting simulation was performed by a forecasting model and fine-tuned with real time data. The model result is shown in the following graph.

International Training Programmes

13th International Training Programme

The ITCS Unit had successfully organized the 13th International Training Programme on "Wind Turbine Technology and Applications" during 7th – 30th May 2014 specially for Association of South East Asian Nations (ASEAN) countries at NIWE, Chennai, which was sponsored by Ministry of External Affairs (MEA), Government of India under the ASEAN-India Cooperation Fund programme and supported by Ministry of New and Renewable Energy, Government of India. The course was attended by 22 participants from 8 countries (Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Thailand, Vietnam).

The training was inaugurated by Dr. Yogender Kumar Yadav, Director, Sardar Swaran Singh – National Institute of Renewable Energy, Kapurthala, Punjab.

Dr. Yogendra Kumar Yadav inaugurating the Course

Participants at Gamesa & Vaata Manufacturing factory

Forty Eight lectures were scheduled during 23 days programme, which was handled by 18 NIWE scientists, 5 manufacturers, 6 developers, 2 consultants and 4 premier academicians. Apart from theoretical lectures, we had scheduled practical classes to Wind Resource Assessment Laboratory, Small & Large Wind Turbine Testing and R&D facilities. To provide hands an experience, visits to Large Wind Turbine Manufacturing Factory (M/s. Gamesa Wind Turbine Pvt. Limited, Mamandur) and Small Wind Turbine Manufacturing Factory (M/s. VAATA Infra Limited, Red Hills) were also arranged.

Mr. A.A. Khatana, Executive Director, IREDA, New Delhi was the Chief Guest for the Valedictory Function and has also distributed the Course Certificates.

14th International Training Course

ITCS Unit had successfully conducted the 14th International Training programme on "Wind Turbine Technology and Applications" during 3rd to 30th September 2014 for ITEC / SCAAP countries sponsored by Ministry of External Affairs (MEA), Government of India and supported by Ministry of New and Renewable Energy (MNRE), Government of India .

The course was attended by 18 enthusiastic participants from 13 countries (Bhutan, Cuba, Ethiopia, India, Maldives, Mongolia, Myanmar, Nigeria, Peru, St. Lucia, Syria, Tanzania and Uganda) and inaugurated by Mr. D. Vaidyanathan, Chief General Manager, ITCOT.

Mr. D. Vaidyanathan delivering the Inaugural address

During 28 days of training, 47 lectures were delivered by 18 NIWE scientists, 5 manufacturers, 6 developers, 2 consultants and 4 academicians. Apart from theoretical lectures, practical classes had been conducted in Wind Resource Assessment Laboratory, Small & Large Wind Turbine Testing and R&D facilities. To provide hands an experience,

visits to large Wind Turbine Manufacturing Factory (M/s. Regen Power Tech, TADA, Chennai), Small Wind Turbine Manufacturing facilities (M/s. AUROVILLE, Pondichery), WTTS / WTRS (Kayathar) and operating Wind farms were also organized.

Dr. C. Vaidyanathan distributing the Course Certificate

Dr. C. Vaidyanathan, Former Vice Chancellor, Sri Chandrasekharendra Saraswathi Viswa Mahavidyalaya, Kanchee-puram & Retired Chief Scientist, SERC was the Chief Guest for the Valedictory Function and distributed the Course Certificate to all the participants.

12th International Training Course

The ITCS Unit had successfully conducted the 12th International Training programme on "Wind Turbine Technology and Applications" during 19th November to 12th December 2014 specially for African Countries. Ministry of External Affairs (MEA), Government of India had

Mr. Benedikt Anselman releasing the Course Material

sponsored this special course under Africa India Forum Summit – II programme which was supported by the Ministry of New and Renewable Energy (MNRE), Government of India.

Twenty one participants from 8 countries Burundi, Ethiopia, Kenya, Malawi, Mauritius, Nigeria, Sudan and Tanzania have attended the training programme with diverse background. Professional levels of the participants were from vocational skill development teachers, engineers and scientific officers as well as higher level officers of ministerial service in the energy sector.

Mr. Benedikt Anselman, Vice President, TUV Rheinland- India has inaugurated the training programme as the "Guest of Honour" and released the "Course Material".

During the course tenure of 24 days, 18 NIWE scientists, 5 manufacturers, 6 developers, 2 consultants and 4 premier academicians have presented forty seven classroom lectures along with case studies apart from practical training, field & factory visits to facilitate a paramount knowledge transfer to the participants.

Participants have also visited Small and Large Wind Turbine Testing and R&D facilities at WTTS / WTRS, Kayathar and large Wind Turbine Manufacturing Factory of M/s. Gamesa Wind Turbine at Mamandur which enabled them to acquire hands on experience on both field and factory.

Mr. Alok Ranjan Jha distributing the Course Certificate

Mr. Alok Ranjan Jha, Deputy Secretary, East and South Africa Division, Ministry of External Affairs was the chief guest for the Valedictory Function and have presented the Course certificates to all the participants.

15th International Training Programme (one month)

NIWE has successfully conducted the 15th International Training Programme on "Wind Turbine Technology and Applications" during 4th February to 3rd March 2015 addressing all

aspects of Wind Power starting from introduction to wind and its technology, wind resource assessment, installation, operation and maintenance aspects of wind farms along with financial analysis and CDM benefits. This is a special training course for ITEC / SCAAP Countries sponsored by the Ministry of External Affairs (MEA), Government of India under ITEC / SCAAP programme and supported by the Ministry of New and Renewable Energy (MNRE), Government of India. The course was attended by 20 participants from 13 countries (Afghanistan, Algeria, Bangladesh, Botswana, Fiji, Lithuania, Madagascar, Malaysia, Nigeria, Sudan, Syria and Tanzania)

The training was inaugurated by Dr. Ramachandramoorthy, Vice Chancellor, St. Peter's University, Chennai.

47 classroom lectures were scheduled, which was handled by NIWE scientists and external experts from Wind Turbine Manufacturers, Wind Farm Developers, Consultants, Academicians, Utility and IPP Individual also practical training at Laboratories and visits to wind farm field and factory to M/s. Global Wind Power Limited at Pondicherry, M/s. MinVayu at Auroville (Pondicherry), visit to Kayathar and Kanyakumari Wind Turbine Test Station and Wind Turbine Research Station.

Dr. G. Raghava, Chief Scientist, Structural Engineering Research Centre (SERC), Chennai was the Chief Guest for the valedictory function and distributed the Course Certificates to all the participants.

Glimpses of 15th International Training Programme

Visits Abroad

Dr. S. Gomathinayagam, Director General

- Attended the Expert Group Meeting on Renewable Energy Resource Assessment for Countries in the Asia-Pacific Region at Bangkok, Thailand during 25th and 26th September 2014.
- Business Initiative Group / BIG Group one of Spain has selected NIWE - National Institute of Wind Energy for International Quality ERA Award, Gold Category and the award ceremony attended by Dr. S. Gomathinayagam to collect the award at Geneva, Switzerland during 20th to 22nd March 2015.

K. Boopathi, Additional Director & Head, WRA

- Attended the Offshore Wind Energy Review meeting organized by British High Commission at London held during 9th & 10th June 2014.
- Participated in the 13th Annual Offshore Wind Energy (GOW14) Conference organized by M/s. Renewable UK (formerly BWEA) at Glasgow, United Kingdom held during 11th & 12th June 2014.
- Attended Special Training on Wind Power Forecasting offered by M/s.Vortex Factoria at Barcelona, Spain during 10th to 12th July 2014.
- Attended conference on Offshore Wind Energy Programme organized by M/s. GWEC/FOWIND at Hamburg, Germany during 21st to 26th September 2014.

A.G. Rangaraj, Assistant Director (Technical) WRA **&**
M.C. Lavanya Assistant Director (Technical), WRA

- Attended Special Training on Wind Power Forecasting offered by M/s.Vortex Factoria at Barcelona, Spain during 10th to 12th July 2014.

J.Bastin, Assistant Director (Technical), WRA

- Attended Special Training on Wind Power Forecasting offered by M/s.Vortex Factoria at Barcelona, Spain during 10th to 12th July 2014.·
- Participated and presented a paper in the International conference (RESUS 2015) on "Comparison of Merra, Era-Interim Re-analysis wind profile data with Actual measurements in Semi Complex Terrain in India" (authors K. Boopathi, J. Bastin, Dr. S. Gomathinayagam, B. Krishnan) at Universite des Mascareignes, Rose Hill Campus, Mauritius during 3rd to 5th March 2015.

S.A. Mathew, Additionl Director & Head, WTT

- Participated in the IEC CAC Advisory Group for Test Laboratories meeting at Westin Poinsett, Greenville, South Carolina, USA held during 12th and 13th of May, 2014.
- Presented a scientific paper entitled "Wake Effects of Wind Turbines and its impacts on Power Curve Measurements" in the ICSREE 2014: XII International Conference on Sustainable and Renewable Energy Engineering in Dubai, UAE during 18th – 19th October 2014.

A. Senthil Kumar, Additional Director & Head, S&C

Participated in the IECRE Management Committee (REMC) and Forum meeting - Wind Energy held at Boulder, Colorado, USA during 16th to 18th September 2014.

P. Kanagavel, Additional Director & Head, ITCS

Delivered a lecture on "Environmental Impact of Wind Energy" in the BIT's New Energy Forum Conference 2015 at Quindao, China during 21st to 23rd September 2014.

Dr. G. Giridhar, Director & Head, SRRA

Visited U.S. for training/FAT for AMS at Yankee Instruments, Massachussetts, USA under SRRA Phase II during 5th to 14th April 2014.

GENERAL INFORMATION

GOVERNING COUNCIL		
The following are the members of the Governing Council & Annual General Body (To administer and guide the affairs of the Institute)		
1.	Mr. Upendra Tripathi, I.A.S., Secretary, MNRE, New Delhi,	President of the Society and Chairman
2.	Mr. Rajesh Lakhoni, I.A.S., Principal Secretary to Government Energy Department, GoTN, Chennai	Member
3.	Mrs. Varsha Joshi, I.A.S., Joint Secretary (Wind Energy) MNRE, New Delhi	Member
4.	Mr. J B Mohapatra, I.R.S., Joint Secretary and Financial Adviser, MNRE, New Delhi	Member
5.	Mr. Sunil Soni, I.A.S., Director General, BIS, New Delhi	Member
6.	Mr. Major Singh Member Planning, CEA, New Delhi	Member
7.	Mr. Shyam Chetty, Director, NAL, Bangalore	Member
8.	Mr. Debasish Majumdar, Chairman & Managing Director, IREDA, New Delhi	Member
9.	Mr. S.K. Soonee, CEO, Power System Operation Corporation Limited, New Delhi and Chairman, R&D Council, NIWE	Member
10.	Mr. Ramesh Kymal Chairman, IWTMA, Chennai	Member
11.	Dr. S. Gomathinayagam, Director General, NIWE, 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, NIWE	Chairman
2.	Financial Adviser, MNRE	Member
3.	Director General, NIWE	Member

FINANCE COMMITTEE		
The following are the members of the Finance Committee (To review the financial performance of the Centre)		
1.	Mr. J.B. Mohapatra, I.R.S., Joint Secretary & Financial Adviser, MNRE, New Delhi	Chairman
2.	Mr.Rajesh Lokhani, I.A.S., Principal Secretary to Government, Energy Department, Tamil Nadu Government	Member
3.	Mrs. Varsha Joshi, I.A.S., Joint Secretary (Wind Energy), MNRE, New Delhi	Member
4.	Dr. S. Gomathinayagam, Director General, NIWE, Chennai	Member
5.	Mr. Dilip Negam, Director (Wind Energy), MNRE, New Delhi	Member
6.	Mr. R.P. Batra, Deputy Secretary (Finance) MNRE, New Delhi	Member
7.	Mr. D. Lakshmanan, Director (F&A), NIWE, Chennai	Member Secretary

RESEARCH AND DEVELOPMENT COUNCIL		
The following are the members of the Research and Development Council (To guide NIWE on laying down Research direction to serve the Indian Wind Energy Sector)		
1.	Mr. S.K. Soonee, CEO, Power System Operation Corporation Ltd, New Delhi – 110 016	Chairman
2.	Mrs. Varsha Joshi, I.A.S., Joint Secretary, Ministry of New and Renewable Energy, New Delhi – 110 003	Member
3.	Dr. B. S. K. Naidu. Ex-Director General, NTPI & CPRI and Chairman, Great Lakhs IEMR, NCR, New Delhi	Member
4.	Mr. Y. K. Sehgal, Executive Director (Smart Grid), Power Grid Corporation of India Ltd, Gurgaon – 122 001	Member
5.	Smt. K. A. Fathima, Former Senior Director – C-DAC, Trivandrum – 695 030	Member
6.	Mr. S. C. Bhan, Scientist-E, India Meteorological Department, New Delhi – 110 003	Member
7.	Mr. Ganesh Prasad, GM (R&D), M/s. Engineers India Ltd, New Delhi – 110 066	Member
8.	Dr. N.K. Singh, Addl. General Manager, Bharat Heavy Electricals Ltd, Hyderabad – 502 032	Member
9.	The Chairman, Indian Wind Turbine Manufacturers Association, Chennai.	Member
10.	Dr. S. Gomathinayagam, Director General, National Institute of Wind Energy (NIWE), Chennai – 600 100	Member
11.	Mr. Rajesh Katyal, Deputy Director General & Head, R&D, National Institute of Wind Energy (NIWE), Chennai – 600 100	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 / NIWE approved manufacturers)		
1	Dr. S. Gomathinayagam, Director General, NIWE	Chairman
2	Mr. G. Upadhyay, Director, MNRE	Member
3	Mr.. M.K. Deb, CECL, Bhopal	Member
4	Prof. A.P. Haran, Park College of Engineering, Coimbatore	Member
6	Mr. Rajesh Katyal, Deputy Director General & Head, R&D, NIWE	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, Director General, NIWE	Chairman
2.	Mr. Dilip Nigam, Director (Wind Energy), MNRE	Member
3.	Mr. A. A. Khatana, Executive Director, IREDA	Member
4.	Mr. V. Balaji, DGM, SRLDC	Member
5.	Mr. Madhusudan Khemka, Hon.Chairman, IWTMA, Chennai	Member
6.	Dr. K. Kasthurirangaian, Chairman, IWPA, Chennai	Member
7.	Mr. A. Senthil Kumar, Additional Director & Head, S&C, NIWE	Secretary

PROTOTYPE WIND TURBINE MODELS COMMITTEE

The following are the members of the Prototype Wind Turbine Models Committee

1.	Dr. S. Gomathinayagam, Director General, NIWE	Chairman
2.	Mr. Mohamed Hussain, Director, MNRE & Head, WTRS, NIWE	Member
3.	Mr. Siddhartha Bhatt, Additional Director, CPRI, Bangalore	Member
4.	Mr. D.V. Giri, Secretary General, IWTMA, Chennai	Member
5.	Mr. A. Senthil Kumar, Additional Director & Head, S&C, NIWE	Member 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 NIWE)

1.	Dr. S. Gomathinayagam, Director General, NIWE	Chairman
2.	Mr. Rajesh Katyal, Deputy Director General & Head, R&D, NIWE	Member Secretary
3.	Mr. D. Lakshmanan, Director, F&A, NIWE	Member
4.	Assistant Director, F&A, NIWE	Member
5.	Mr. P. Kanagavel, Additional Director & Head, ITCS, NIWE	Member

Vigilance Awareness Week

Vigilance awareness week for the year 2014 was observed in NIWE from 27.10.2014 to 01.11.2014 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 NIWE Campus. The Events started with a parade of security personnel at NIWE followed by flag hosting and concluded with distribution of Sweets.

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 NIWE and the Committee conducted its quarterly meetings on 24th June 2014, 18th September 2014, 10th December 2014 and 18th March 2015. No complaints received during the year 2014-15.

Foundation Day

NIWE's "Foundation Day", 17th Birthday was celebrated third consecutive year on 21st March 2015, with variety of programmes. First time in NIWE history, 'Open Day' was announced for public to visit all the facilities of NIWE on 21st March 2015 between 9.30 am and 12.30 pm to create awareness about the Renewable Energy Sources and its applications.

Glimpses of Public visit during Open Day of NIWE's Foundation Day

Glimpses of Foundation Day

As part of the celebrations, in association with World Wide Fund for Nature (WWF) India, various competitions were conducted for school children where in more than 600 students from 30 schools across Tamil Nadu participated in the competitions. Mr. K.P. Sukumaran, Former Advisor, MNRE and former Executive Director, NIWE delivered a Foundation Day lecture at the conference Hall of NIWE among NIWE staff and winners of the competitions. As Chief Guest of the day, he distributed awards to the winning student as well as the awards and souvenirs to the NIWE Staff.

Promotions during the year 2014-15

S. No.	Name	Previous Cadre and Scale of Pay	Promoted Cadre and Scale of Pay	Date of Promotion
1.	Mr. Rajesh Katyal	Scientist 'E' Rs.37,600-67,000/- + GP Rs.8,700	Deputy Director General Rs.37,600-67,000/- + GP Rs.8,900	01.01.2014
2.	Mr. P. Kanagavel	Scientist 'C' Rs.15,600-39,100/- + GP Rs.6,600	Additional Director Rs.15,600-39,100/- + GP Rs.7,600	01.01.2014

Sl. No.	Name	Previous Cadre and Scale of Pay	Promoted Cadre and Scale of Pay	Date of Promotion
3.	Mr. K. Boopathi	Scientist 'C' Rs.15,600-39,100/- + GP Rs.6,600	Additional Director Rs.15,600-39,100/- + GP Rs.7,600	01.01.2014
4.	Mr. N. Rajkumar	Scientist 'B' Rs.15,600-39,100/- + GP Rs.5,400	Deputy Director (Technical) Rs.15,600-39,100/- + GP Rs.6,600	01.01.2014
5.	Mrs. B. Muthulakshmi	Sr.Steno Rs.9,300 – 34,800 + GP Rs.4,200	Executive Secretary II Rs.9,300 – 34,800/- + GP Rs.4,800	13.10.2013
6.	Mr. R. Naveen Muthu	Technician Rs.5,200 – 20,200 + GP Rs.2,400	Junior Engineer Rs.9,300 – 34,800 + GP Rs.4,200	24.03.2014
7.	Mr. R. Vinod Kumar	Technician Rs.5,200 – 20,200 + GP Rs.2,400	Junior Engineer Rs.9,300 – 34,800 + GP Rs.4,200	24.03.2014
8.	Mr. M.R. Gunasekaran	Sr.Steno Rs.9,300 – 34,800/- + GP Rs.4,200	Executive Secretary II Rs.9,300 – 34,800/- + GP Rs.4,800	13.04.2014
9.	Mr. C. Stephen Jeremias	Junior Engineer Rs.9,300 – 34,800 + GP Rs.4,200	Assistant Engineer Rs.9,300 – 34,800 + GP Rs.4,800	01.04.2014
10.	Mr. B. Krishnan	Junior Engineer Rs.9,300 – 34,800 + GP Rs.4,200	Assistant Engineer Rs.9,300 – 34,800 + GP Rs.4,800	01.04.2014
11.	Mr. T. Suresh Kumar	Junior Engineer Rs.9,300 – 34,800 + GP Rs.4,200	Assistant Engineer Rs.9,300 – 34,800 + GP Rs.4,800	02.04.2014
12.	Mr. M. Selva Kumar	Daftary Rs.5,200 – 20,200 + GP Rs.1,900	Record Keeper Rs.5,200 – 20,200 + GP Rs.2,400	14.08.2014

Official Language Act

NIWE has been an active member in the Town Official Language Implementation Committee, Chennai. The Hindi version of "PAVAN", the Quarterly Newsletter of NIWE is considered a standard communications in Hindi.

Hindi Fortnight 2014 was celebrated in National Institute of Wind Energy (NIWE) Chennai during 15th to 30th September 2014. Competitions were conducted for Hindi Speaking and Non-Hindi speaking officials and Outsourcing Staff of NIWE. Mr. Jawaahar Laal Sharma, Consultant (OL) read out the Hindi Day-2014 message of Mr. Piyush Goyal, Honorable Union Minister of New and Renewable Energy (MNRE), Government of India. 174 participants took part in the competitions. Valedictory function was conducted on 9th October 2014, the prizes were distributed to the winners by Dr. S. Gomathinayagam, Director General, NIWE.

Continuous Hindi Classes is being conducted in the campus of NIWE from March 2015 to improve upon spoken Hindi and also to prepare staff members for appearing in the examinations towards implementation of Official Language.

Right to Information Act

During the year 2014-15, 3 applications were received seeking information under RTI Act, 2005 and requisite details have been given. No appeal has been preferred against the decision of CPIO.

Implementation of Persons with Disabilities Act 1995

The following facilities are being available to Persons with Disabilities

1. Though NIWE is functioning in a two storey building (where lift is not mandatory) a lift has been provided for the convenience of physically challenged.
2. A separate ramp has been provided to enable use of crutches / wheel chairs.
3. Low level steps laid by the side of the lift for easy access.
4. Post reservation for physically handicapped as per GOI rules.

HUMAN RESOURCE

S.No.	Name	Cadre
Office of Director General		
1.	Dr. S. Gomathinayagam	Director General
2.	Mrs. Anuradha Babu	Executive Staff Officer
3.	Mr. T. Ganeshamoorthi	Junior Executive Assistant
Finance & Administration		
1.	Mr. D. Lakshmanan	Director (F&A)
2.	Mr. R. Girirajan	Assistant Director (F&A)
3.	Mrs. K. Tamilselvi	Administrative & Accounts Officer
4.	Mr. V. Shanmugam	Executive Assistant
5.	Mrs. B. Muthulakshmi	Executive Secretary II
6.	Mrs. J. Rekha	Junior Executive Assistant
7.	Mr. M. Selvakumar	Record Keeper
8.	Mr. M Malaravan	Senior Driver
9.	Mr. S Maruthanayagam	Driver
Research & Development		
1.	Mr. Rajesh Katyal	Deputy Director General & Head
2.	Mr. J.C. David Solomon	Additional Director
3.	Mrs. Deepa Kurup	Deputy Director (Technical)
4.	Mr. M.R. Gunasekaran	Executive Secretary II
5.	Mr. R. Naveen Muthu	Junior Engineer
Wind Resource Assessment		
1.	Mr. K. Boopathi	Additional Director & Head
2.	Mr. A.G. Rangaraj	Assistant Director (Technical)
3.	Mr. J. Bastin	Assistant Director (Technical)
4.	Ms. M.C. Lavanya	Assistant Director (Technical)
5.	Mrs. G. Arivukkodi	Assistant Engineer
6.	Mr. T. Suresh Kumar	Assistant Engineer

S.No.	Name	Cadre
7.	Mr. B. Krishnan	Assistant Engineer
8.	Mr. R. Vinod Kumar	Junior Engineer
9.	Mr. K.A. Haji Abdul Ibrahim	Daftary
Wind Turbine Testing		
1.	Mr. S.A. Mathew	Additional Director & Head
2.	Mr. M. Saravanan	Assistant Director (Technical)
3.	Mr. Bhukya Ramdas	Assistant Director (Technical)
4.	Mr. M. Karuppuchamy	Assistant Engineer
5.	Mr. A.R. Hasan Ali	Assistant Engineer
6.	Mr. Y. Packiyaraj	Assistant Engineer
7.	Mr. S. Paramasivan	Junior Engineer
Standards & Certification		
1.	Mr. A. Senthil Kumar	Additional Director & Head
2.	Mr. N. Rajkumar	Deputy Director (Technical)
3.	Mr. S. Arulselvan	Assistant Engineer
Information, Training & Commercial Services		
1.	Mr. P. Kanagavel	Additional Director & Head
Engineering Services Division		
1.	Mr. M. Anvar Ali	Additional Director & Head
2.	Mr. C. Stephen Jeremias	Assistant Engineer
Employees on Deputation from MNRE		
1.	Mr. A. Mohammed Hussain	Director
2.	Dr. G. Giridhar	Director
3.	Mr. Joel Franklin Asaria	Additional Director
Contract Staff in SRRA		
1.	Mr. Prasun Kumar Das	Assistant Director (Technical) (Contract)
2.	Mr. R. Karthik	Assistant Director (Technical) (Contract)

NIWE 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.

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.
- International Journal of Recent Research and Applied Studies, Member

Auditor's Report

R. JANAKIRAMAN & Co.,
Chartered Accountants

New No: 6, Old No:43,
Maharaja Surya Rao Road,
Alwarpet,Chennai -600 018.

Partners :
CA.R. JANAKIRAMAN B.Com., FCA
CA.J.CHANDRASEKARAN B.Sc, FCA
CA.C.GEETHA B.Com, AICWA, FCA, DISA..CISA,CSIM
CA.K.CHANDRA MOULI B.Sc, FCA, M.S, MBDM(UK),DISA,CISA

CA.T.V.V.NARAYANAN B.Com, FCA, DISA
CA.B.VISWABARATHY B.Com, ACA
CA.KAVITHA UMAPATHY M.Com, ACA

The Chairman
Governing Council
National Institute of Wind Energy
Chennai – 600 100

INDEPENDENT AUDITORS' REPORT

Sir,

We have audited the attached financial statements of National Institute of Wind Energy Formerly(C-WET), Velachery – Tambaram, Pallikaranai, Chennai, which comprise the Balance sheet as at 31.03.2015, the Income & Expenditure Account and the Receipts and Payments Account for the year then ended and a summary of significant accounting policies and other explanatory information.

Management's Responsibility:

NIWEs' Management is responsible for the preparation of these financial statements that give a true and fair view of the financial position, financial performance and cash flows of the NIWE in accordance with the Accounting Standards issued by the institute of chartered accountants of India. This responsibility also includes maintenance of adequate accounting record in accordance with the provisions of the Indian laws applicable to NIWE for safeguarding the assets of the Institution and for preventing and detecting frauds and other irregularities; selection and application of appropriate accounting policies; making judgments and estimates that are reasonable and prudent; and design, implementation and maintenance of adequate internal financial controls, that were operating effectively for ensuring the accuracy and completeness of the accounting records, relevant to the preparation and presentation of the financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility:

Our responsibility is to express an opinion on these financial statements based on our audit.

We have taken into account the provisions of the Indian law's applicable to NIWE, the accounting and auditing standards and matters which are required to be

included in the audit report under the provisions said Indian laws and the Rule made thereunder.

We conducted our audit in accordance with the Standards on auditing issued by the Institute of chartered Accountants of India. Those standards require that we comply with the ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatements.

An audit involves performing procedures to obtain audit evidence about the amounts and the disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal financial control relevant to NIWEs' preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the NIWEs' internal finance control.

An audit also includes evaluating the appropriateness of the accounting policies used and reasonableness of the accounting estimates made by the management, as well as evaluating the overall presentation of financial statements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion:

a) In our opinion and to the best of our information and according to the explanations given to us, the aforesaid financial statements, including the Balance Sheet, Income & 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:

   i. In the case of Balance Sheet, of the state of affairs of the above mentioned Institution as at 31st March, 2015;

   ii. in the case of Income & Expenditure account of the Excess of Income over expenditure of this Institution for the year ended on that date; and

   iii. In the case of Receipts and payments Account of the Receipts and Payments of this Institution for the year ended on that date.

E-mail: rjco1960@gmail.com Phone: 044-24352596 044-24352597 Mobile: 9381051212/9840122090 9840756873

Emphasis of Matter:

We draw attention to the Note No.13 of "Schedule 14: Notes forming part of the accounts", NIWE has changed the accounting policy from charging the expenditure on the running project to Income & Expenditure in the year of incurring the same to accumulating the same and charging to Income & Expenditure in the year of completion of the project when corresponding fee received is continued to be shown under advance received from projects in the year of receipt and accounted as income in the year of completion of project. Accordingly, a sum of Rs.2,01,71,256/- being expenditure during the year is shown in the Balance Sheet under the head of "Current Assets, Loans, Advances and Other Assets: Expenditure on running projects". Because of this change in Accounting policy, surplus is more by Rs. 2,01,71,256/- and General fund is more by Rs. 2,01,71,256/-.

Our opinion is not qualified in respect of this matter.

Report on Other Legal and Regulatory Requirements

We report that:

a) We have obtained all information and explanations which to the best of our knowledge and belief were necessary for the purpose of our audit;

b) In our opinion, proper books of account have been kept by the above mentioned Institution so far as appears from our examination of the books;

c) The Balance Sheet, Income & Expenditure Account and Receipts and Payments Account referred to in this report are in agreement with the books of accounts;

d) In our opinion the Balance Sheet, Income and Expenditure Account and Receipts and Payments Account dealt with by this report are prepared in accordance with the applicable Accounting Standards issued by the Institute of Chartered Accountants of India.

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

Place: CHENNAI
Date: 23 SEP 2015

J.Chandrasekaran, R.JANAKIRAMAN & Co.
PARTNER
M.NO.027861

E-mail: rjco1960@gmail.com Phone: 044-24352596 044-24352597 Mobile: 9381051212/9840122090 9840756873

NATIONAL INSTITUTE OF WIND ENERGY

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

Chennai - 600 100

BALANCE SHEET AS AT 31st MARCH,2015

(Amount in Rs.)

FUND AND LIABILITIES	Schedule	31st March, 2015	31st March, 2014
CAPITAL ASSET FUND	1	36,86,89,600	29,06,88,615
RESERVES AND SURPLUS	2	43,44,85,821	36,13,16,521
CURRENT LIABILITIES AND PROVISIONS	3	14,77,38,363	17,81,38,165
TOTAL		**95,09,13,784**	**83,01,43,301**
ASSETS			
FIXED ASSETS			
(a) Created out of Central Government Grants	4	35,13,33,473	28,80,39,813
(b) Out of Internal Generation Grants		1,73,56,127	26,48,802
CURRENT ASSETS, LOANS AND ADVANCES	5	58,22,24,184	53,94,54,686
TOTAL		**95,09,13,784**	**83,01,43,301**
SIGNIFICANT ACCOUNTING POLICIES	13		
NOTES ON ACCOUNTS	14		

For National Institute of Wind Energy Technology

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

Sd/-	**Sd/-**	**Sd/-**	**Sd/-**
D.Lakshmanan	**Dr. S.Gomathinayagam**	President/	**J.Chandrasekaran**
Director (F&A)	Director General	Chairman	Partner
			Membership No.027861

NATIONAL INSTITUTE
(An Autonomous R & D Institution under Ministry of
Chennai

RECEIPTS AND PAYMENTS ACCOUNT

RECEIPTS			31st March, 2015	31st March, 2014
I.	**Opening Balances**			
	(a)	Cheques in hand		
	(b)	Bank balances		
		i) In Current Account	1,00,000.01	22,52,216
		ii) In Savings Bank Account	13,81,44,730.94	3,23,07,636
		iii) In Deposit Accounts	36,00,00,000.00	36,00,00,000
	(c)	Stamps on hand	9,899.00	2,472
			49,82,54,629.95	**39,45,62,323**
II.	**Grants Received / UnUtilised Grants**			
	(a)	From Government of India	12,00,00,000	14,00,00,000
	(b)	From Government of India Smart Grid Project	64,52,000	-
	(c)	Sale of Fixed Assets	9,144	(74,740)
	(d)	From Government of India for execution various projects/General Reserve	-	2,37,02,711
	(e)	From Government of India for SRRA Project	7,00,00,000	21,75,00,000
III.	**Income on Investments**			
IV.	**Interest Received**			
	(a)	On Bank deposits	4,90,25,759	2,45,25,660
	(b)	On Bank deposits (SRRA)	28,17,965	23,22,317
V.	**Other Income**			
	(a)	Fees for services	8,36,26,850	4,00,26,648
	(b)	Income from publications	23,55,911	1,43,365
	(c)	Energy receipts	2,01,98,769	4,84,11,746
	(d)	Misc. Income	2,17,53,435	62,32,627
	(e)	Misc. Income (including SRRA Income)	12,69,921	-
VI.	**Amount borrowed**			
VII.	**Any other receipts**			
	(a)	Fees received in advance on Consultancy projects	7,45,59,750	8,39,10,250
	(b)	Fees received in advance on Consultancy projects (SRRA)	82,50,000	-
	(c)	Security deposit received	10,51,560	25,73,932
	(d)	Security deposit received (SRRA)	9,50,000	39,300
	(e)	Earnest money deposit received	42,75,064	45,18,000
	(f)	Earnest money deposit received (SRRA)	-	9,26,580
	(g)	Service tax realised	5,950	93,19,538
	(h)	Service tax realised (SRRA)	-	1,77,798
	(i)	TDS to be remitted	10,59,525	-
	(j)	TDS to be remitted (Including SRRA)	12,37,058	5,66,463
	(k)	Advances and Deposits - Grants	8,40,650	2,73,489
	(l)	Sundry Creditor (SRRA/Branch Division)	1,32,38,033	-
	(m)	Advances and Deposits - Internal Generation	62,46,674	17,37,032
	(n)	Receivable from Debtors/other payments	46,53,045	3,39,79,131
	(o)	Performance Guarantee - Grants	11,17,931	86,789
	(p)	Performance Guarantee - SRRA	2,42,792	-
			49,52,37,786	**64,08,98,636**
		TOTAL	**99,34,92,415**	**1,03,54,60,959**

OF WIND ENERGY
New and Renewable Energy, Government of India)
600 100

FOR THE YEAR ENDED 31st MARCH 2015

(Amount in Rs.)

PAYMENTS			31st March, 2015	31st March, 2014
I.	**Expenses**			
	(a)	Employee related Expenses	4,49,09,020	3,49,28,684
	(b)	Administrative Expenses	4,08,69,794	4,94,80,985
II.	**Payments made against funds for various projects**			
	Out of CFA			
	(a)	In house R&D project expenses	4,50,02,373	13,53,05,781
	(b)	Seminar & Information dissemination	33,19,981	10,58,030
	(c)	Accreditation fee	44,944	59,243
	Out of Grants for projects			
	(a)	WRA Lakshadeep	-	1,50,600
	(b)	Wind Profile Measurment - Dhanushkodi	64,32,323	1,46,55,134
	(c)	Wind Shear Assessment expenses 120Mast	16,86,039	52,80,774
	(d)	North-Eastern Project 2006-07	5,56,749	16,15,397
	(e)	Study on Uncovered / New areas (2003-04 to 2010-11)	35,82,527	1,21,38,358
	(f)	Solar Radiation Resource Assessment	3,11,52,309	1,29,19,381
III.	**Investment and Deposits made**			
IV.	**Expenditure on Fixed assets & Capital Work-in-Progress**			
	(a)	Purchase of Fixed assets (Grants)	2,17,24,932	1,49,69,141
	(b)	Purchase of Fixed assets (Internal Generation)	1,47,07,325	28,78,148
	(c)	Expenditure on Capital Work-in-progress	-	(23,21,263)
	(d)	Advance on capital account (including imports) Grants	-	92,12,247
	(e)	Advance on capital account (including imports) Internal Generation	-	24,227
	(f)	Purchase of Fixed assets (SRRA)	11,62,78,044	11,66,18,345
V.	**Refund of Surplus Money**			
	(a)	Balance of Grants-in-aid to Government of India	-	-
VI.	**Other Payments**			
	(a)	Refund of Security deposits / Performance Guarantee	73,11,526	56,59,683
	(b)	Refund of Security deposits SRRA / Performance Guarantee	63,24,692	49,100
	(c)	Refund of Earnest Money Deposits	50,16,819	17,33,000
	(d)	Refund of Earnest Money Deposits (SRRA)	9,26,580	20,000
	(e)	Expenditure on Consultancy Projects	4,39,77,351	3,17,46,458
	(f)	Advance & Deposits from Grants	(1,68,06,490)	14,54,400
	(g)	Advance & Deposits from SRRA	(2,02,48,468)	2,65,00,045
	(h)	Advance & Deposits from Internal Generation	4,10,89,800	14,83,580
	(i)	Payment of TDS (Grants)	3,15,785	3,29,612
	(j)	Payment of TDS (Internal Generation)	3,12,924	-
	(k)	Payment of TDS (SRRA)	85,704	-
	(l)	Service tax remittances	71,936	93,19,538
	(m)	Service tax remittances (SRRA)	-	1,77,798
	(n)	Receivable from Debtors/other payments	1,54,43,563	59,88,922
	(o)	Festival advance paid	4,500	(7,500)
	(p)	Transfer of fees received in advance	6,78,61,850	4,37,78,482
	(q)	Transfer of fees received in advance from SRRA	1,64,50,000	-
VII.	**Closing Balances**			
	(a)	Cheques in hand		
	(b)	Bank Balances		
		i) In Current Account	1,00,470.01	19,11,291
		ii) In Savings Bank Account	8,49,78,626	13,63,33,440
		iii) In Deposit Accounts	41,00,00,000	36,00,00,000
	(c)	Stamps in hand	8,887	9,899
		TOTAL	**99,34,92,415**	**1,03,54,60,959**

For National Institute of Wind Energy

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

Sd/-
D.Lakshmanan
Director (F&A)

Sd/-
Dr. S.Gomathinayagam
Director General

Sd/-
President/Chairman

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

NATIONAL INSTITUTE OF WIND ENERGY

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

Chennai - 600 100

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st MARCH, 2015

(Amount in Rs.)

INCOME	Schedule	31st March, 2015	31st March, 2014
Income from Scientific & Technical Consultancy Services	6	10,38,25,619	6,60,88,636
Income from publication	7	23,55,911	24,19,350
Interest Earned	8	4,69,78,932	2,45,20,172
Other Income	9	2,23,19,014	1,95,97,767
Grants from Government of India allocated for Revenue expenditure during the year	3.1	4,08,55,756	3,42,30,629
Grants from Government of India allocated for In house project expenditure during the year	3.1	6,06,24,936	16,31,39,611
Closing stock		52,80,287	19,88,407
TOTAL (A)		**28,22,40,454**	**31,19,84,572**
EXPENDITURE			
Opening stock		19,88,407	22,23,276
Establishment Expenses	10	4,69,15,500	3,30,12,710
Administrative Expenses	11(A)	4,08,55,756	3,42,30,629
Consultancy Project Expenses	11(B)	4,05,93,601	4,03,17,359
In house project expenditure		6,06,24,936	16,31,39,611
TOTAL (B)		**19,09,78,200**	**27,29,23,585**
Balance being excess of Income over Expenditure (A-B)		9,12,62,254	3,90,60,987
Prior period adjustment	12	(1,879)	
Transfer to Capital Asset Fund	4	1,80,91,075	28,78,148
Transfer to Welfare Fund		4,26,381	
BALANCE BEING SURPLUS TRANSFERRED TO GENERAL RESERVE FUND		7,27,42,919	**3,61,82,839**
SIGNIFICANT ACCOUNTING POLICIES	13		
NOTES ON ACCOUNTS	14		

For National Institute of Wind Energy

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

Sd/-	Sd/-	Sd/-	Sd/-
D.Lakshmanan	Dr. S.Gomathinayagam	President/	J.Chandrasekaran
Director (F&A)	Director General	Chairman	Partner
			Membership No.027861

राष्ट्रीय पवन ऊर्जा संस्थान

NATIONAL INSTITUTE OF WIND ENERGY

नवीन और नवीकरणीय ऊर्जा मंत्रालय
अनुसंधान एवं विकास स्वायत संस्थान, भारत सरकार
An Autonomous R & D Institution
Ministry of New and Renewable Energy, Government of India

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

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