वार्षिक रिपोर्ट

ANNUAL REPORT 2016-17

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

नीवे NIWE

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(till 31st January 2017)

Dr. Rajesh Katyal
Director General (Additional Charge), NIWE

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From the Director General's Desk . . .

The year of 2016-17 brought many fruitful achievements for National Institute of Wind Energy. NIWE achieved a milestone in offshore wind energy sector in the country by installing its, first of this kind, structure for wind resource assessment. Forecasting and scheduling services to Tamil Nadu SLDC was another new initiative. NIWE has also made available free access to the data measured under the wind monitoring programme through the WRA web portal. A unique concept of integrating 75 kWp SPV system with old 200 kW wind turbine was implemented at NIWE-WTRS Kayathar. These initiatives were taken towards realizing the larger goal of Government of India's 60 GW target for Wind Energy by the year 2022.

India's ambitious plan of 175 GW renewable energy expects significant export possibilities of wind energy equipment across the World; since it is being manufactured in India with Internationally Accredited Certified Quality at an affordable International price, by over 21 manufacturers. India is having this orderly development of wind energy sector standing 4th in installed capacity in the World and 2nd in manufacturing of wind turbine equipments.

Offshore Wind and Industrial Business

Offshore wind is another sector where India can aim at harnessing reasonable potential of renewable power, based on preliminary estimates of potential along the coastline. NIWE will play a pivotal role in realising this in the coming years. Installation of the, first of its kind, Offshore Wind Monitoring platform at Gulf of Khambhat, 22 km from the Gujarat coastline, was a milestone activity. The LiDAR supplied by FOWIND is likely to be installed by mid of November 2017 NIWE is also in the process of finalising guidelines to enable private participation for Offshore studies and surveys, which will further boost the sector. Proposals for Geophysical and Geotechnical studies were initiated for Zone A in Gujarat and Tamil Nadu, a prerequirement for the design of offshore foundations.

Wind Resource Assessment

In order to lay further impetus on the 60 GW target, NIWE as per MNRE guidelines is providing free access to the data measured under the wind monitoring programme through the NIWE-WRA web portal to the stakeholders. Another activity in the pipeline for the benefit of stakehoders is the development of an online registry of wind turbines installed across the country in line with European efforts, which requires active support from the industry and stakeholders. This way, NIWE will be establishing long-term generation data from wind farms to understand their update performance, and also an important input for repowering. Wind Resource Assessment has been a continuing process at NIWE, with 100m and 120m height masts commissioned, in addition to the existing 75 masts in 7 States, to gather data upto 120m level. The accuracy of wind power forecasting and scheduling has been continuously improving and 2nd year in succession for IWPA who are financing the project. A

successful showcasing of wind power forecasting and scheduling by NIWE has proven significant improvement of evacuation of more wind energy, close to meeting about 10,000 million units in a day, in Tamil Nadu. This also indicates an increase of 26% more grid availability for wind power evacuation.

Wind Turbine Testing

The Wind Turbine Testing Unit completed four testing assignments during the year. As a new initiative, power curve measurements using nacelle mounted LiDAR is also being explored, an alternative to the conventional mast based measurements. A research work on development of LiDAR based Control Strategies for Wind Turbine Annual Energy production optimization has been proposed. LiDAR based systems as per literature are able to provide preview information of wind speed, direction and shears at various distances from of the wind turbines. This technology paves the way for new control concepts such as feed forward control and model predictive control to increase the energy production and to reduce loads of wind turbines.

Wind Research Station

NIWE has implemented a customized SCADA for remote monitoring of energy generation at WTRS, Kayathar through a Consultancy executed by CSIR-CSIO. Wind Solar Hybrid intelligent convertor system have been established at Kayathar and a new 2 MW DFIG model INOX wind turbine erection has been completed. The wind solar hybrid is a unique concept that NIWE has been working on, is the integration of 75 kWp SPV system, with its old 200 kW wind turbine at WTRS, Kayathar. This will enhance the CUF of the existing plant by maximizing the utilization of full load capacity of the WEG during the wind-season and off-season periods.

An R&D project on development and installation of micro-thruster augmented wind electric generator is under implementation on one of the 200 kW Micon WEGs at WTRS, Kayathar. The project aims to increase the capacity utilization of the WEG. As part of the research facility at WTRS, Kayathar, a 2000 kW DFIG was installed. The development of LiDAR based control strategies for wind turbine AEP optimization is proposed on the machine.

Standards and Certification

NIWE, as Member of the RLMM Committee constituted by MNRE, Govt. of India, is rigoursly taking efforts to implement, as guided by SRPC (Southern Regional Power Committee), the required LVRT compliance which necessitates capacity building of LVRT field testing at NIWE. As per the CEA technical standards for grid interfacing, all the wind turbines, which are grid connected, need to be certified for LVRT features (low voltage ride through) and harmonics. NIWE has been continuously working with National Load Despatch Centre and Southern Regional Load Despatch Centre to facilitate higher and reliable grid stability with increased power quality as mandated by CEA/CERC notification on LVRT compliance. A renewed certificate has been released to RRB and suggestions of SRPC has been implemented in RLMM. The last RLMM Committee meeting was completed at NIWE on 26.10.2016, prior to RLMM function being directly handled by MNRE. NIWE has been consistently working, on capacity building in Internationally Accredited Certification of wind turbines, along with TUV Rheinland, Germany.

Part of the tasks for the Internationally Accredited Certification projects have been executed by NIWE certification team towards capacity building in collaboration with TUV Rheinland, Germany.

Information, Training and Customized Services

Four International Training courses have been conducted by ITCS Unit and notable among them were the specialised courses on "Wind resource assessment, small Wind Energy & hybrid system and Solar radiation Assessment" for SNAs and Capacity Building training programme on Small Wind Turbines. These training programmes were designed with focus on Wind & Solar resource assessment and Small Wind Energy & Hybrid Systems, schemes run by MNRE with active support from NIWE. NIWE conducted one National Training Programme. A special training course on Wind Resource Assessment and Wind Farm Planning for Officials of Ministry of Energy and Mineral Department, Uganda was conducted by NIWE. Global Wind Day 2016 was celebrated by conducting programme for students and children. NIWE also participated in few exhibitions during this period by hosting stalls and information about the activities was disseminated and services of NIWE .

Solar Radiation Resource Assessment

Solar Radiation Resource Assessment unit has been undergoing a series of training programmes in collaboration with Industry and also planning solar power forecasting for the entire India in association with GIZ. The Unit is continuing its efforts in solar resource assessment around the country. Many stations were established and micro-siting carried out during the year. The Unit has also initiated solar forecasting in consultation with POSOCO and SLDCs.

Knowledge Sharing & Management

In order to update the current organizational knowledge to changing needs and trends, the unit took a number of initiatives, like providing a platform for exchange of knowledge through the Technology Think Tank and enhancement of soft skill training. Several International researchers also worked at NIWE on under RTF-DCS and ISRF fellowship schemes. Several undergraduates and postgraduates completed their final year projects in NIWE, using the infrastructure available in NIWE. Two R&D projects were sponsored to academic institutions during the year with focus on hybrid systems and energy storage. The Unit also undertook two testing assignments on small wind turbines. To facilitate small wind energy systems market, a 20m level wind speed map was released, derived from the online GIS 100m level map.

The new initiatives taken by NIWE were the result of continued co-operation and co-ordination with the Wind Industry. NIWE is fully geared up to support the wind industry in achieving the ambitions target of Government of India.

Dr. Rajesh Katyal
Director General (Additional Charge)

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 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 and Government of India.

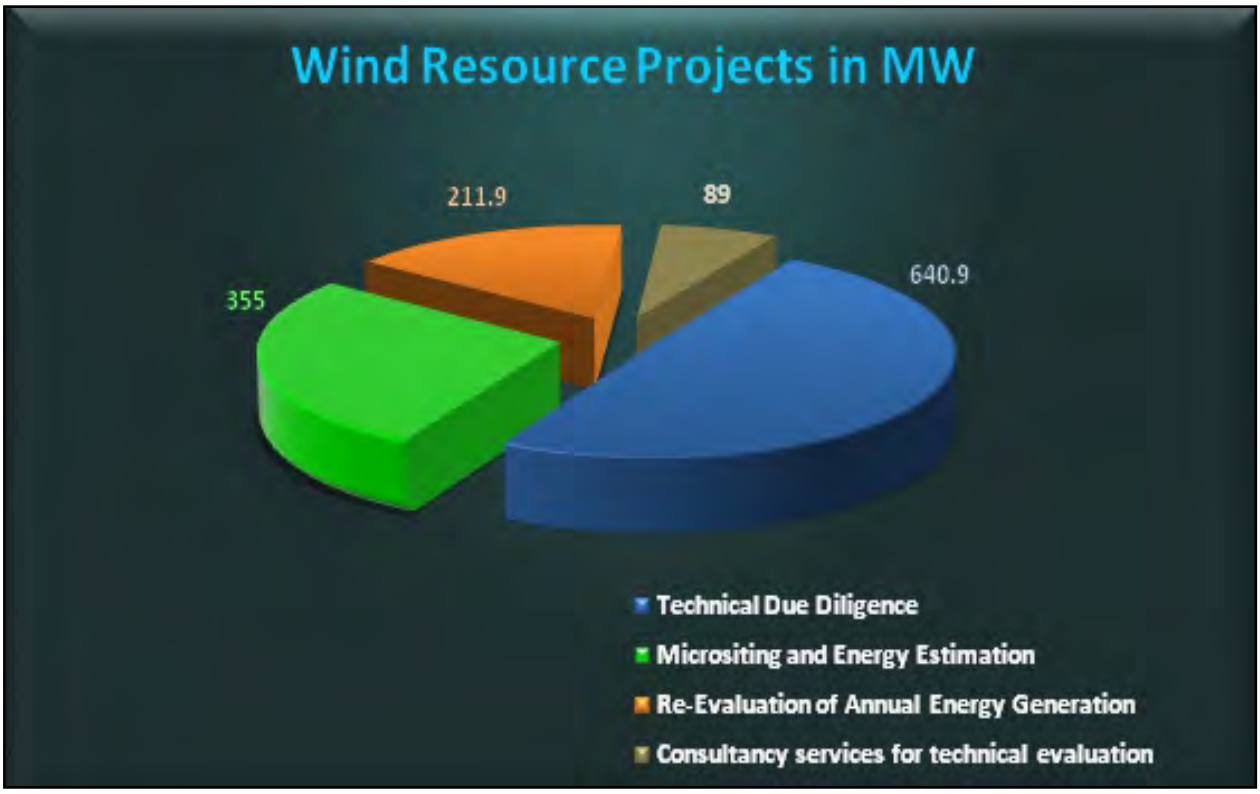
Mission

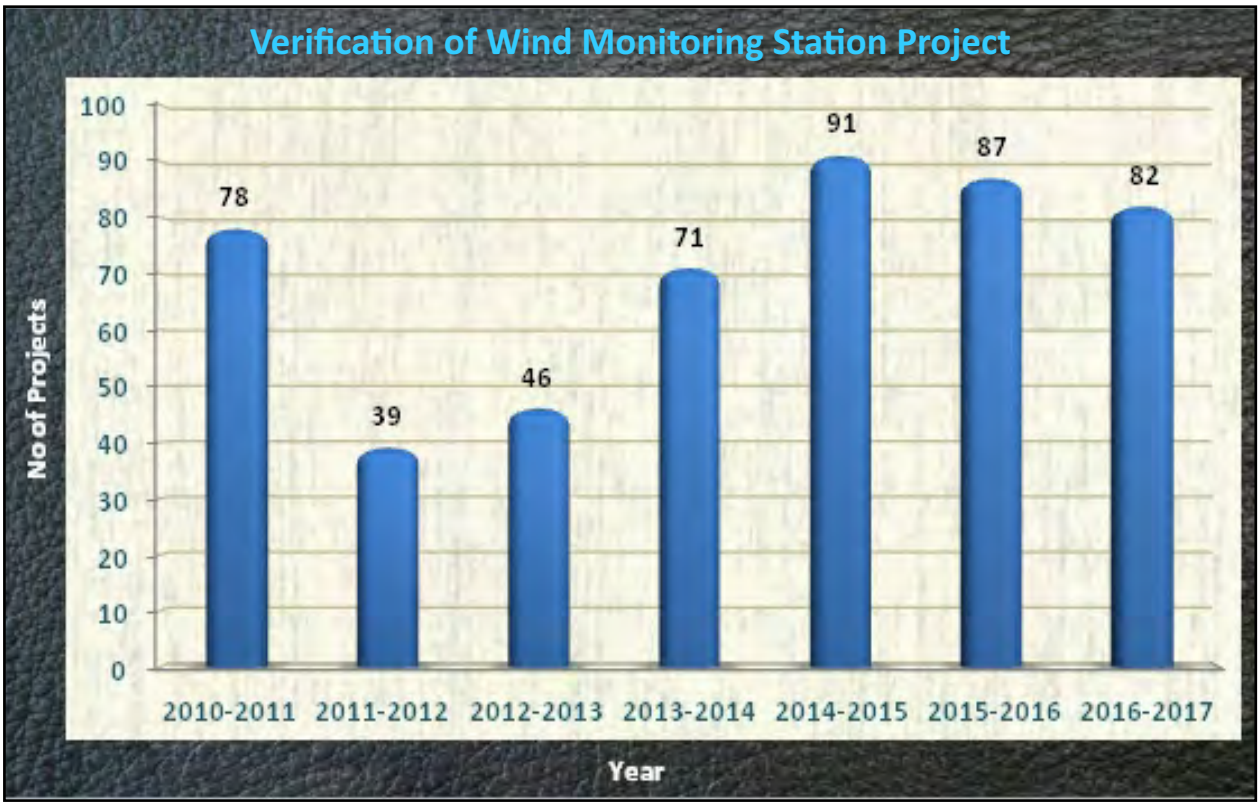
NIWE, a knowledge based institution of high quality and dedication, offers services and seeks to find total solutions for the major stakeholders across the entire spectrum of the wind energy sector. It will support the wind turbine industry in achieving and sustaining quality such that products of the 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.

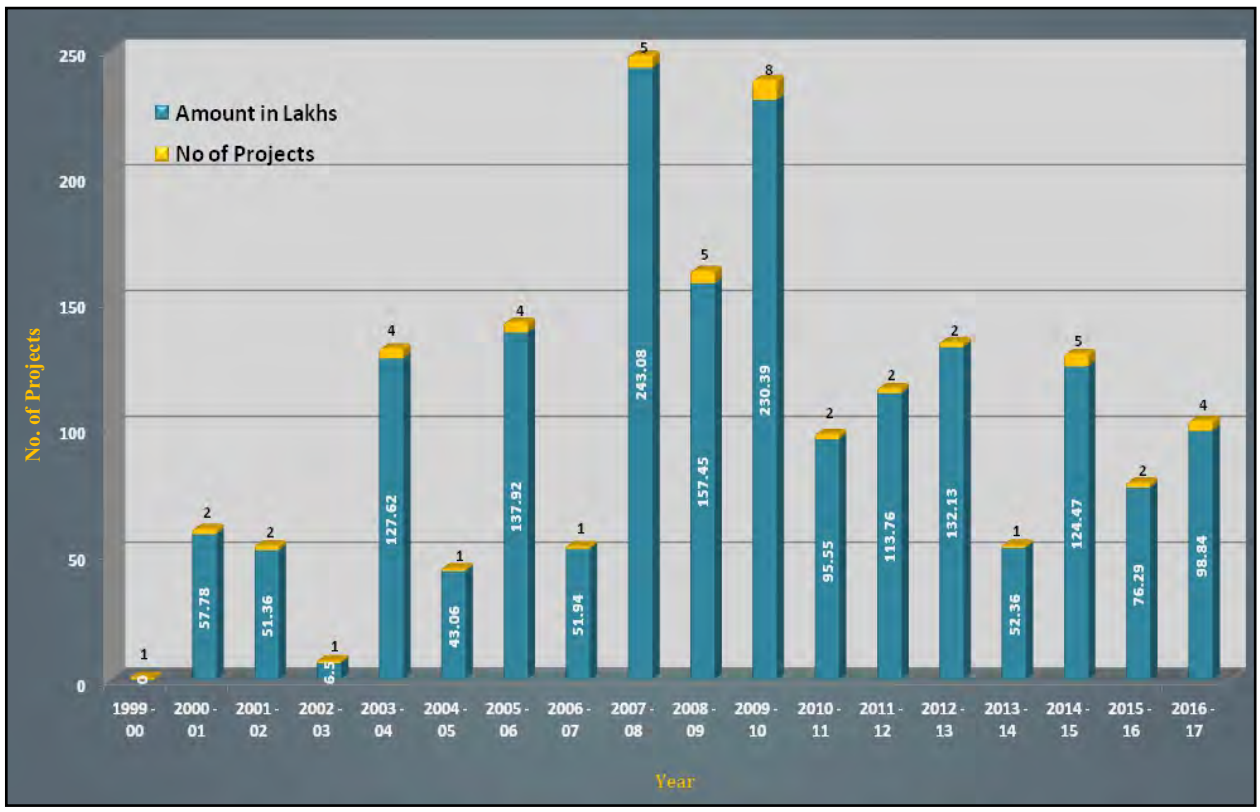
Objectives

- 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.

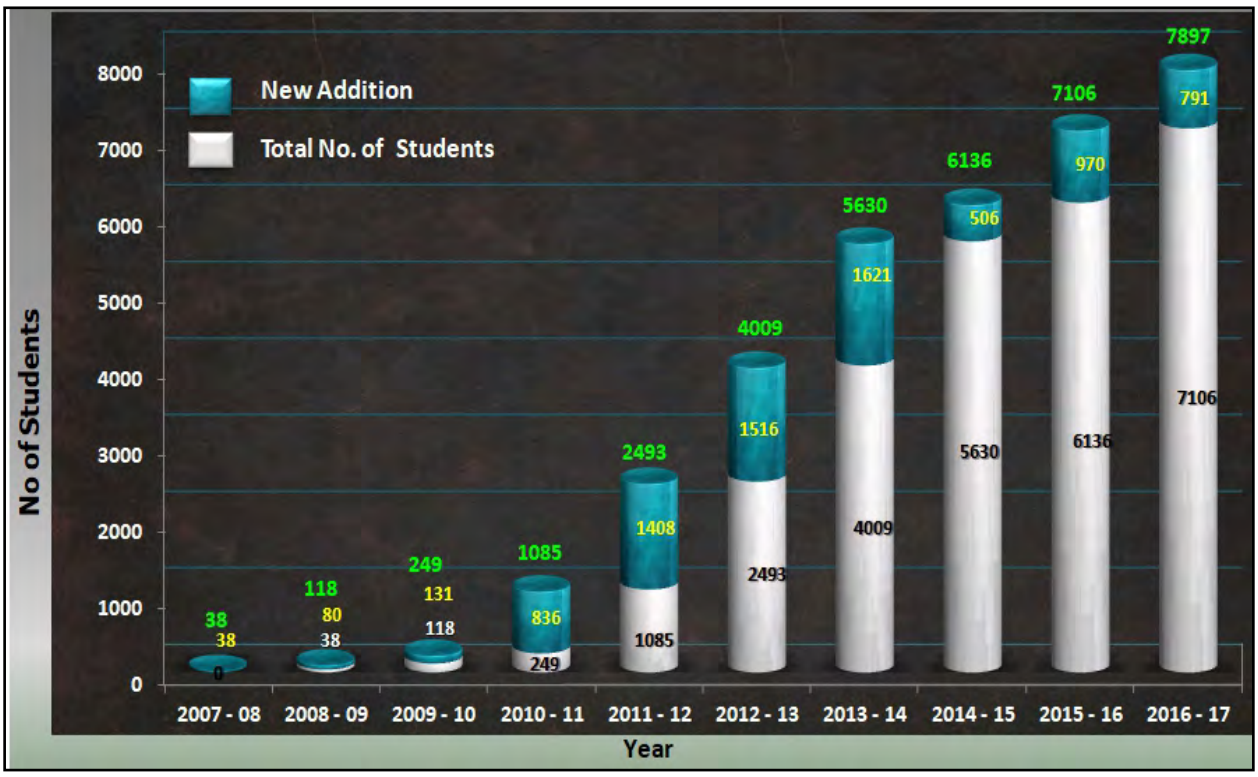
NIWE'S MISSION HIGHLIGHTS







Wind Turbine Testing Projects



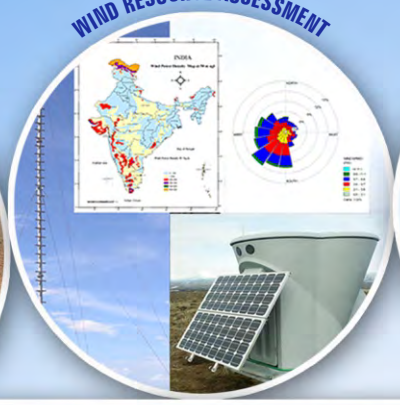
RE Awareness created among Students

National & International Training Courses

NIWE Publications

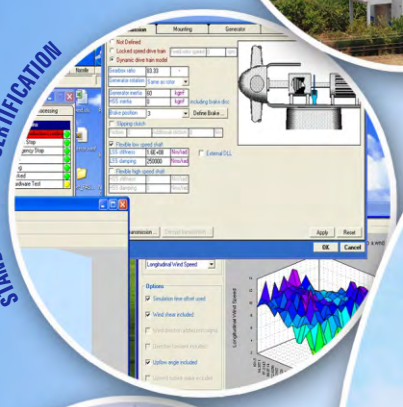
TOWARDS MISSION AND OBJECTIVES

WIND TURBINE TESTING



WIND RESOURCE ASSESSMENT

OFFSHORE, SMALL WIND HYBRID SYSTEM & IB



STANDARDS AND CERTIFICATION

WIND TURBINE RESEARCH STATION

INFORMATION, TRAINING & CUSTOMIZED SERVICESS

KNOWLEDGE SHARING AND MANAGEMENT

ENGINEERING SERVICE DIVISION

SOLAR RADIATION RESOURCE ASSESSMENT

OFFSHORE WIND AND INDUSTRIAL BUSINESS

Installation of First Offshore Wind Monitoring Structure at Gulf of Khambhat, Gujarat

NIWE has achieved a milestone, first of its kind, in offshore wind energy sector in the country by installing its first Structure (Monopile & Platform) for mounting LiDAR to carry out Wind Resource Assessment studies at Gulf of Khambhat off Gujarat Coast (Lat : 20°45'30" N; Long: 71°36'50"E). The installation of LiDAR is underway and is likely to be commissioned by end of April 2017, thereafter the offshore wind data measurements will commence.

The Monopile and Support Platform of 47.5m long with 1.2m diameter and allied components namely Boat Landing, Fender, Ladder and Hand Rails etc., has been fabricated and the same was transported to the proposed location with Jack up Barge MV- Ocean Pride. The Installation activities were carried out during the period from 14th to 22nd March 2017.

Jack up Barge Holding Structure

Preparation for Installation

Hydraulic Pile driving mechanism

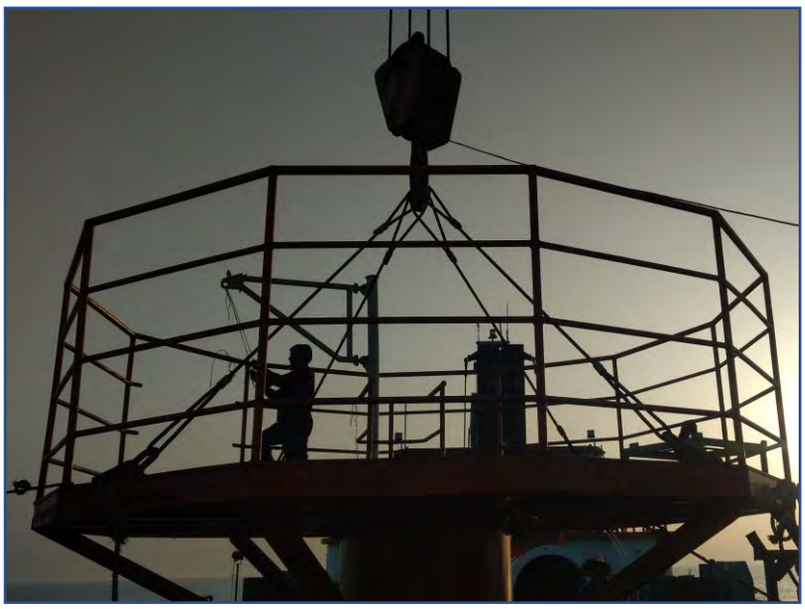
The Monopile driving was carried out using customised mechanisms based on estimated site conditions. Hydraulic pile driving mechanism has been chosen to drive the monopiles and hammering is done to increase the stability of the monopile after driving to a sufficient depth.

Hammering Monopile for Stability

Completion of Monopile Installation

The Boat Landing, Ladder, Fenders and other accessories of the platform has been welded to the monopile for technicians to climb on the platform for carrying out the health monitoring of the wind sensors installed.

Mounting Ladders



Platform mounting in progress

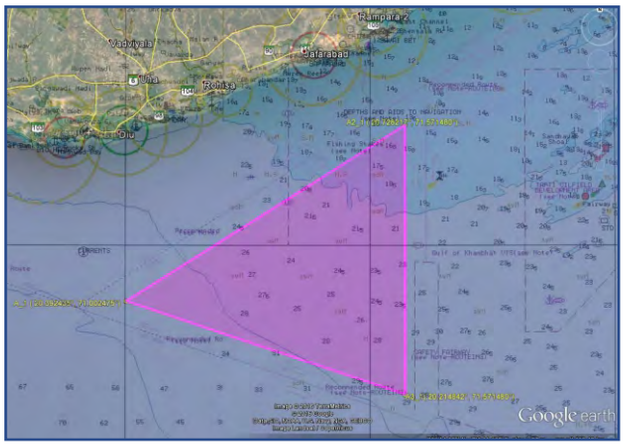
The Platform of 5m diameter was fixed to the monopile with nuts and bolts for mounting LiDAR and its ancillaries.

Fixing Boat Landing and Resting Platform

Completed Monopile and Platform

Geophysical and Geotechnical investigations off Gujarat and Tamil Nadu Coasts

NIWE proposes to conduct geophysical and geotechnical surveys and studies both off Gujarat and Tamil Nadu coasts to better understand the subsea profiles. The geophysical and geotechnical studies will cover the entire Zone A as per the FOWIND report both for Gujarat and Tamil Nadu coasts. The data obtained from the study will provide useful pointers in design of offshore foundations/structures.



Bathymetry of Gujarat Location

Bathymetry of Tamil Nadu location

Remote Monitoring of WTRS, Kayathar and Integration with Energy Management System at NIWE

EMS - RMS Display Icon

NIWE has undertaken the project for installation of Energy Management System (EMS) at NIWE, Chennai, including the remote data collection from the wind turbine installed at Wind Turbine Research Station (WTRS), Kayathar, in association with Central Scientific Instruments Organization (CSIR-CSIO), Chennai. The EMS has been successfully installed at NIWE, Chennai and has total of 17 nodes. The system is under observation and based on the data generated from EMS, the report evaluation and analysis is underway. Thereafter, the integration of Remote Data Monitoring software with the EMS software will be undertaken. The data generated from the Remote Monitoring System (RMS) will be useful for carrying research relevant studies for the benefit of the scientific fraternity.

Achievement

Achieved the milestone, first of its kind, in offshore wind energy sector in the country by installing Structure (Monopile & Platform) for mounting LiDAR to carry out Wind Resource Assessment studies at Gulf of Khambhat, Gujarat.

WIND RESOURCE ASSESSMENT

NIWE has been involving in the realization of nationwide Wind Resource Assessment (WRA) programme, sponsored by the Government of India, in association with State Nodal Agencies (SNA). Further, in order to extend support to the industry and developers, NIWE takes up various projects such as validation studies, technical due diligence studies, micro-siting exercises, Detailed Project Report preparation, Repowering analysis, Wind Power Forecasting, etc. The Ministry of New and Renewable Energy [MNRE], Government of India has been sponsoring the WRA programmes to measure, analyze and publish wind data in the country for the last two decades. Under these programmes, wind has been measured at 811 locations for periods ranging from one to five years. As on March 31st 2017, 19 stations are in operation in six States. During 2016-17 a total number of three wind monitoring stations have been commissioned. Details of new wind monitoring stations installed and in operation are given in table -1.

Table - 1 Status of Wind Monitoring Stations during 2016-17

S.No.	State	Number of Stations	
		Installed (new) during 2016-17	In operation as on 31.03.2017
1.	Tripura	0	2
2.	Meghalaya	0	4
3.	Madhya Pradesh	0	1
4.	Rajasthan	0	1
5.	Tamil Nadu	2 (R&D) & 1 (WPF)	10
6.	Uttarakhand	0	1
	Total	**3**	**19**

Of the cumulative total of 811 stations established till 31.03.2017, 237 stations have been found to have Wind Power Density (WPD) in excess of 200 W/m^2 at 50 m agl, 21 stations at 80m agl and 30 stations at 100m agl. Summary of WPD are given in Tables - 2.1, 2.2 & 2.3 respectively.

Table – 2.1 WPD Distribution at 20m to 50m agl

WPD range [W/m^2]	Number of stations
200-250	107
251-300	61
301-350	27
351-400	17
>401	25
	237

Table – 2.2 WPD Distribution at 80m agl

WPD range [W/m^2]	Number of stations
200-250	11
251-300	7
301-350	2
351-400	1
>401	-
	21**

** WPD calculated at 78m height for 4 sites.

Table – 2.3 WPD Distribution at 100m agl

WPD range [W/m^2]	Number of stations
201-250	17
251-300	10
301-350	2
351-40	-
>401	1
	30

WRA in the uncovered area, State wise details of the wind monitoring stations commissioned during 2016-17, in the country under various WRA programmes are given in Table -3. The wind monitoring stations are of 50m, 80m, 100m and 120m height and Sensors are placed at 10m, 30m, 50m (50m height mast), 20m, 50m, 78m, 80m (80m height mast), 10m, 50m, 80m,100m^{-2} level (100m height mast) 10m, 30m, 60m, 90m,120m (120m height mast) levels. [All the heights are above ground level].

Table - 3 State wise installations of wind monitoring stations established during 2016-17

S.No.	Station	District	State	Commenced On	Height of the mast
R & D Project					
1.	TNPL Perungudi	Tirunelveli	Tamil Nadu	30.07.2016	50m
2.	Kelayambal	Pudukottai		23.12.2016	80m
Wind Power Forecasting Project					
3.	Devimangalam	Trichy	Tamil Nadu	07.02.2017	100m

NIWE has released partial funds to the following State Nodal Agencies to install wind monitoring stations during this financial year. Details are given in Table - 4.

Table - 4 Fund released for State Nodal Agencies to install WMS during 2016-17

Sl.No.	State	No. of stations sanctioned	Mast height (m)	Amount (Rs. in Lakhs)
WRA in uncovered/new areas in NE region, 2016-17				
1.	Assam	7	50m	3.995
2.	Arunachal Pradesh	15	50m	8.565
3.	Manipur	5	50m	2.855
4.	Meghalaya	7	50m	3.995
5.	Nagaland	3	50m	1.715
6.	Tripura	5	50m	2.855
7.	Mizoram	5	50m	2.855
WRA studies, 2016-17				
1.	Chhattisgarh	10	100m	1.508
2.	Telangana	5	100m	0.754
3.	Kerala	5	100m	0.754
Estimation & Validation of Wind Power Potential at 100m level in 7 States of India				
1.	Maharashtra	-	100m	7.55
2.	Gujarat	-	100m	16.59
3.	Karnataka	-	100m	15.05
CONSULTANCY PROJECT		**-**	**-**	**-**
Total				**69.041**

Consultancy Projects

In addition to the wind monitoring projects funded by MNRE, NIWE has carried out 123 consultancy projects during the year 2016-17 towards supporting the industry and developers. These short-term projects were to provide micrositing services, wind power forecasting, Re-evaluation of annual energy, Power Curve Energy Demonstration (PCED) test, technical due diligence, preparation of WPD map, consultancy services for technical evaluation. In addition, technical services like verification of data collection procedure adopted by private firms was undertaken under the direction from the Ministry and 6 wind monitoring station have been commissioned under consultancy projects. Details of consultancy projects carried out during the financial year 2016-17 are given in Table - 5.

Table - 5 Consultancy projects taken up during 2016-17

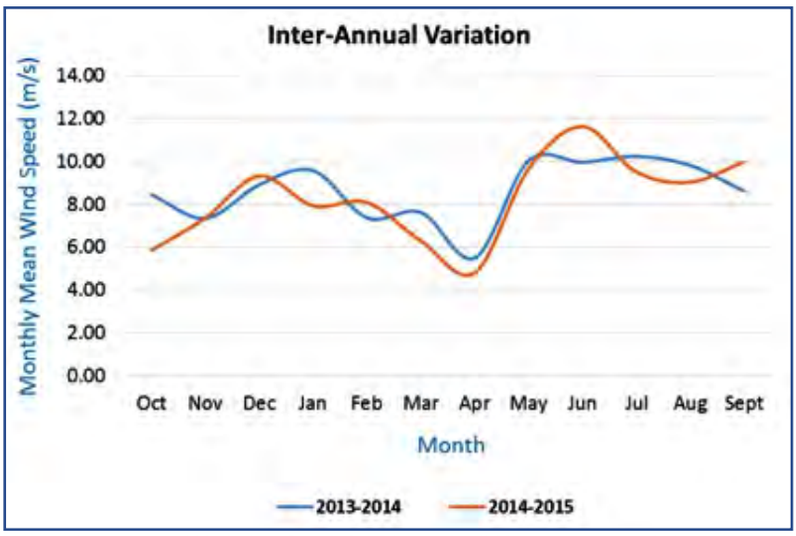
Sl.No.	Project Name	No. of Projects
1.	Verification of procedure of wind monitoring stations	82
2.	Site visit on Verification of procedure of wind monitoring stations (30 sites)	3
3.	Extrapolation of Wind Speed and WPD	1
4.	Wind Power forecasting services	1
5.	Technical Due Diligence	18
6.	Consultancy services for technical evaluation	1
7.	Micrositing and Energy Estimation	2
8.	Power Curve Energy Demonstration (PCED) test	2
9.	Wind Power Potential Pre-Feasibility study	1
10.	Preparation of WPD map	4
11.	Consultancy services for proposed wind farm	3
12.	Re-Evaluation of Annual Energy Generation	4
13.	Prefeasibility study	1
	Total	**123 projects**

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 RISΦ,DTU, 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 RISΦ DTU. The result shows wind energy density from 200 W/m^2 to 500 W/m^2 at 10m 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 is being collected from October 2013 onwards.



Inter-Annual Variation Graph for Dhanuskodi Measurement at 102m

Based on the analysis, the monthly average wind speed at 102m found to be with an annual average of 8.65 m/s. The estimated energy density for the wind speed records is averaged 536 W/m^2. By considering the operative zone of wind turbines as 4 m/s – 25 m/s, it is safe to quote that 92% of time a multi-megawatt modern day turbine can be in the operative zone at Dhanushkodi site. Overall, the results obtained from the measurement campaign are promising and encouraging.

The report on Offshore Wind Resource Assessment at Dhanushkodi is published in NIWE website.

Wind Power Forecasting Services

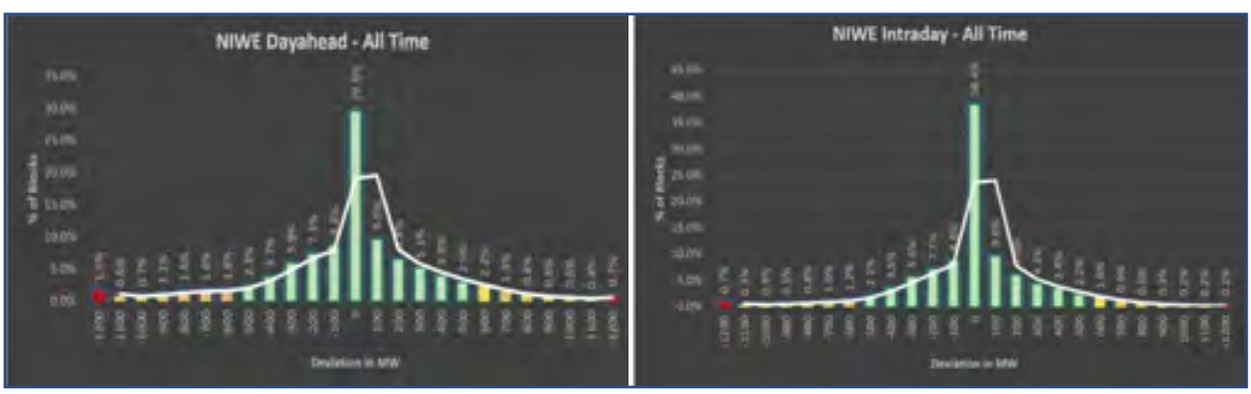
NIWE is providing wind power forecasting service, to entire state of Tamil Nadu, for Indian Wind Power Association (IWPA). For the purpose, NIWE has been collecting wind power generation data from various wind farms substations (107 substations) across the State through GPRS and works with Vortex, Spain to arrive wind power generation estimation for the following day, up to 10 days ahead. NIWE has created an automated system to pick up and process the real-time generation data which are being received at 15 minutes' interval. This processed input is continuously being fed into the forecast model developed by Vortex. In addition to the above inputs, the software model has been configured to capture the current atmospheric data (Numerical Weather Prediction (NWP)) and using the real-time generation data. It refines the forecast result for the next 10 days for every one and half hour interval as per CERC norms in vogue. The above process is being done for each sub-station. At every one and half hour interval these individual files are integrated into a single file, from which consolidated forecast (MW of Wind Power) for the entire State, is delivered to Tamil Nadu Generation and Distribution Corporation (TANGEDCO). In addition, NIWE has developed indigenous data quality check / processing algorithm and Forecast refinement algorithm to further reduce the NWP uncertainty errors, as per CERC norms in vogue.

The forecast is being done based on wind data obtained from a European Metrological Agency (ECMRWF-European Centre for Medium Range Weather Forecasting). This involves getting satellite data of the prevailing weather condition (present and predicted) where all the wind turbines are located. The data, along with the height of the wind turbine and the wind pattern, is then analyzed and the predicted wind power generation is sent to State Load Dispatch Centre (SLDC), Regional Load Despatch Centre (RLDC) and various stakeholders. In addition to e-mail communication, a

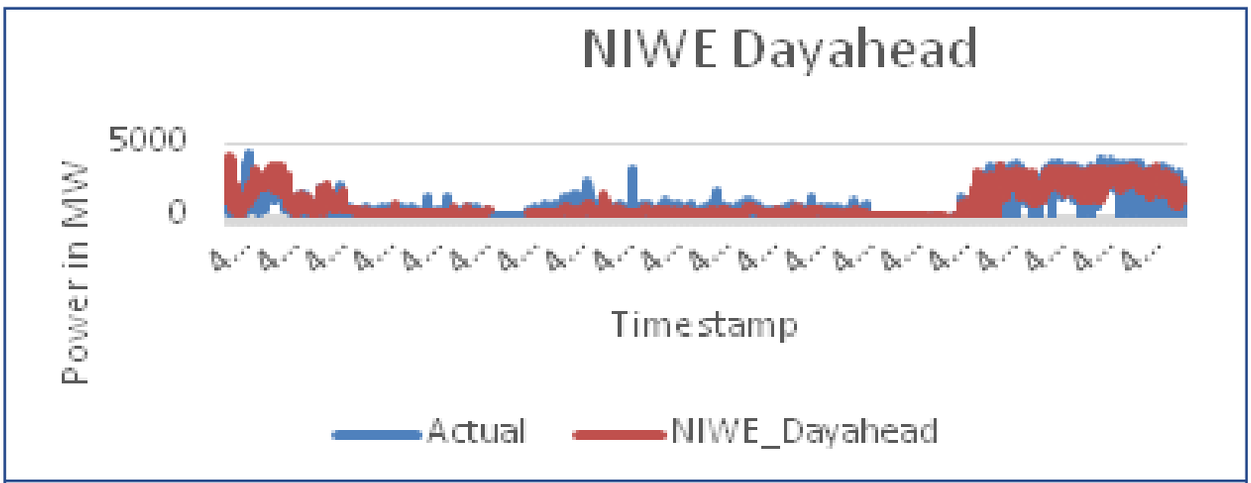
dedicated web portal has been developed and provided exclusive access to TANGEDCO to view and download real time forecast / scheduling data.

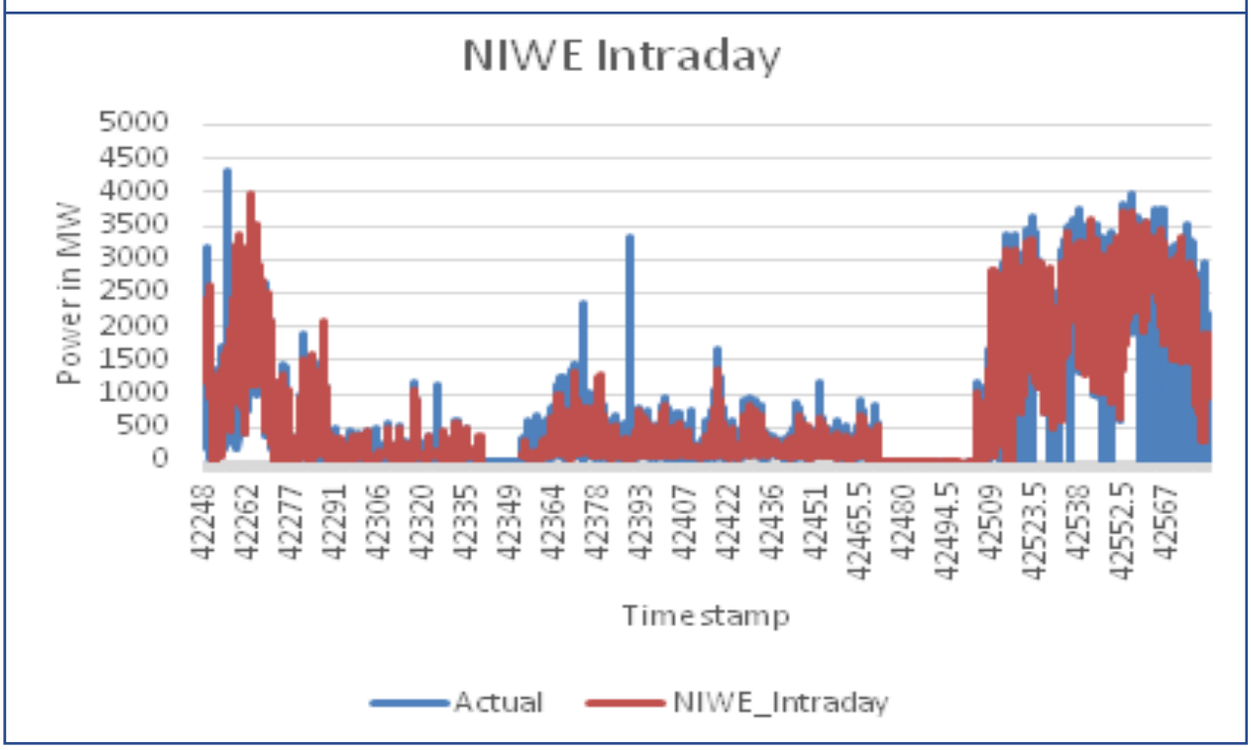
Since 24th March 2016, apart from wind power forecasting, NIWE is also offering Forecasting and Scheduling services to Tamil Nadu SLDC. During the period from April 2016 to March 2017 the following activities have been carried out.

- Finetunement of numerical prediction system.
- Finetunement of wind speed forecasting model using WRF.
- Development of Algorithm on optimizing day ahead wind scheduling Initiated scheduling services.
- Dedicated system has been created to view latest scheduling in TNSLDC.
- Created algorithm to generate daily generation report.
- Day ahead algorithm modification.
- Based on the successful completion of Wind Power Forecasting services for one year period, IWPA has extended the same for the next one year period.
- The Accuracy level of our day ahead Scheduling is 97% and intraday scheduling is 99% as per CERC norms.
- Work order issued to M/s.Vortex.
- Coordination with M/s.Vortex to refine the forecast station wise is under progress.
- Secondary stand by forecast system for continuous service was successfully established in NIWE.
- Implementation of NCMRWF numerical system in NIWE is completed.
- Created power curve using NCMRWF numerical system at 25km resolution, for 10m & 50m hub height, for 103 sub stations.
- Creation of actual generation data monitor system is completed.
- Monthly actual generation data report has been sent regularly to IWPA.
- Customized hub height power curve for 103 sub stations has been completed.
- Validation of created power curve model has been completed.



- Dynamic power curve system has been created for NCMRWF data.
- Final report on wind power forecasting for year 2015-16 has been sent to IWPA
- Static power curve has been created for 25km, 4km resolution for 50m, 10m & custom hub height data
- Ayyanaruthu historical data analysis.
- Coordination with ISRO – SAC in connection with Numerical Weather Prediction (NWP) model Output for wind power forecasting project in the state of Tamil Nadu.
- Created dedicated ftp for Numerical Weather Prediction (NWP) data transfer between ISRO-SAC and NIWE.
- Forecasting error analysis upto March 2017.
- NIWE indigenous forecasting model has been developed.
- Creation of Ensemble forecasting system is under progress.





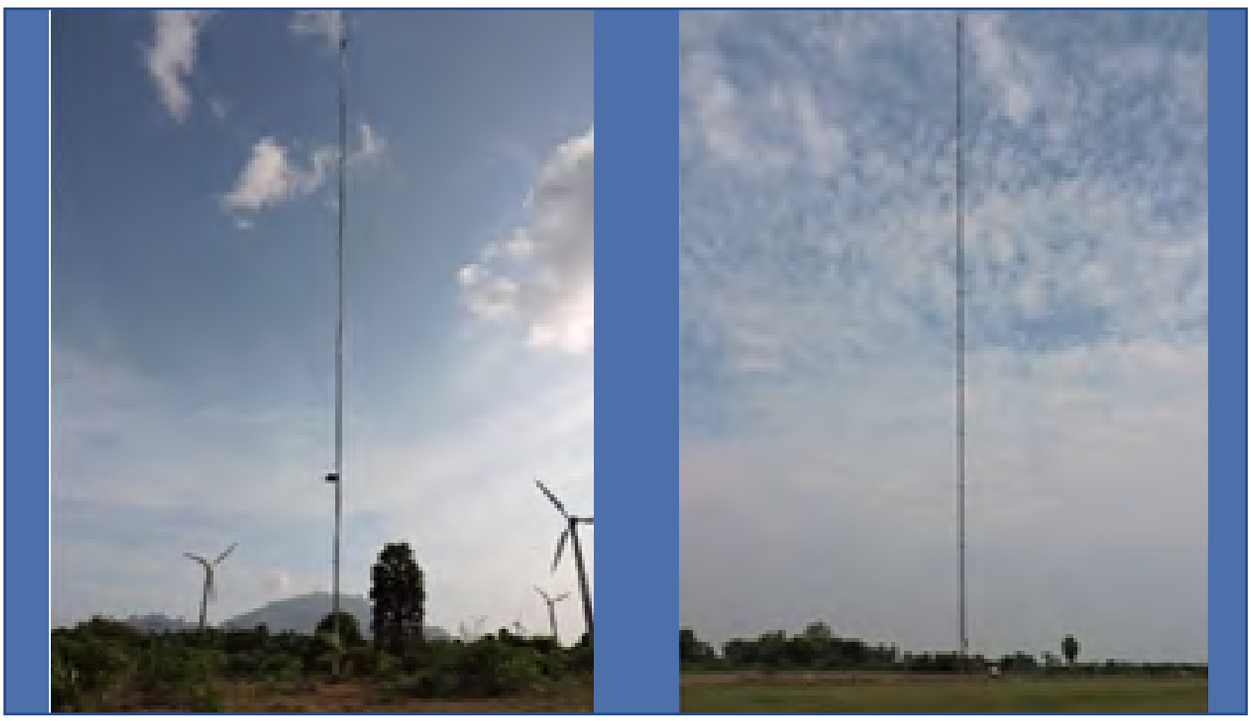
Research Met Mast

Installed a 50m tubular mast at Perungudi TNPL wind farm area to conduct a Research Study on the influence of mountain pass on wind flow and its impact on the power generation at Entry & Exit points of Muppandal Pass for validating the CFD tools.

Installed WMS at Manalmelkudi site to conduct a Research study.

Web Portal

- In order to publish the Government sponsored wind monitoring data a Wind Monitoring data webportal has been created successfully and monthly data updated in the web portal.
- Development of web portal for "Online registry of Wind Turbines installed across the country" is under progress.



50m tubular mast at Perungudi

Manalmelkudi

Publication on NIWE Web Portal

Report on Wind Solar Hybrid Energy Production Analysis

Authors : K.Boopathi, M.C.Lavanya, Dr.G.Giridhar & Prasun Kumar Das Editor : Dr.S.Gomathinayagam

Energy is critical to the economic growth and social development of any country. Indigenous energy resources need to be developed to the optimum level to minimize dependence on imported fuels, subject to resolving economic, environmental and social constraints. This led to a boost in research and development as well as investment in renewable energy industry in search of ways to meet energy demand and to reduce dependency on fossil fuels with ambitious but achievable target of (100GW Solar + 60 GW Wind + 15GW other RE) 175GW by 2022 . Wind and solar energy are becoming popular owing to abundance, availability and ease of harnessing for electrical power generation.

Wind power generation at all the selected 24 sites spread in windy States of India has high potential (having more than 200 WPD (watts per square meters) wind power density with minimal seasonal trend variation. The possible Solar power generation at the windy sites has recorded highest annually at Kalimandayam, Palayam, Chadmal, Devareddypalli, Kompalli, Kuran, Motibaru, Suigam, Haikal, Machenahalli, Mustigeri, Nirana, Taralkatti, Ganesh Goshla, Bassi, Dag, Gara and Pandhro followed by lowest Annual energy of power generation at Akkanayakanpatti, Melamandai, Veralimalai, Kondurpalem, Sunkisala, Gaga and Jamgodrani Hills. Where ever the Wind downtrends Solar tends to compensate with the reduction of wind generation. So integrating these renewable sources together by hybrid power systems is complementary to reduce the power demand and facilitate the continuous power supply to the grid through green energy.

In a given wind potential location with bankable met-mast measurement the effective land area (10 km circular) will be 314 sq.km (77558 acres). Depending on % of area for wind projects the range of possible capacities are 224 MW to 1884 MW and 1.5 to 7 times that of wind capacity can be added in the same area making the range of Solar capacity addition from 336 MW to 15512 MW.

Hybrid policy of Government of India needs only the last mile push in tariff determination for hybrid projects with wind and solar along with energy storage and smart grid technologies.

Published a Report on Offshore Wind Profile Measurement at Dhanushkodi

Authors : K.Boopathi & J.Bastin Editor : Dr.S.Gomathinayagam

In India, the onshore wind energy technologies and developments have reached a matured phase but, the offshore wind potential of the country remains unexplored and hence unexploited, so far. With this into mind, from the Government side, various initiatives are being taken for the offshore wind development in the country through preliminary assessments, collaborative studies, etc., through National Institute of Wind Energy (NIWE), MNRE, Chennai. As a part of the study, NIWE was assigned to commission a specially designed (with corrosion resistive features) 100m tall meteorological mast at Dhanushkodi, Rameshwaram for the wind profile measurement.

Through various preliminary studies, it has been revealed that the coastal line of Gujarat and southern part of Tamil Nadu (especially in Rameshwaram and Kanyakumari regions) seem to have very good wind potential. Some of the studies concluded that there is a possibility to develop 1GW Offshore wind Power each at Rameshwaram & Kanyakumari. The study also mentioned that the data required validation by measurement in the sea by establishing wind masts.

As an initiative towards validation, NIWE has installed a 100m met-mast at Dhanushkodi and the wind data has been monitored since October 2013. Based on the analysis, the monthly average wind speed at 102m found to be with an annual average of 8.65 m/s. The estimated energy density for the wind speed records is averaged 536 W/m^2. By considering the operative zone of wind turbines as 4 m/s – 25 m/s, it is safe to quote that 90% of time a multi-megawatt modern day turbine can be in the operative zone at Dhanushkodi site. Overall, the results obtained from the measurement campaign are promising and encouraging.

This document briefs about the initiatives taken by the Government for the offshore wind energy harnessing and details about the first offshore met-mast measurement campaign being carried out by NIWE at Dhanushkodi, Rameswaram.

Wind Potential
GIS Map for 120m level

Necessity for energy security and caution on environment degradation made wind as one of the non-ignorable source in Indian energy mix. The government's ambitious goal of 60,000 MW of wind power by 2022 is highlighting the needed focus on the green power's contribution in India's sustainable development. In order to meet these ambitious goals, India is not only committed to refine and strengthen the regulatory framework governing wind power in India, but also to provide the necessary reliable background information on the geographical variation and magnitude of the Indian wind resource and an estimated gross technical potential spread across the entire country at today's wind turbine hub heights. This information is essential for the Policy makers, Private players, Government Agencies and other stakeholders of the industry to move towards achieving the ambitious goal as envisaged by the government. With the above facts into consideration, under the direction of MNRE, NIWE has assessed the wind potential within the country at 100m hub height with scientific rigor and based on authentic latest available data-sets of wind as well as land geologically spread across India.

At present NIWE would like to extend the same methodology to estimate the indicative wind potential at 120m agl (above ground level). With increasing hub heights, this indicative map would be a useful source for the wind farm developers and other stakeholders. Preliminary wind potential map has been developed at 120m for the entire country. The map is under validation and fine-tuning needs to be done. Initial version of Web Portal for the 120m map display has been developed.

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 50 m agl and 102 GW at 80m level with the assumption of 2% land availability in the wind potential area. In order to validate 80m level, MNRE has sanctioned the projects to carry out wind measurement at 100m level in 75 locations in 7 States of India.

Under this project, 75 nos. of 100m high lattice wind monitoring stations have been successfully commissioned in the 7 windy States of the country. Data acquisition has been completed. Data acquisition has been completed for 73 sites and continuously monitoring and receiving real time wind data from 2 stations in 2 States. Monthly data analysis, verification and preparation of final reports is in progress.

The details are tabulated in the below in Table-6.

Table - 6 Details of WMS commissioned/closed down at 100m level

S.No.	State	WMS's having one year data	WMS's having two year data	WMS's having three year data	Closed	Running
1	Andhra Pradesh	1	6	3	10	–
2	Gujarat	3	7	2	12	–
3	Karnataka	--	11	2	13	–
4	Maharashtra	4	2	2	8	–
5	Madhya Pradesh	5	2	–	7	1
6	Rajasthan	–	8	3	11	1
7	Tamilnadu	--	8	4	12	–
	Total	**13**	**44**	**16**	**73**	**2**

Special Training Course

In order to create awareness among the SNA officials regarding the importance of Wind Resource Assessment & Wind Turbine Technology, a special Training Course on "Wind Resource Assessment & Wind Energy Technology for SNA officials except NE region was organized by NIWE during 22nd to 26th August 2016 at NIWE, Chennai.

The prime objective of this training course is to transfer knowledge and needed skills to the officials

Chief Guest inaugurating the Course

from State Nodal Agencies/ departments for effectively implementing the wind power projects and Renewable Energy technologies in their respective States.

The five days training session was started on 22nd August 2016 with inaugural function chaired by Prof. Dr. K. Kasthurirangaian, Chairman, Indian Wind Power Association with the Inaugural Address.

The training course was attended by 18 participants from 7 States (Karnataka, Jammu & Kashmir, Chhattisgarh, Rajasthan, Telangana, Maharashtra, Kerala) and one Union Territory Pondicherry across the country except NE region; the course was highly appreciated by the participants for its intellectual level and the method of its organization. The 5 days training programme included classroom lectures, onsight demonstration, field 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. And onsight demonstration and field visits had been arranged at Kayathar & Kanyakumari wind farms to the participants.

The 5 days training programme concluded on 26th August 2016 with the Valedictory function chaired by Dr. M.V. Ramana Murthy, Scientist-G/Head, NIOT and Guest of Honour by Sh.Sven Ruin, Project Manager, TEROCAB, Sweden.

The participants were very much satisfied by the quality of lectures and hospitality. The feedback from the participant's reflected the need for more number of such training programmes frequently.

Two days Training Course / Program

A two-day training program on "Wind Resource Assessment, Small Wind Energy & Hybrid System and Solar Radiation Assessment for State Nodal Agencies (SNA) officials was held in Hotel Donyi Polo Ashok, Itanagar on 16th and 17th February 2017. The training programme was focused to help the SNA Officials with the assessment of Wind in their respective State, Installation of Wind Mast, Maintenance of existing solar, wind farms, and explain the working of small wind turbines. Forty-eight SNA officials from eleven States across the country (Assam, Arunachal Pradesh, Karnataka, Manipur, Kerala, Andhra Pradesh, Rajasthan, Sikkim, Himachal Pradesh, Mizoram & Tripura) have attended the said training programme and the course was highly appreciated by the participants for its intellectual level and the method of organization.

The Inaugural function started with a welcome address by Mr. K.Boopathi, Addl. Director & head, WRA, NIWE. Then, Mr. J.P. Singh, Former Director, WE, MNRE and NIWE Co-ordinator for the North-East briefed about the purpose and the objective of the workshop. Shri Bhanu Pradap Singh, CEO Himachal Pradesh Nodal Agency stressed the need of Renewable energy and highlighted the success story of Renewable energy development in Himachal Pradesh. Shri. Marki Loya, Director, Arunachal Pradesh State Nodal Agency has briefed the status of Renewable energy implementation in the State and need of further assistance from the Government .

Distribution of Course Certificates to the Participants

The honourable Chief Secretary of Arunachal Pradesh, Smt. Shakuntala Gamlin, IAS, delivered the Inaugural Address where she stressed on the need for development of Renewable energy in the North-East region. She also welcomed the drastic fall in the prices of equipment needed for the generation of renewable energy. She offered to help for ease of access on setting up of renewable energy plant in her State.

Dr.P. Kanagavel, Addl. Director & Head, ITCS presented the current energy scenario of India and stressed on the need for switching over to renewable energy from Non-renewable to contain greenhouse effect and global warming.

Various speakers highlighted the need for solar-wind hybridisation to increase the PLF which was about 15% for PV solar plant and 20% for wind farms running independently. Mr. J. P. Singh also explained the potential application of Solar-wind hybridisation in remote telecom towers where maximum towers doesn't receive continuous supply of electricity from the grid and had to be diesel generator dependent. Small Wind turbines could easily be installed in existing telecom towers to meet some of its energy demand.

Sh. Rajarshi Sen, Technical Advisor, IESA, CES India gave a presentation on the operation and maintenance of wind solar power plant with battery storage. He explained how to increase the efficiency of a PV Panel, wind turbine and the battery. He also pointed out simple maintenance technique which would also increase the shell life of the plant. An official from the newly empanelled Bergey wind power explained the methodology of selecting small wind turbine with high rated life.

Mr. Prasun Kumar Das , the next day, explained explaining the SRRA Data & its Applications. He described the method on how the data collected from a wind mast and its evaluation. He also explained the usage of solar and wind atlas available on the NIWE website. Then Mr. K.Boopathi gave a presentation on the wind resource assessment techniques and his talk explained from where wind gets its power, how to tap the power and how to assess the right place for setting up of wind mast. He also encouraged all the nodal agencies to come up with sites to install wind masts.

Smt. Shakuntala Gamlin, IAS inaugurating the Course

Mr. David Solomon explained the mechanism and testing of a small wind turbines. He said that the turbines go under rigorous tests to ascertain their safety and function before they are rated or empanelled. He explained the effect of dump load and showed the mechanical failures and wear out a different machine parts after they are put through the tests. Mr. M. Anvar Ali, Additional Director & head, ESD explained the optimum utilisation of Small Wind Turbine. He also explained the concept of Smart Grid to optimise the use of energy.

The training programme helped to understand the basics behind a solar wind hybrid system, the technology behind it and the bureaucracy involved in its implementation. The necessity of installing a wind mast with all the latest equipment to monitor the conditions of a potential site was also discussed. Meso Mapping and the use of SRRA's solar and wind potential map was also taught. The training helped the participants to understand that with a rise in electricity consumption of our country and the negative effect of greenhouse gases due to the burning of fossil fuels, Renewable energy is a way forward for a clean and green future.

Participants during the session

One Day Technical Workshop

A one day technical workshop on "Small Wind Energy and Hybrid Systems & its relevance to Telecom Tower" with the support of Maharashtra Energy Development Agency (MEDA), Government of Maharashtra on 1st July, 2016 at Hotel Novotel, Pune was organized by NIWE. The workshop was inaugurated by Hon'ble Secretary, MNRE; along with Joint Secretary, MNRE; Director General, Maharashtra Energy Development Agency; Director, Gujarat Energy Development Agency and Director General, National Institute of Wind Energy, Chennai.

Small wind turbines and Small Wind Energy–Solar hybrid systems are becoming more popular worldwide. These systems can play a major role in the decentralized energy generation and its utilization; it can potentially reduce the pressures on centralized generation systems, transmission and distribution networks. Presently, a small annual market (a few hundred kilowatts) for small wind and wind–solar hybrid systems exists in the country. The market is driven mostly by the capital subsidy programme of the Ministry of New and Renewable Energy (MNRE), Government of India. The potential market for renewable-energy-based micro–generation as per a study is estimated at around 83,000 MW. This takes into context applications in rural and urban decentralized electrification, Telecom towers, part-load replacement of diesel-based captive power plants.

Telecom Sector is a promising stakeholder for implementation of renewables. The telecom towers are energy intensive and require non-stop power without any interruption. On an average, the country's telecom tower network consumes over 11 billion kWh annually and is likely to increase. In the absence of grid or intermittent power supply where the grid is available, these telecom towers run on diesel. As a result, the telecom sector consumes around 3 billion litres of diesel annually for powering these towers. Need of the hour is to reduce the Carbon footprint and the cost of operation in this sector. On an average, even if, 50 % of the mobile towers shift to renewable power from diesel, the cost saved would run into hundreds of crore annually. Presently, about 4,40,000 numbers of

Hon'ble Secretary Inaugurating the Workshop with Joint Secretary

telecom towers are installed in India. Out of this, about 1,93,000 towers are connected to the grid and the rest depends on diesel during power outages.

Hence, in order to understand the available options for the reliable supply of power to these towers from RE specifically from SWES systems (Small / Wind-Solar Energy Systems), a one day workshop was organized by NIWE.

The workshop provided an invaluable platform for dialogue and open exchange of views and experiences between the policy makers and the targeted stakeholders. The workshop focused on some of the major issues that concerns the Small wind power industry and the telecom tower operators who are the second largest diesel consuming sector in India. The workshop gave a comprehensive overview of the technical, financial and policy solutions presently available in India and brainstormed for finding innovative solutions. This aim to bring together all Indian Stakeholders under one roof for a day to have fruitful discussions.

The workshop saw attendance in good numbers from Small Wind Turbine manufacturers, SWES system integrators, Solar Channel partners, Telecom tower operators and SNA's from Maharashtra, Gujarat, Goa, Chhattisgarh, Tamil Nadu, Meghalaya, Manipur and Sikkim. Exhibits of Small Wind Turbine models were also showcased as part of the workshop. The stalls saw a lot of erudite discussion between the invitees from educational institutions and the targeted stakeholders.

During the workshop, Hon'ble Secretary, MNRE had released 20m (above ground level) wind speed map of India. Further, the GIS based map was also made available at NIWE's website for the public to utilize the information and facilitate the project developers to identify appropriate places / sites for the effective implementation of the SWES projects.

Further, during the inaugural function, various SNA's, small wind turbine manufacturers, SWES system integrators, etc. were felicitated with appreciation awards / certificates by Hon'ble Secretary, MNRE for their outstanding contribution in the promotion / implementation of Ministry's SWES programme.

The workshop had the benefit of hearing experts from the field of policy making, Small wind turbine, Telecom sector, batteries and inverters.

Technical Committee Meetings

The following meetings were organized during the period 2016-17.

- Meeting on Wind Power Forecasting services with IWPA/TNEB officials at NIWE, Chennai on 11th April 2016.
- Monitoring Committee Meeting on " Design and Development of Photonic System for real time remote monitoring of Wind and other Air parameters" at NIWE, Chennai on 22nd April 2016.
- Review Meeting on Wind Power Forecasting with IWPA officials at NIWE, Chennai on 5th May 2016.
- First meeting of the NE region Wind Resource Assessment Cell at NIWE, Chennai on 6th May 2016.

- Meeting on Wind Power Forecasting Services with IWPA, TNEB officials at NIWE, Chennai on 12th May 2016.
- Technical Committee Meeting to determine the selling cost of time series wind data of 100m at NIWE, Chennai on 3rd June 2016.
- Demonstration of Data Loggers by the bidders at NIWE, Chennai on 15th July 2016.
- Standing Technical Committee (STC) Meeting towards procurement of met masts & its accessories, Instruments at NIWE, Chennai on 20th July 2016.
- Meteodyn (CFD based Wind Flow Modelling) software training for NIWE Scientists and Engineers at NIWE, Chennai on 21st July 2016.
- Review Committee Meeting on Bird Migration Study to discuss about the progress at NIWE, Chennai on 2nd August 2016.
- Meeting on implementation of WRA on telecom towers at NIWE, Chennai on 9th September 2016.
- Technical Committee Meeting for finalization of technical specification of LiDAR at NIWE, Chennai on 15th September 2016.
- Meeting/discussion on Wind Power Forecasting with IWPA/TANGEDCO officials has been convened at NIWE, Chennai on 18th October 2016.
- WRA Scientists & Engineers imparted training on "Wind Resource Assessment and Wind Farm Planning" for the officials of Ministry of Energy and Mineral Department, Uganda at NIWE, Chennai during 7th to 18th November 2016.
- Offshore Guidelines Committee meeting for finalization of draft guidelines for Offshore studies and surveys by private sectors was convened at NIWE, Chennai on 3rd January 2017.
- Training programme on Wind Resource Assessment for the Project Assistants to be posted in NE region has been organized at NIWE, Chennai during 18th to 31st January 2017.

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 75 meters and 50 meters 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 No's 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.

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.

The following were the detailed activities of the unit;

- Type Testing of XYRON 1000 kW wind turbine at Richadewda, Ratlam District, Madhya Pradesh of M/s. XYRON TECHNOLOGIES LTD. The instrumentation work is completed.
- Type Testing of INOX 2000 kW wind turbine at Kidi village, Babra Taluk, Amreli (Dist), Gujarat of M/s. INOX WIND LTD. The measurements have been completed and final test reports issued to the customer and project has been closed.
- Power Curve Measurement of Regen 1500 kW wind turbine at Vagarai Village, Dindigul (Dist), Tamil Nadu near Dharapuram of M/s. REGEN POWERTECH PVT LTD. The measurements have been completed and final test reports issued to the customer and project has been closed.
- Site Calibration for Power Curve Measurements of model GE /1700/103, 1700 kW wind turbine (during Low Wind Season) at Badval, Kadapa District, Andhra Pradesh. The measurements have been completed and final test reports issued to the customer and project has been closed.
- Received Leadership Appreciation from wind industry member INOX WIND for the quality, support and pro active approach of the testing unit and its services during the year 2016.
- Site Calibration equipment was designed, integrated and deployed for the first site using solar power.
- Participated and assisted NIWE/MNRE in drafting the " Guidelines for Development of Onshore Wind Power Projects" for the benefit of the wind industry.
- Successfully completed Re-Certification Audit –ISO 9001:2008 by DNV-GL on 5th August 2016 at WTTS, Kayathar and 8th August 2016 at NIWE.

Site Calibration for Power Curve Measurements of model GE /1700/103, 1700 kW wind turbine (during Low Wind Season) at Badval, Kadapa District, Andhra Pradesh

- Successfully completed the NABL Re-assessment Audit as per the requirements of ISO/IEC 17025:2005 on 24th & 25th January 2017 (Test site - Xyron 1000 kW Wind turbine) at Ratlam, Madhya Pradesh.
- The establishment and improvement of the surveillance system to monitor measurements at remote sites and also to carry out tests from NIWE , Chennai were carried out.

The surveillance system for the security of NIWE Campus at WTTS / WTRS, Kayathar which also assists in the monitoring of the instruments and equipment in the Equipment Database Management System (EDMS) has been completed.

Training on "First Aid" both Theoretical and Practical held on 15.11.2016 at WTTS, Kayathar








WIND TURBINE RESEARCH STATION

NIWE established Experimental Wind Turbine Research Station at Kayathar, Thoothukudi District of Tamil Nadu, 600 kms away from the State capital Chennai around towards south. 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 Research station is spreaded over approximately 100 acres of land with total Wind Electric Generators installed capacity of 6400 kW which comprises, 27 years old, 9 nos 200 kW, one 600 kW, one 2000 kW (Variable Speed WEG) and one 2000 kW Wind Electric Generators (DFIG 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. Installations of additional R&D facility by the addition of 2000 kW DFIG model wind electric generator was completed during the year 2016-17 at WTRS, Kayathar.

First Generation200 kW MICON Wind Electric Generators

Regular Periodic Operation & Maintenance of nine 200 kW MICON Wind Electric Generators

The completely renovated 27 years first generation 9 nos of 200 kW MICON Wind Electric

Wind Turbine Research Sation, Kayathar

Generators at Wind Turbine Research Station, Kayathar were put into continuous operation during the windy season of 2016 after Operation & Maintenance (both preventive and breakdown) works carried out efficiently and total energy generated is being fed into the grid by maintaining unity power factor for all the machines.

Development and Installation of Mircro Thruster Augumented Wind Electric Generator

An R&D project sanctioned by MNRE, New Delhi and implemented by Vellore Institute of

Erection of Cylinders, Compressor in the Control Room

Connection of Pressurised Pipe inside the turbine

Installation of Micro Thruster at the tip of the blades

Technology, Vellore for Development and Installation of Micro Thruster Augumented at one of the 200 kW MICON Wind Electric Generator at WTRS, Kayathar under progress. The specific objective of the project is to prove the concept of a thruster augmented wind electric generator (WEG) for better efficiency and to increase the capacity utilization of the WEG. Work on erection of cylinder, compressor in the control room at site and laying of pressurised pipe inside the WEG were completed and installation of micro thruster in the blades of the WEG are under progress.

Solarisation of Wind Farm

In this experimental research wind farm at WTRS, Kayathar a hybrid study on grid integration of 75 kWp solar PV power plant with one of the 27 years old, 200 kW first generation MICON wind electric generator for maximum utilization of connected grid load during season/off-season periods by utilizing the existing land, transformer, transmission lines etc. was completed. This solarisation

Grid Integration of 75 kWp Solar with 200 kW WEG

Smart Controller for the Integration

(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.

Installation of 2000 kW DFIG Wind Electric Generator

The installation works of 2000 kW DFIG model INOX Wind Electric Generator was completed and the machine was commissioned to Grid for the purpose of conducting various R&D related activities at field level.

Visits

The following visits were coordinated and showcased the Small & Large Wind Turbine Testing, R&D and WRA facilities:

Industrial Visit

- 60 Students and 3 staff from Varatharajan Polytechnic, Perambuloor on 22nd July 2016.
- 19 Students and 1 staff from Anna University, Chennai, Tamil Nadu on 24th July 2016.
- 59 Students and 4 staff from Thiyagi Dharmakkan Amirtham College of Arts and Science of Physics and Chemistry Department ,Tamil Nadu on 2nd February 2017.

Special Dignitaries Visit

- 23 officials from various State Nodal Agencies, for Training programme on Wind Turbine Technology and Applications on 26th August 2016.
- 30 foreign delegates of 18th International Training Programme on Wind Turbine Technology and Application on 31st August 2016.
- Dr. Jagmohan Singh Raju, IAS., Chairman cum Managing Director of TEDA along with Director General , NIWE on 5th January 2017.
- 23 foreign delegates of Special International Training Course on “Wind Turbine Technology and Applications” on 11th February 2017.
- 24 foreign delegates of 19th International Training Course on “Wind Turbine Technology and Applications” on 17th February 2017.

STANDARDS & CERTIFICATION

Wind energy sector is rapidly growing in India with the introduction of more new wind turbine models with increased unit size and larger rotor diameter. Type Certification of wind turbines plays an active role to facilitate the orderly growth of wind energy sector.

Certification - Renewals

NIWE has completed three projects on renewal of certificates of wind turbine models during the year 2016-17.

Sl.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	03.04.2017
2.	M/s RRB Energy Limited	Pawan Shakthi- 600 kW / 600 kW	04.07.2017
3.	M/s Southern Wind Farms Limited	GWL 225 / 225 kW	05.01.2018

In addition to the above, based on the directives from Ministry of New and Renewable Energy (MNRE), Internationally accredited certification services are made available in India by NIWE through a tri-party co-operation agreement signed on 06.05.2015 among NIWE, M/s. TUV Rheinland Industrie Service GmbH, Germany, an Internationally accredited Certification Body for Wind Turbines, and M/s. TUV Rheinland (India) Private Limited, Bengaluru. During the year, based on the said Co-operation, NIWE has carried out the following Certification Projects along with M/s. TUV Rheinland:

- Manufacturing Inspection for Hub & Nacelle Assembly Unit and Wind Turbine Tower unit for an Indian wind turbine manufacturer in connection with Type Certification of their wind turbine model.
- Manufacturing inspection for production unit of the converter for an Indian manufacturer.
- In addition, a Certification project viz., “Inspection for the Manufacturing Evaluation at a wind turbine tower production unit” is being carried out by NIWE - TUVR Certification Group and the project is under progress.

Participation in Meeting of Certification Body – Wind Turbines at TUV Rheinland, Germany

Shri. A. Senthil Kumar, Director & Head, S&C and Shri. S.Arulselvan, Assistant Engineer, S&C participated in the meeting of Certification Body – Wind Turbines and other meetings during 21.06.2016 to 24.06.2016 at M/s. TUV Rheinland Industrie Service GmbH, Cologne, Germany.

During the year, the S&C Engineers, viz., Shri.A.Senthil Kumar, Director & Head(S&C), Shri. S. Arulselvan, Assistant Engineer & Shri. N. Raj Kumar, Deputy Director (Technical), have been authorized as Certification experts for NIWE – TUV Rheinland Projects by the German accreditation body viz., DAkkS.

Standards

Bureau of Indian Standards (BIS) is the National Standards Body of India for issuing Indian Standards. S&C unit is involved in the preparation of Indian standards on wind turbines by

providing support to BIS. A committee viz., Wind Turbines Sectional Committee (ET 42) has been formulated by BIS for the preparation of Indian standards on wind turbines, under the Chairmanship of Director General, NIWE. NIWE, which is a part of BIS ET 42 committee, provides the technical support to BIS in all the standards related works. Based on the contribution, Six Indian standards on wind turbines have already been finalized.

During the year, BIS introduced modifications in one of the finalized standards. Upon review of the changes, comments have been communicated to BIS by NIWE. Subsequently, an approval for the modified finalized document has been issued by Chairman, Wind Turbines Sectional committee (ET42) / Director General, NIWE.

Wind Turbines Sectional Committee (ET 42) Meeting

During the year, 7th meeting of Wind Turbines Sectional Committee (ET 42) of Bureau of Indian Standards (BIS) was organized at NIWE, Chennai on 24th March 2017; in this meeting NIWE provided the technical support to BIS. Shri. A. Senthil Kumar, Director & Head, S&C, participated in the ET 42 Committee meeting and explained the status of various Standards related works being carried out by NIWE.

BIS ET 42 meeting held at NIWE, Chennai

Contribution to IEC / IECRE

India is a P-member (Participating member) in IEC TC 88 committee, which is responsible for issue of IEC standards for wind turbines. NIWE provides the technical support to BIS regularly on the works related to International Electrotechnical Commission (IEC) standards including voting for draft IEC standards at IEC TC 88 Committee. Based on the review of eight draft IEC standards / documents, voting recommendations have been prepared by NIWE and sent to BIS for onward forwarding to IEC TC 88.

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)". Based on the efforts taken by NIWE and MNRE, BIS has obtained the membership for India in IECRE system. NIWE is providing the technical support regularly to Central Marks Department (CMD) of BIS on IECRE related works. based on the review of two draft proposals / documents of IECRE, voting recommendations have been prepared by NIWE and have been sent to BIS for onward forwarding to IECRE.

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, Revised List of Models and Manufacturers of Wind Turbines (RLMM) lists, finalized by the committee constituted by MNRE, were being issued NIWE periodically, till October 2016.

The type certification involves multidisciplinary activities and requires the knowledge to understand and interpret the information on type certification scheme and also other technical informations related to the type certificate. NIWE provided the technical support to the RLMM committee constituted by MNRE in the verification of the documentation being provided by various wind turbine manufacturers to finalize the list.

During the year, two Revised List of Models and Manufacturers of Wind turbines (RLMM), lists dated 10.06.2016 & 26.10.2016 were issued by NIWE. Six new wind turbine models, including one new Indian wind turbine manufacturer, have been included in the lists. In addition, updation of various documentation including type certificate for the existing wind turbine models (more than 50 numbers) and wind turbine manufacturers have been included in the lists. As a part of the RLMM

Issuing renewed Certificate to M/s. RRB Energy Limited

process, Director & Head, S&C and S&C Engineers carried out the verification of the manufacturing facility of three wind turbine manufacturers. Further, consolidated lists of wind turbine models and manufacturers have been uploaded in the NIWE website.

Shri. A. Senthil Kumar, Director & Head, S&C attended two meetings of the MNRE committee held at MNRE, New Delhi to discuss and suggest the methodology / protocol to be followed including the list of documents required towards enlisting of Wind Turbine Generator (WTG) manufacturers / models by MNRE. Subsequently, based on the MNRE guidelines issued in October 2016, RLMM works will be carried out by MNRE and NIWE will provide the technical support to MNRE for Type Certificate related issues, as and when sought by MNRE.

Prototype Wind Turbine Models

NIWE is implementing MNRE guidelines on installation of prototype wind turbine models in India. 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(s) in connection with grid synchronization of prototype wind turbines of a wind turbine model. NIWE has formulated a committee to take the suitable decision on issuing the recommendation letters. NIWE 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. During the year, MNRE has amended the guidelines by incorporating few changes which includes the increase in number of allowable prototype wind turbines from 'FIVE numbers' to 'a total capacity upto 15 MW'. Accordingly, the amended guidelines are being implemented by NIWE.

During the year, NIWE has issued three recommendation letters, which includes two recommendation letters issued in connection with grid synchronization of each one-prototype wind

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

turbine of two wind turbine models for the purpose of Type testing and six prototype wind turbines of one wind turbine model for the purpose of developmental works.

Quality Management System

Wind Turbine Type Certification services of NIWE are certified as per the requirements of ISO 9001: 2008 by Det Norske Veritas. During the year, successfully undergone the re-certification audit and renewed certificate with extended validity, issued by DNV-GL. The continual improvement and maintaining the Quality Management System are ongoing.

INFORMATION, TRAINING AND CUSTOMIZED SERVICES

NIWE is the only premier institute of its kind in the developing countries and it is NIWE's responsibility to speed up wind energy development not only in the country but also in neighbouring and developing countries. As a part of such activities, the Information, Training and Customized Services (ITCS) unit, as a focal point for information dissemination and training programmes is providing excellent facilities for learning, training, upgrading the infrastructure for good research environment and also reaching out to the public as well as industries to promote wind energy in the country. The following are the activities during 2016-17.

Training Programmes

NIWE is imparting training for National & International participants through Training courses. NIWE successfully organized 23 International Training Courses on "Wind Turbine Technology and Applications" and 24 National Training courses on "Wind Energy Technology" including special and customized training courses since 2004. Till now through above training courses, more than 1200 national participants from all parts of the country and 468 international professionals from 78 countries have been trained.

During the year 2016-17, a total of 7 Training courses - 3 National Training Course including one special Capacity Building Training programme on Design, Installation and Maintenance of Small Wind Turbines' and 20th & 21st National Training courses on 'Wind Energy Technology' and 4 International training courses of which 2 international Training courses specially for (i) Officials of Ministry of Energy and Mineral Department (MEMD), Uganda on "Wind Resource Assessment and Wind Farm Planning" and (ii) for African Countries sponsored by the Ministry of External Affairs (MEA), Government of India under AIFS-III on Wind Turbine Technology and Applications and 18th & 19th International Training Courses were conducted successfully. The lectures of the courses were 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) were provided, specially prepared for the benefit of the participants. Also

NIWE had conducted an Induction Training programme for the Newly Recruited Scientists-B of Ministry of New and Renewable Energy during October 2016.

National Training Courses

National training courses are designed by NIWE for 5 days duration to orient the participants towards Wind Energy Technology starting from wind resource assessment to wind farm development including installation & commissioning, O&M and financial aspects & benefits.

20th National Training Course

Successfully conducted the 20th National Training Course on "Wind Energy Technology" during 7th to 11th November 2016 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 in a focussed manner. The course was attended by 38 participants from 9 States with diverse background. The course was inaugurated by Dr. Jagmohan Singh Raju, IAS, Chairman and Managing Director, Tamil Nadu Energy Development Agency (TEDA).

Chief Guest delivering the Inaugural Address

Prof. Sudhindra Nath Panda, Director, National Institute of Technical Teachers Training and Research (NITTTR) was the Chief Guest in the Valedictory Function and distributed the course certificates to all the participants.

Capacity Building Training Programme

NIWE had successfully conducted the 10 days Capacity Building Training Programme on "Design, Installation and Maintenance of Small Wind Turbines", during 27th February to 8th March 2017 at NIWE for the sanctioned strength of 25 participants from 8 States and 1 Union Territory (Andhra

Participants at work

Pradesh, Chandigarh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh & Pondicherry), a special residential training programme, sponsored by Ministry of New and Renewable Energy, GoI.

Since this kind of training course, being the first of its kind in India, the objective of the training course had been to build the capacity of participants on small wind energy technology and practically train them on how to design a small wind turbine to facilitate the growth of Small Wind Turbines in rural and low windy areas of India with an idea to create employment opportunities for rural youth. In addition to knowledge transfer, special skills were taught to the participants on Operation and

Distribution of Course Certificate to the participants

Maintenance and full practical training (hands on session) were given on installation and commissioning of small wind turbine. The participants expressed their overwhelmed satisfaction through their feedback and requested for more such training programmes in future.

21st National Training Course

NIWE had successfully organized the 21st National training course on "WIND ENERGY TECHNOLOGY" during 20th to 24th March 2017 to address all aspects of Wind Power, starting from Wind from wind resources assessment to project implementation and operations & maintenance in a focused manner. The course was attended by 59 participants from 9 States of the Country with diverse background. The training course was inaugurated by Er. M. Asokan, Chief Engineer, Grid Operation, TNEB. Dr. Rajesh Katyal, Director General and Head, OW&IB delivered the Valedictory address and distributed the Course Certificates to all the participants.

Chief Guest inaugurating the Course

Participation in Exhibitions

NIWE had established and managed its Stall in the following exhibitions and disseminated the information about the activities and services of the Institute along with the wind energy awareness to the visitors in various capacities.

- "Switch Global Expo" — International Energy Conference at Vodadara, Gujarat during 6th to 10th October 2016.
- IGEP Fair Husum Wind India 2016 at Intersolar India at Mumbai held during 19th to 21st October 2016.
- 104th Indian Science Congress" organized by Indian Science Congress Association at Sri Venkateswara University, Tirupati, Andhra Pradesh held during 3rd to 7th January 2017. Honourable Chief Minister of Andhra Pradesh Mr. Chandrababu Naidu inaugurated the NIWE stall.

Honourable Dr. Chandra Babu Naidu, Chief Minister of Andhra Pradesh inaugurating the NIWE Stall

Global Wind Day 2016 Celebration

Global Wind Day is a worldwide event that is commemorated annually on 15th June and NIWE has been celebrating the Day since 2009 with various events. This year, the Global Wind Day events were organised at two locations in Tamil Nadu i.e., Chennai and Vedaranyam, Nagapattinam, Tamil Nadu in association with WWF-India. The event included the capacity building training workshops for teachers and competitions for students.

Celebration at Chennai

The Global Wind Day celebrations were structured between 14th and 15th June 2016 for students and teachers separately in the campus of the National Institute of Wind Energy, Chennai.

On 14th June 2016, the event started with the welcome address by Dr. P. Kanagavel, Additional Director and Head, ITCS, NIWE, Dr. S. Gomathinayagam, Director General, NIWE, delivered the inaugural address in the Global Wind Day celebrations. In his address, the Director General pointed out the importance of renewable energy resources especially wind energy in combating the primary

contributors to the phenomena of climate change and reiterated that those of us who are living on this planet should constantly remind ourselves of the fact that we have borrowed this Earth for the future generations, therefore we must strive to contribute meaningfully towards the collective efforts to mitigate the consequences of use of fossil fuels. Col. Sanath Gopinath, Head, WWF – India, Tamil Nadu Office, spoke of the joint initiative and WWF's activities in India and their role in conservation, education, outreach and policy. Mr. Thangaraj, Coordinator, National Green Corps and Mr. Rajasekar, Coordinator, Eco Clubs were present. A total of 61 teachers from 55 schools attended the training workshop at NIWE campus.

Capacity Building Workshop on Climate Change and Renewable Energy

The capacity building workshop on renewable energy for teachers was conducted on the same day Dr. P. Kanagavel, Additional Director and Head ITCS, NIWE delivered a lecture which focused on climate change and renewable energy. He specified the impact of climate change in the energy sectors and addressed the need for changes in the utilization of energy resources and its generation for daily consumption. He also invited the attention of the participants to the availability of renewable energy resources in India and drew a comparison in its effective exploitation with the world. After this session, Mr. S. Saravanan, Senior Education Officer, WWF-India, Tamil Nadu Office moderated a discussion on the consequences of climate change and effective measures at the level of local communities and civil society towards reducing its impact.

The second session on wind energy and their function was conducted by Mr. Joel Franklin Azaria, Additional Director, ITCS, NIWE. He exposed various types and the functioning of wind turbines and evolution of wind energy as a renewable resource to the participants. The teachers who had participated in the workshop were taken to a campus tour where in NIWE Renewable Energy facilities were showcased. Briefings and demonstrations pertaining to the work being carried out at the NIWE was explained by the various departments of the institute.

Glimpses of Global Wind Celebration at Chennai

Competitions for Students on Renewable Energy

On 15th June 2016 the Global Wind Day celebration started with students being addressed by Dr. S. Gomathinayagam, Director General, NIWE. He advised the students not to be inhibited by their age and inexperience and invited them to explore all possibilities to make a difference in their environment. Col. Sanath Gopinath, Head WWF- India Tamil Nadu Office invited the students to seek effective solutions to environmental problems instead of fixating on the quest for perfect solutions. Dr. P. Kanagavel, Additional Director and Head, ITCS, NIWE explained the significance of the Global Wind Day to the students. Then the competitions of painting, poster making along with the Quiz were conducted concurrently at three different areas of the venue. After that students were taken on a conducted tour of the NIWE, during which they were introduced and explained about the Renewable Energy facilities available in the campus.

Dr. S. Gomathinaygam, Director General, NIWE gave away prizes to the winners of the competitions and released two posters highlighting the significance of renewable resources of energy.

Celebration at Vedaranyam

This year NIWE and the WWF-India extended the Global Wind Day programme beyond Chennai to Vedaranyam Taluk, Nagapattinam district. The programmes were organized and conducted on similar lines as was done at Chennai. The events were jointly coordinated by Mr. G. Singaravelu, Coordinator, Phonix, WWF Nature Club, Anantharasu Aided Middle School and Mr. S. Karunanithi, Head Master, R. N. Government Higher Secondary School, Aayakaranpulam II.

On 25th June 2016, painting competition for students on renewable energy resources was conducted at Aayakaranpulam II. The competition commenced after a brief address by Dr. P. Kanagavel, Additional Director & Head ITCS, NIWE. A total of 41 students from classes 7th & 8th participated in the drawing competition.

Capapcity Building Workshop On Climate Change and Renewable Energy

On 27th June 2016, a capacity building training workshop was conducted for the teachers of higher secondary schools in and around Vedaranyam and Thiruvarur. The workshop began with the inaugural session led by Mr. S. Karunanithi, Headmaster of the host school. The District Science

Glimpses of Global Wind Celebration at Vedaranyam

AEO's Mr. M. Balasubramanian from Nagapattinam and Mr. Victor Raj from Thiruvarur shared their knowledge with the teachers and emphasized the important of this workshop. Mr. Singaravelu, Coordinator, Phonix WWF Nature Club and Mr. Muthamizh Anandan, Coordinator, National Green Corps also addressed the teachers. A total of 41 teachers from Nagapattinam and Thiruvarur districts participated in the workshop.

Mr. S. Saravanan, Sr. Education Officer, WWF-India, Tamil Nadu Office briefed the participants about the activities of WWF-India and its role in wildlife conservation, environment education and outreach programme with various stakeholders. Dr. P. Kanagavel, Additional Director and Head ITCS, NIWE conducted the session on climate change and its impact on the energy sector. Mr. Joel Franklin Azaria, Additional Director, ITCS, NIWE spoke about wind energy and its importance in the future scenario. He explained the significant growth in power generation from wind that the world has witnessed over the last few years supported by data pertaining to the same.

NIWE's Foundation Day Celebration 2017

NIWE's "Foundation Day", 19th Birthday was celebrated for the fifth consecutive year on 21st

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

Glimpses of NIWE's Foundation Day lecture and Prize distribution

March 2017, with variety of programmes. 'Open Day' was announced for public to visit all the facilities of NIWE on 21st March 2017 between 9.30 am and 12.30 pm to create awareness about the Renewable Energy Sources and its applications. All the staff members of NIWE were presented with mementos in commemoration of the 19th Foundation Day of NIWE.

Dr. M.V. Ramana Murthy, Scientist G, National Institute of Ocean Technology, Chennai was the Chief Guest and delivered the Foundation Day Lecture in the program organised at the Conference Hall, NIWE.


pavan

EDITORIAL

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NIWE'S Newsletter – PAVAN

NIWE is regularly publishing a well received quarterly bilingual NIWE newsletter "PAVAN", which disseminates information about the activities & services of NIWE, wind energy news, technical articles and information on wind energy related events. In this period, 49th to 51st issues have been published in web-downloadable format as well as printed and mailed to stakeholders. The 52nd issue was published at the end of the quarter. The Newsletter publication has received good feedback over years. The PAVAN aims to keep the Industry professionals, students and researchers updated about the progress in wind energy sector and NIWE activities.

Prof. Anna Mani Information Centre

NIWE has state-of-art Library named after renowned meteorologist "Prof. Anna Mani" as Information Centre and it has about 2000 books on renewable energy in general and wind energy in particular with allied subjects. It includes books on Energy and environment, sustainable development, all engineering disciplines, science, management and personality development. NIWE's Library has also subscribed to all major National and International Journals & Magazines

related to wind energy and other allied engineering disciplines. It is also having around 300 technical reports and 300 conference proceedings and other information resources like Wind Atlas and data books, Maps, Manuals, souvenirs, Digital resources, etc.

NIWE Library has been computerised with automation software and Online Public Access Catalog (OPAC) facility. It has also membership with leading libraries like IIT, Anna University and American Library for reference purposes. Interested students / researchers / academicians / public can access NIWE's Library with prior permission, without borrowing free of cost .

Visitors

- Mr. Kees, Director, M/s. Hutselflux, Netherland visited on 18th October 2016.
- Dr. Habeck, German Minister & Mr. Fabig, Consulate General of Germany in Chennai alongwith German Delegates visited on 18th October 2016.

Students Visit

To create awareness and to motivate towards research on wind energy, achieving the indigenization and also to create awareness about the activities and services of NIWE, schools and college students are encouraged to visit the campus. During the year 2016-17, the following visits were coordinated.

Sl. No.	Name of the Institute	No. of Students	Date of Visit
School Students Visit			
1	Ellen Sharma Memorial Matriculation Higher Secondary School, Sholingallur	76	08.07.2016
2	Akshaya Matriculation Higher Secondary School, Chennai	52	05.12.2016
3	American School, Taramani, Chennai	71	30.01.2017
College Students Visit			
1	GKM College of Engineering Perungalathur, Chennai	25	02.12.2016
2	Rajiv Gandhi College of Engineering & Research, Nagpur, Maharashtra	44	21.12.2016
3	Amirta University, Ettimadai, Coimbatore, Tamil Nadu	16	25.02.2017
4	VEL Tech Engineering College, Avadi, Chennai	71	02.03.2017
5	Dr. Babasaheb Ambedkar College of Engineering and Research, Wanadongri, Nagpur, Maharashtra	31	07.03.2017
6	VEL Tech Engineering College, Avadi, Chennai	69	09.03.2017

Sl. No.	Name of the Institute	No. of Students	Date of Visit
7	Aarupadai Veedu Institute of Technology, Paiyanoor Kancheepuram Dist.,Chennai	72	16.03.2017
Special Visit			
1	Nepal Electricity Authority, Katmandu, Nepal; through National Productivity Council, Chennai	15	29.04.2016
2	National Institute of of Technical Teachers Training & Research (NITTR), Taramani, Chennai	24	27.07.2016
3	SRM University (Conference) SRM Nagar, Kattankulathur - 603 203	131	09.01.2017 & 10.01.2017
4	Hindustan University (Faculties)	16	12.01.2017
5	National Institute of of Technical Teachers Training & Research(NITTR), Taramani, Chennai	16	22.02.2017

Students Internship

Two students from PSG Institute of Technology and Applied Research, Chennai has done their internship at ITCS unit for a period of two weeks from 29th November to 9th December 2016.

The following foreign students training fellowship applications have been processed under different scheme.

Research Training Fellowship for Developing Country Scientists (RTF-DCS)

1. Mr. Tchodou Samah B from Directorate General for Energy, Ministry of Mines and Energy, Togo
2. Mr. Tinotenda Zvavashe from National University of Science & Technology, Zimbabwe.
3. Ms. Nogoye Diaw from Fann Hock, Senegal (November 2016)
4. Mr. Aung Ko Oo from Renewable Energy Research Department, Department of Research and Innovation, Ministry of Education, Myanmar.
5. Mr. Daniel Menga from Department of Renewable Energy University of Maroua, Cameroon.
7. Mr. Tchawe Tchawe Moukam from University of Ngaoundere, Cameroon
8. Mr. Edouard Mboumboue from Cameroon

Indian Science and Research Fellowship (ISRF)

Dr. Thi Thi Soe from Renewable Energy Research Department, Department of Research and Innovation, Ministry of Education, Mynamar has joined WRA unit, NIWE for research work.

KNOWLEDGE SHARING & MANAGEMENT

The Societal Mission of the unit is in alignment with the new ISO 9001:2015 standard's requirement to handle the organizational knowledge. The unit strive to execute this mandate by determining the knowledge necessary for NIWE's operation, Maintains knowledge and makes it available to the extent necessary, consider the current organizational knowledge and compare it to changing needs and trends & acquire the necessary additional knowledge.

These were achieved through the following initiatives.

Technology Think Tank (TTT)

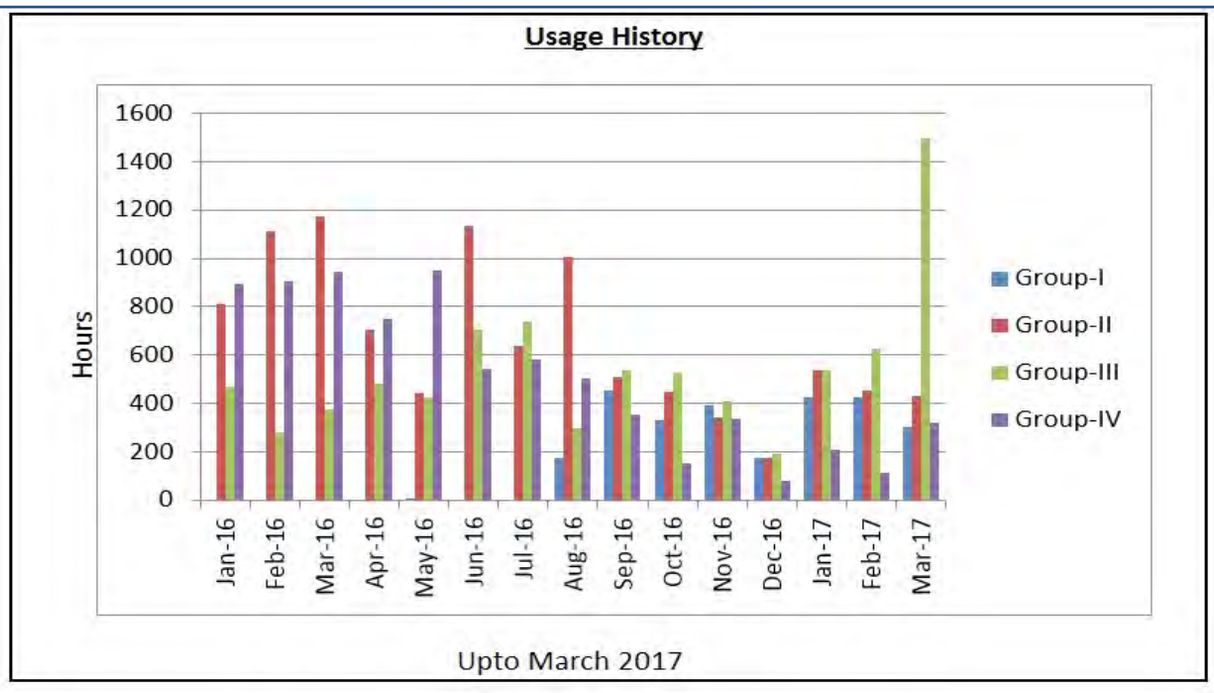
TTT provides a platonic stage to exchange ideas and encourage cerebration of viewpoints on various engineering concepts related to wind energy. Every Thursday afternoon the open session starts with a thematic presentation given by a resource person either from within or without followed by a sanguine discussion on that theme moderated by the coordinator and having the participants and the

resource person discussing the subject. Every unit of NIWE nominates in its resource in turns and since inception in year 2014 the floor has seen 91 of such TTT knowledge based moderated discussion at NIWE.

Work Group & Soft skill Training

Self-Learning avenues: A suite of Industry standard renewable Energy related software has been placed at the Work Group lab for usage of all stakeholder communities including NIWE staff. The intention is right capacity building. Initiative aims at human resource skill development and honing skills of professionals working for the renewable energy sector, primarily within NIWE and thereafter other interested personnel.

Internal staff gets an avenue to new skills and become more productive towards NIWE requirements. Students, academic staff, Project engineers, scientists and other professionals working for the renewable field will have a platform to learn and acquaint with new soft skill which would consequently improve their productivity in their areas of contribution in the wind sector. There were 86 active members who have collectively clocked more than 1526 hours of soft skill training on the workgroup software during the period 2016-17.



Software Group

Group-I	Wind Resource Assessment & Wind Farm Planning
Group-II	Wind Turbine - Aero Mechanical Design
Group-III	Electrical & Electronics and Grid Power Quality
Group-IV	Computational Analysis and Simulation

Skill Training:

Training at regular intervals is provided to NIWE staff on software usage and job skills to perform consultancy works. Trained engineers of NIWE can then partake in the various jobs performed by

the NIWE units and increase the units business revenue and productivity. Training provided during the period are:

- 5 days training on "DIGSILENT Software" was conducted by Mr. Adrian Constantin, Expert from OEM, Germany during 26th - 30th September 2016 at NIWE, Chennai.

Training & Activity Shots

Student Internship & Final Year Project (STI-FY)

Engineering Student Projects & Internships are offered as a means of grooming future professionals for probable entry to wind energy sector & allied fields. The applications should be made in advance for short-listing candidates allowed to carry out projects & Internships at NIWE.

The workgroup software have been made open to have access for these students in addition to the employees of NIWE , Project Mode Engineers and paid members. The 88 post-graduate students and graduate students have undertaken Internship and project work through the unit of NIWE.

Testing of Small Wind Turbine (SWT)

Accreditation of the Testing Process: The unit has made all the needed internal preparation for establishing the Testing process as per the requirements of ISO 17025:2005. The procedures, work instructions, formats and other technical details relevant for application have been worked out and proposes to go for its accreditation related audit through NABL in the first quarter of FY. 2017-18. When accredited, it will be the first of its kind in the country.

Testing Activities:

I. Windistar 4500

The turbine is an off grid battery charger model. The Agreement for testing the wind turbine was signed during April 2015 for carrying out power performance measurements, duration test and safety & function test for two wind seasons- 2015 & 2016. The Agreement for testing was signed for two wind seasons to meet the requirements of the duration test, which requires minimum number of hours of operation of the wind turbine at certain wind speeds (1.8 Vavg & 1.2 Vavg , Vavg being the annual average wind speed based on design class).

Windistar 4500 under test at WTRS, Kayathar

The performance tests were completed during August 2016 and the following test reports issued to the customer, M/s Wish Energy Solutions Pvt. Ltd :

i. Power Performance measurement

ii. Duration Test

iii. Safety & Function Test

II. Vaata Smart

The is a grid connected wind turbine. The Agreement for testing the wind turbine was signed during February 2015 for carrying out power performance measurements, duration test and safety & function test for two wind seasons- 2015 & 2016. The approval for grid connection for testing from TANGEDCO was obtained by the customer (M/s Vaata Infra ltd., Chennai) in September 2015. Hence the testing could be started during the wind season of 2016 only.

The turbine was under trial measurements during 2016 and the report of trial measurements carried out during the period was submitted to the customer. The type testing was closed based on the request of the customer.

Research Council of NIWE

NIWE's twenty- fourth meeting of its R&C council on 12.09.2016 was conducted under the august chair of Shri.S.K.Soonee, Chief Executive Officer (CEO) Power System Operation Corporation Limited (subsidiary of POWERGRID). This was the first RC meeting after the reconstitution of the council in the year 2016. Two projects one each on multi-input DC/DC converter for the hybrid system & Compressed Air based Energy Storage for Small Wind Applications from NIT, Durgapur and KCG Engg. College were selected for the financial support.

ENGINEERING SERVICES DIVISION

Engineering Service Division (ESD) has been established during March 2013 for NIWE's infrastructure development and multi-disciplinary engineering services starting with Civil, Electrical, Information Technology and cyber security infrastructure, planning. Maintenance and management and striving to bring more renewable energy mix to NIWE campus and demonstrate energy conservation techniques for NIWE.

In the modern resource assessment, for Wind as well as Solar requires sophisticated instrumentation and data acquisition systems interfaced with network server using GPRS mobile networks which need to be maintained 24x7 to facilitate resource data collection, storage, retrieval analysis and processing.

It mainly executes the construction works of basic amenities like new floor space for fresh recruits / expanded areas of work, enhancement of security apparatus / infrastructure & upkeep of existing infrastructure both civil and IT/communication related.

The Unit would also in the long run showcase the possible renewable energy mix in the day-today energy consumption at NIWE and improve to demonstrate the techniques of energy conservation as well as renewable energy penetration.

Management of IT infrastructures including networking of intra and internet facilities with focused attention on cyber security along with uninterrupted power supply to critical server ends computer system.

Audio - Video conferencing – WTRS Kayathar

- Audio - Video Conferencing Facility both in NIWE, Chennai campus and WTRS, Kayathar campus has been established.
- The “Digital India” workshop co-ordinated by Ministry of Coal through Audio-Video Conferencing hall on 28th November 2016 both in NIWE, Chennai and WTRS, Kayathar. This campaign was launched by Government of India to ensure that Government services are made available to citizens electronically by improving online.

The "Digital India" workshop at Audio-Video Conferencing Hall – NIWE, Chennai

NIWE's Official 'face-book' page

NIWE Face book page has been created to manage social activities of NIWE. (www.Facebook.com/niwechennai).

2.5 kW Wind Solar Hybrid System

A new 2.5 kW Solar Hybrid System has been installed during June 2016 on the roof top of NIWE building for study purpose. The prime objective of this study is to find the wind potential availability over the roof top of NIWE in order to install a 2.5 kW Wind Solar Hybrid off Grid tied system using CFD. The roof top installed earlier with Solar Panels 20 kW and 3 kW Small wind turbine, was making a lot of interruption in the wind flow and was reducing wind velocity, which in turn affects the performance of the hybrid system. Hence, a thorough analysis of the wind flow over the roof top was necessary to find the potential place to locate the system.

NIWE's Official 'Twitter' page

NIWE's 'Twitter' page has been created to manage social/official activities of NIWE. (www.Twitter.com/niwe_chennai). The General News, Nationwide announcements and official photographs are being updated regularly .

Energy Management System

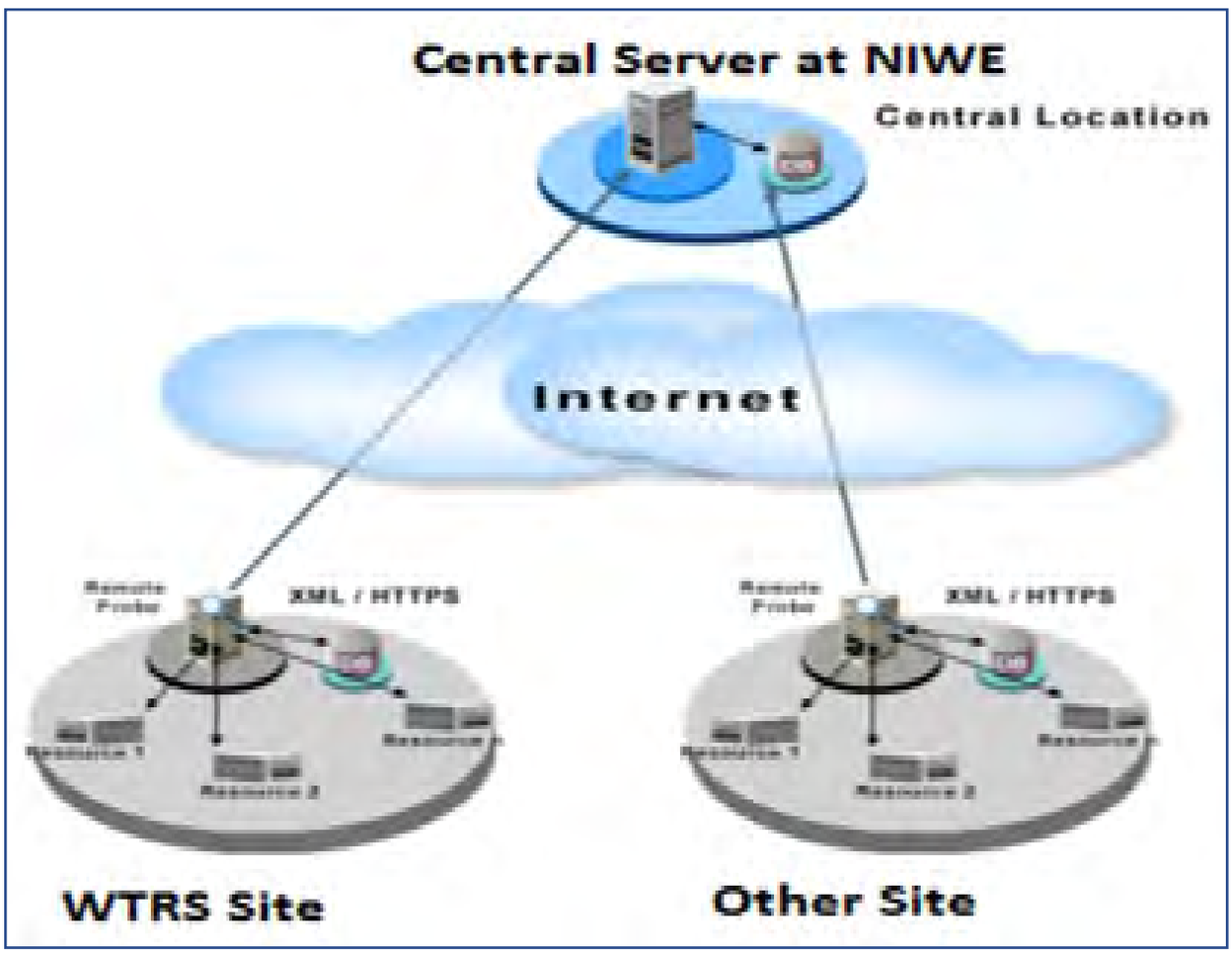
Energy Management System (EMS) is a computer aided system which is used to monitor and record the data of energy, environmental and process parameters in a place where it has been installed

The EMS installed in the National Institute of Wind Energy (NIWE) by the CSIR-Central Scientific Instruments Organisation (CISO), Chennai will improve the overall performance of electrical distribution system of NIWE, and will pave the way to minimize the excess energy consumption at every stage of energy flow from 500 kVA transformer; 400 kVA and 62.5 kVA generators; Solar and Hybrid systems. The EMS installed at NIWE acquires data from 17 energy nodes.

EMS installed at NIWE has been integrated with Remote Monitoring System (RMS) which has been designed, developed and installed by CSIR-CSIO through wireless communication system to transfer live energy and environmental data of Orbital TMC controller installed at Wind Turbine (200 kW), WTRS, Kayathar. RMS is having features of displaying about 30 energy and environmental parameters such as voltage, current, power, wind speed, temperature, rpm, thyristor angle and etc.

Solar 15 kW SPV Generation

The Power Generation of 15 kW SPV plant from April to March 2017 is 7314 kWh and the Cumulative generation is 34.21MWh.



Solar 30 kW SPV Generation

The Power Generation of 30 kW SPV plant from April to March 2017 is 27880 kWh and the Cumulative generation is 43.40 MWh.

Civil Works

- The Secretary, MNRE dedicated NIWE to the Nation on 18th February 2016. In this connection, the fabrication of Inscription stone work has been done and the stone Installation work has been completed during the month of April 2016.
- Construction of Security Guard room near entrance main gate work has been completed.
- Construction of Store room and Staff room at the rear side of the utility Block work has been completed and inaugurated during the month of May 2016.
- Construction of front side sump platform and dismantling of parapet wall work has been completed during the month of June 2016.
- Construction of flooring and fixing of tiles at Driver cabin work has been completed during the month of June 2016.
- Construction work of platform for scrap storage and roof sheet work for scrap storage materials at the back side of the SRRA is container has been completed.
- Construction of additional two wheeler shed near to the lift room has been completed during the month of August 2016.
- Landscaping of Gardening work at the front side of the NIWE campus building has been completed during the month of December 2016.
- The Road Laying of Reinforced Cement Concrete (RCC) work through CPWD at the main entrance of NIWE campus in between security gate to main gate has been completed, the land levelling and edging cement solid block at front side for VIP car parking work has been completed.

General Maintenance Works

- 'Water pumping windmill' repair work in the NIWE campus has been completed during the month of April 2016.
- Replacement of damaged tiles work, around the conference hall, has been completed during the month of May 2016.
- 5 kW Hybrid wind solar system – small 3.2 kW wind turbine repair work has been completed during the month of September 2016.
- Reclamation work, for car parking, at front yard has been completed in the month of September 2016.

- Re-installation of Solar Water pump at the rear side of the SRRA's cabin has been completed in the month of November 2016.
- Water proofing coverage work for SRRA's Cabin at the rear side of the building has been completed during the month of July 2016.
- The 5 kW rooftop wind solar Hybrid system and SPV street lights repair work has been completed which were damaged in December 2016 during Vardha Cyclone.
- The 15 kW and 20 kW SPV solar power plants repair work has been completed which were damaged in December 2016 during Vardah Cyclone.

SOLAR RADIATION RESOURCE ASSESSEMENT

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 NSM. One of the major objectives of NSM is to establish India as a global leader in Solar Energy.

The SRRA project is being implemented by National Institute of Wind Energy (NIWE), Chennai, an autonomous R&D institution under the Ministry, 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.

Important Work

- Karaikudi SRRA station relocated in the same campus from ground level to rooftop.
- Relocated PDPU, Gandhi Nagar SRRA & AMS station to GERMI campus at Gandhi Nagar.
- Dr. G. Giridhar visited Leh during 9th to 11th May 2016 for feasibility study on Solar Potential at Defence Institute of High Attitude Research (DIHAR) at Leh and submitted a report to DIHAR.
- A committee meeting to fix the Term of Reference on EOI on Solar Forecasting held on 30th April 2016 & 30th September 2016.
- Micrositing visit carried out at :
  - Raipur 1MW SPV plant of CREDA microsited for relocating Bilaspur SRRA station.
  - Chandrapur (Govt, Engg. College) for establishing SRRA station under MEDA Consultancy Project.

- Parbhani (Agricultural University) for establishing SRRA station under MEDA Consultancy Project.
- Badi Sid 10 MW SECI SPV plant for relocating the Bodana SRRA station.
- Dr. G. Giridhar attended meeting on Solar Forecasting with MNRE, SECI and NISE officials during 25th to 28th April 2016 at New Delhi.
- Bikaner (Maharaja Ganga Singh University) and new campus of IIT Jodhpur at Karwad for relocation of Mathania and existing IIT Jodhpur SRRA stations.

- Dr. G. Giridhar attended meetings with MNRE & SECI officials regarding solar forecasting on 21st July, 2016 and National Wind-Solar Hybrid Policy Committee Meeting on 22nd July 2016 at SECI, New Delhi.
- Signed MoU with St. Xavier Catholic College of Engineering on 12th August 2016 in connection with Academic, R&D and Collaborative activities.
- SRRA brochure released by Director General, NIWE on 15th August 2016 during the Independence Day celebration.
- Tender evaluation of EOI for solar forecasting held on1st & 2nd September 2016.
- Dr. G. Giridhar attended Standing Committee Meeting with MNRE officials on "Energy" in New Delhi on 31st August 2016.
- Dr. G. Giridhar attended Seventh meeting of the Interim Administrative Cell of International Solar Alliance (ISA Cell) on 7th September 2016.
- MoU with GERMI, Gandhi Nagar signed by DG, NIWE on 26th September 2016 in connection with Academic, R&D and Collaborative activities.
- Technical Committee Meeting on Unified Solar Radiation Resource Assessment was held on 30th September 2016 under the Chairmanship of Dr. S. Gomathinayagam, Director General, NIWE.
- Standing Technical Committee meeting in connection with the establishment of two SRRA stations in Maharashtra held on 30th September 2016 under the Chairmanship of Dr. M. S. Ramana Murthy, NIOT.
- SRRA officials visited Gangtok, Sikkim in connection with dedication of Gangtok SRRA station jointly with GIZ, New Delhi and SREDA, Gangtok and visited Darjeeling, West Bengal in connection with workshop on solar energy during 24th to 29th November 2016.

Achievements

- Karthik. R attended the 14th BSRN Science Review workshop organized by WMO from 26th to 29th April 2016, at Canberra, Australia and proposed 4 stations to bring under BSRN network. Also delivered a talk on "4 proposed stations & on Indian experiences of Solar Resource Assessment". BSRN accepted to incorporate 4 stations under their prestigious world network.

- Quality Controlled data of 71 SRRA stations were provided to 27 clients under SDSAP-2013 policy for 1st April 2016 to 31st March 2017.
- Project report on Solar Resource Assessment in Anas, HP was submitted to M/s. SJVN in March 2017.
- Calibration of 39 pyranometers and 15 Pyrheliometers of SRRA project carried out for the period from April 2016 to March 2017.
- Calibration of 38 pyranometers and 3 phyreliometers was carried out under commercial mode for the period from April 2016 to March 2017.
- 3 days training and workshop organized by SRRA in association with M/s. Digicollect, Bangalore on "Open Source Quantum GIS, Mobile Based Data Collection and Web GIS Application" during 30th May to 1st June 2016.
- 6 days training program on Solar Energy conducted by M/s. Steinbeis Solar Centre, Chennai on designing of Solar Power Plants, DPR, financial analysis of solar plants and solar software, such as, PVsyst and SAM during 16th to 23rd June 2016 at NIWE.
- A training program on "Stand alone PV System: Design and installation" carried out during 18th - 22nd July 2016 under PPP mode through M/s. GSES, New Delhi.

GSES Training Program

- Solar Forecasting meeting on instruction from PSDF, POSOCO with various SLDC members held on 14th October 2016 at Kochi.

Visitor

- Dr. Mali, DDGM (SI), IMD, Pune and Dr. R.D. Vashishtha, Former DDGM, IMD, visited Chennai, PEC, Thiruvallur and Pondicherry SRRA stations during 5th to 7th April 2016.

SLDC Meeting held at Cochin

Future Plans

- Establishment of low cost SRRA stations to cover more geographical areas for collection of ground measured solar data for finer refinement of solar atlas and for finer solar data collection.
- Refinement of Indian solar forecasting model developed for various climatic regions of the country using SCADA data from different region.
- Preparation of Solar potential map of India with respect to the Land use and land cover details and the measured finer details of solar radiation resources.
- Preparation of turbidity map of India based on the aerosol data collected from the ground stations.
- Preparation of e- book on solar radiation resource data for India.
- Implementation of the concept of virtual power plants.

PUBLICATIONS

The following papers / articles published by NIWE officials in the Journals, Magazines, Newsletters and Conferences

Journals / Magazines / Newsletter

1. **Thi Thi Soe, B.Krishnan, K.Boopathi, S.Gomathinayagam** "Optimum Wind Farm Layout Considering Energy Yield And Wake Losses in Kyonkadun, Ayeyarwaddy Region, Myanmar" Vol. 6, Iss. 12, pp-73-80, ISSN: 2249–6645, International Journal of Modern Engineering Journal, Dec. 2016.

2. **Thi Thi Soe, K.Boopathi, J.Bastin, A.G.Rangaraj, S.Gomathinayagam** "Assessment of Technical Wind Power Potential in Myanmar" Vol. 4, Iss. 1, pp-312-319, International Journal of Advance Engineering and Research Development, Jan.2017.

3. **D. Lakshmanan, Dr. S. Rabiyathul Basariya**, "Factors Affecting the Effectiveness of Advertising in the Current Scenario " Advertising Factors are Immune to Business which Aspire to Inspire before You Expire" Vol. 6, Iss. 1, pp-1264-1267, International Journal of Science and Research (IJSR), Jan. 2017.

4. **Thi Thi Soe, A. Hari Bhaskaran, K. Boopathi, S.Gomathinayagam** "Strategy for Wind Energy Development in Myanmar– An Overview," Vol. 4, Iss. 2, pp-119-123, International Journal of Advance Engineering and Research Development, Feb.2017.

5. **Thi Thi Soe, B.Krishnan, K.Boopathi, S.Gomathinayagam** "Social and Environmental Study on Wind Power Development in Ayeyarwaddy, Myanmar" Vol. 3, Iss. 1, International Journal of Advance Research, Ideas and Innovations, Feb.2017.

6. **Dr. P. Kanagavel, D. Chandralekha & S. Saravana Kumar,** Human Resource Development in Wind Energy —India and Trainings conducted at NIWE, Bi-monthly Magazine-IWTMA, India Wind Power Vol. 2, Issue 3, August - September 2016.

7. **R Katyal** et al "Optimal reactive power controller for wind-driven stand-alone doubly fed induction generators" Wind Engineering Journal 2017, Vol. 41(2)124 –143.

Conferences

A technical paper titled "Deployment of Small Wind Turbines on Telecom Tower - A Case Study" has been submitted for SWES Training Programme organized at Pune on 1st July 2016.

INVITED LECTURES

DELIVERED BY NIWE STAFF IN TRAININGS, CONFERENCES, WORKSHOP, SYMPOSIUM AND SEMINARS

Dr. S. Gomathinayagam, Director General

- Delivered a talk on "Offshore Wind Power : Status of development in India" in 'Indo-Australian Marine Renewable Energy Workshop' at IIT Madras on 5th April 2016.
- Chief Guest for the Inaugural function of International Conclave on RE Systems and Technology (ICREST-16) and delivered an Inaugural Address on "Scenario and trends of Renewable Energy Systems" at Saveetha School of Engineering, Chennai on 6th April 2016.
- Chief Guest for the International Seminar on "Renewable Energy Systems" at Hindustan University, Padur on 26th July 2016.
- Presentation before Hon'ble Minister on Draft guidelines for Development of Onshore Wind Power Projects on 19th September 2016.
- Guest Lecture on Wind Energy Technology at VIT, Chennai on 8th November 2016.
- Participated as Speaker in Panel discussion under Session on Wind Retailing the Leadership position at TN Renewable Energy Conference, Chennai on 10th November 2016.
- Lecture delivered on Transforming India Technology and Transformation Bill Gates at 2nd IEC in the series NITI, New Delhi on 16th November 2016.

Dr. Rajesh Katyal, Deputy Director General

- Delivered a lecture on "Deployment of Small Wind Turbines On Telecom Tower - A Case Study" at SWES Training Programme organized at Pune on 1st July 2016
- Delivered a lecture on "Small Wind Turbine Hybrid Systems" for SNA officers during the wind resource assessment program at NIWE, Chennai on 22nd August 2016.
- Delivered a lecture on "Offshore wind turbine technology and the activities carried out by NIWE to three Assistant Secretaries (IAS Oficers) from MNRE at NIWE, Chennai on 29th August 2016.
- Keynote Address and presentation on India's offshore Wind Policy and plans from the Ministry of New and Renewable Energy (Government of India) at "Engineers training workshop on

offshore wind project development" to be organized by FOWIND at Bangalore on 31st August 2016.

- Delivered a lecture on "Small Wind Turbine Hybrid Systems" at one-day National Wind Energy Technical Symposium in the 10th Renewable Energy Expo 2016 at Greater Noida jointly organized by NIWE and UBM India on 8th September 2016.
- Delivered a lecture on "Offshore wind Farms" at 104th Indian Science Congress organized at Tirupati by Shri Venkateshwara University, Tirupati on 7th January 2017.
- Delivered a lecture on "Offshore wind Farms" at one day workshop on Renewable Energy organized by Sri Sai Ram Engineering College, Chennai on 28th February 2017.

Dr. G. Giridhar, Deputy Director General

- Delivered a lecture on "Advances in Humanities, Physical & Mathematical Sciences" at S.A. Engineering College on 6th April 2016.
- Delivered a lecture on "Wind Solar Hybrid system " during the conference conducted by India Infrastructure publishing private Ltd. New Delhi on 22nd September 2016.
- Delivered a lecture on "Sustainable Energy Systems – Renewable Energy Sources" during National Seminar conducted by Kalasalingam University, Krishnankoil, Virudhunagar, Tamil Nadu on 6th October 2016.
- Presentation on "SRRA network & Wind Solar Hybridization" in the training program on Wind-Solar Hybrid Program organized by First View Group at New Delhi on 13th January 2017.

A. Mohamed Hussain, Deputy Director General

- Delivered a lecture on "Over view of Testing/R&D/WRA facilities at WTRS/WTTS, Kayathar during visit of Officials from various State Nodal Agencies for Training programme on Wind Turbine Technology and Application at Kayathar on 26th August 2016.
- Delivered a lecture on "Over view of Testing/R&D/WRA facilities at WTRS/WTTS, Kayathar during visit of Delegates of 18th International Training Programme participants to WTRS, Kayathar on 31st August 2016.

S.A. Mathew, Director & Head

- Delivered a lecture on "Wind Turbine and Testing Measurement Techniques" in one-day National Wind Energy Symposium in 10th Renewable Energy India Expo 2016 organized by M/s. UBM India Pvt. Ltd held at Greater Noida on 8th September 2016.

A. Senthil Kumar, Director & Head

- Made a presentation on S&C unit services to the 3 Assistant Secretaries (I.A.S. officers) during their visit to NIWE to acquaint themselves with the NIWE activities on Wind & Solar on 29th August 2016
- Delivered a lecture on "Type Certification of Wind Turbines" during the technical workshop of 10th Renewable Energy India Expo 2016 organized by NIWE & UBM held at India Expo Centre, Greater Noida on 8th September 2016.

M. Anvar Ali, Additional Director & Head

- Delivered a lecture on "Wind Turbine Generators and Grid Integration of wind power" at Gandhigram University on 24th February 2017.

J.C. David Solomon, Additional Director & Head

- Delivered a lecture on "Design Aspects of Small Wind Turbine" in a 2 days special training for SNA officials of NE regions at Itanagar, Arunachal Pradesh on 16th & 17th February 2017.

K. Boopathi, Additional Director

- Delivered a lecture on "Wind Power Forecasting" during joint meeting of various stake holders of Wind Power investors at Jaipur State Load Despatch Centre, Jaipur on 13th May 2016.
- Delivered a lecture on "Wind Power potential onshore & offshore" during sixth Annual Conference on "Wind Power in India" at New Delhi on 22nd November 2016.

Dr. P. Kanagavel, Additional Director & Head

- Delivered a lecture on "Indian wind energy development and scenario" in the International Conclave on Renewable Energy Systems and Technology-ICREST-2016 organized by Saveetha School of Engineering, Chennai on 7th April 2016.
- Delivered lectures on "Green Library & Energy Efficiency in Libraries" in the Refresher Course in Library and Information Science scheduled during 20th May to 9th June 2016 at UGC-Human Resource Development Centre, Bharathidasan University, Trichy on 30th May 2016.
- Delivered a lecture on "Climate Change Impacts and Renewable Energy" Organized by WWF-India Tamil Nadu State Office at NIWE, Chennai on 15th June 2016.
- Delivered a lecture on "Climate Change Impacts and Renewable Energy" organized by WWF-India Tamil Nadu State Office at R Nadesanar Govt. High School, Vedaranyam on 27th June 2016.
- Delivered lecture in the Training Programme on Energy Efficiency for NITT Scholars on "Renewable Energy (Solar & Wind) at National Productivity Council (NPC), Chennai on 15th July 2016.
- Delivered a lecture on "Overview of Wind Energy" at Vel Tech University, Chennai on 9th August 2016.
- Delivered a lecture on "Wind Energy - The Power for Future" at Highway Research Station, Chennai on 9th August 2016.
- Delivered a lecture on "Wind Energy Development in India and Role of NIWE" at one-day National Wind Energy Technical Symposium in the 10th Renewable Energy India Expo 2016 organized by NIWE and UBM at India Expo Centre, Greater Noida on 8th September 2016.
- Inaugurated and delivered a Key Note address in the One day National Conference on Information Literacy on "Bibliotherapy and Webotherapy for Women" at Soka Ikeda College of Arts and Science for Women, Madhanangkuppam, Chennai on 1st October 2016.

- Participated in the Panel Discussion on "Effectiveness of Green and Renewable Energy in solving Socio Economical Issues" on 19th October 2016 as part of STEMFest 2016 at University of Mysuru held during 17th to 20th October 2016.
- Inaugurated and delivered a lecture in the One Day Workshop for School Teachers on "Solution for Pollution" at Bentinck Girls Hr. Secondary School, Vepery, Chennai on 25th November 2016.
- Delivered a lecture on "Energy, Environment, Renewable and Wind Energy Overview" in the Faculty Development Programme at GKM College of Engg. & Tech., Perungalathur, Chennai on 28th November 2016.
- Delivered a lecture on "Wind Energy Technology: an Overview" at "The Indian Public School", Perungudi, Chennai on 30th November 2016.
- Delivered a lecture on "Wind Turbine Technology and Applications" in the two day National Workshop on "Emerging Technologies using Renewable Energy Sources" organised at Kingston Engineering College, Vellore on 16th December 2016.
- Delivered a lecture on "Large & Small Wind Turbine – Global & Indian Scenario" in the Special Training Programme on WRA & SWES To SNA Officials Of NE Regions and Other States at Itanagar, Arunachal Pradesh on 16th & 17th February 2017.
- Delivered a lecture on "Power from Wind Resources" at National Institute of Technical Teachers Training & Research (NITTTR), Chennai on 21st February 2017.
- Delivered a lecture on "Wind Energy Technology and its status" in the All India Seminar on Renewable Energy –Present Scenario organized by The Institute of Engineers India, Chennai on 3rd March 2017.
- Delivered a lecture on "Wind Energy Technology and its status" at Murugappa Polytechnic College, Chennai on 6th March 2017.
- Delivered a lecture on "Wind Energy Technology and Applications" at Two day national seminar on "Grid connected solar-wind energy systems-Opportunities and challenges" at Bannari Amman Institute of Technology, Sathyamangalam, Erode on 27th & 28th March 2017.

Joel Franklin Asaria, Additional Director

- Delivered a lecture on "Wind Energy - An Comprehensive Overview" organized by WWF-India Tamil Nadu State Office at R Nadesanar Government High School, Vedaranyam on 27th June 2016.
- Delivered lecture in the Training Programme on Energy Efficiency for NITT Scholars on "Renewable Energy (Solar & Wind) at National Productivity Council (NPC), Chennai on 15th July 2016.

Karthik. R, Assistant Director (Technical) Contract

- Presentation on Solar Resource Assessment on 26th August 2016 in the WRA & Wind Energy Technology for SNAs during 22nd to 26th August 2016.

- Presentation on Wind Solar Hybrid Site Mapping conducted by India Infrastructure & Renewable Watch at New Delhi on 22nd September 2016.
- Presentation on SRRA activities to the students and staff members of Prathyusha Engineering College, Thiruvallur on 16th November 2016.

Prasun Kumar Das, Assistant Director (Technical) Contract

- Delivered a lecture on "Role of Solar Resource Assessment in Solar Power Technology" in International conclave on Renewable Energy Systems and Technology (ICREST) - 2016 at Saveetha School of Engineering, Saveetha University, Chennai on 8th April 2016.
- Delivered a lecture on Quality Assessment SRRA data in the Skill Development Program on solar resource assessment and calibration at NISE, Guragon on 5th & 6th May 2016.
- Delivered lecture on "Solar Radiation Resource" for NTPC officers at GERMI, Ahmedabad on 21st November 2016.
- Presentation on "SRRA network & Wind Solar Hybridization" in the training program on Wind-Solar Hybrid Program organized by First View Group at New Delhi on 13th January 2017.
- Presentation on "SRRA and details on the application of SRRA data on various technologies" in the training program for SNA Officials of North East India organized by NIWE on 16th & 17th February 2017.

R. Sasikumar, Consultant

- Presentation on "Solar Radiation Resource Assessment "in the induction training for the MNRE, Scientists on 7th October 2016.
- Presentation on "Solar Resources and Solar Energy Applications" in Periyar University, Salem on 6th February 2017.
- Presentation on Fundamentals of Solar Radiation in the short term training program on "Advances in off grid and grid tied solar PV systems" organized by Government College of Engineering, Kannur on 13th March 2017.

MoU signed

- MoU for the Technical Consultancy services for the development of Wind / SOLAR energy projects has been signed between NIWE & National Hydroelectric Power Corporation (NHPC) at NIWE, Chennai on 7th October 2016.
- MoU has been signed with Government Engineering College, Tirunelveli for academic and research purpose for a period of 3 years on 9th November 2016.

NIWE staff delivered lecture(s) in the following Programmes

18th International Training Course on "Wind Turbine Technology & Applications" held during 17rh August to 9th September 2016		
S.No.	**Topic**	**Speaker**
1	Introduction and Status of Wind Energy Technology	Dr. S. Gomathinayagam
	Wind Turbine Tower	
2	Wind Resource Assessment and Techniques	Shri. K. Boopathi
3	Guidelines for Wind Measurements	Shri. A. G. Rangaraj
4	Wind Data Measurements and Analysis	Smt. G. Arivukkodi
5	Wind Measurements by Remote Sensing Instruments	Smt. M.C. Lavanya
6	Overview of Wind Turbine Components	Shri. J. C. David Solomon
7	Wind Turbine Generators	Shri. M. Anvar Ali
8	Control and Protection System in Wind Turbine	Shri. S. Arulselvan
9	Wind Turbine Foundation	Dr. Rajesh Katyal
	Small Wind Turbine Testing and Hybrid Systems	
10	Design and Layout of Wind Farms	Shri. J. Bastin
11	Type Certification of Wind Turbine and Overview of Design Requirements as per IEC 61400 - 1	Shri. A. Senthilkumar
12	Wind Turbine Testing & Measurement Techniques	Shri. S. A. Mathew
13	Instrumentation for Wind Turbine Testing	Shri. M. Saravanan
14	Safety and Function Testing	Shri. Bhukya Ramdas
	Power Curve Measurements	
15	Offshore Wind Energy	Shri. M. Joel Franklin Asaria
16	Wind Energy Development in India and Role of NIWE	Dr. P. Kanagavel
17	Indian Government Policies and Schemes	Shri. Mohammed Hussain
18	Forecasting of Wind and Energy Production	Shri. A. G. Rangaraj
19	Grid Integration of Wind Turbine	Smt. Deepa Kurup
20	Solar Radiation Resource Assessment	Shri. R. Karthik

"Wind Resource Assessment Program" on 22nd August 2016		
S.No.	**Topic**	**Speaker**
1	History of Wind Energy Conversion Technology and Power Generation including Small wind turbine	Dr. S. Gomathinayagam
2	Wind Resource Assessment & Techniques	Shri. K. Boopathi
3	Small Wind Energy & Hybrid Systems	Dr. Rajesh Katyal
4	An overview on 100m & 20m Wind Atlas and its applications	Shri. J. Bastin
5	Introduction of NIWE Wind Farm Facility	Shri. A. Mohamed Hussain
6	Discussion on wind turbine components	Shri. J.C. David Solomon
7	Wind Measurement & Instrumentation	A. Hari Bhaskaran
8	Measurement parameters & Wind data analysis	Shri. Suresh Kumar
9	Wind Farm Planning Activities	Dr. P. Kanagavel
10	An overview of wind power forecasting	Shri. A. G. Rangaraj
11	Solar Radiation Resource Assessment	Dr. G. Giridhar / Shri. R. Karthik
12	Environmental Impact Study and Economic analysis	Shri. Joel Franklin Asaria
20th National Training Course on "Wind Energy Technology" held during 7rh to 11th November 2016		
1	Introduction and Status of WE Technology	Dr. S. Gomathinayagam
	Wind Turbine Tower concepts	
2	Certification of Wind Turbine	Shri. A. Senthilkumar
3	Wind Measurement and Instrumentation	Shri. K. Boopathi
	Wind Resources Assessment & Techniques	
	Forecasting of Wind and Energy Production	
4	Design and Layout of Wind farms	Shri. J. Bastin
5	Wind Turbine Components	Shri. J. C. David Solomon
6	Wind Turbine Gearbox	Shri. N. Raj Kumar
7	Wind Electric Generators & Types	Shri. M. Anvar Ali
8	Control and Safety System of Wind Turbine System	Shri. S. Arulselvan

S.No.	Topic	Speaker
9	Wind Turbine Foundation Small Wind Turbines and Hybrid Systems	Dr. Rajesh Katyal
10	Indian Wind Energy Development & Role of NIWE	Dr. P. Kanagavel
11	Grid Integration of Wind Turbines	Smt. Deepa Kurup
12	Wind Turbine Testing & Measurement Techniques	Shri. S. A. Mathew
13	Offshore Wind Energy : An overview	Shri. M. Joel Franklin Asaria
Special Training Course on "Wind Resource Assessment and Wind Farm Planning" held during 7th to 18th November 2016		
1	Guidelines for WRA Wind Resource Assessment and Techniques Wind Measurements by Remote Sensing Instruments	Shri. K. Boopathi
2	Site Selection for Wind Monitoring Stations (WMS)	Shri. B. Krishnan
3	Introduction to Wind Technology and WRA program	Dr. S. Gomathinayagam
4	Installation of WMS	Shri Suresh & Shri. R. Vinod Kumar
5	Measurement of wind parameters	Shri. B. Krishnan
6	Indian Wind Atlas An Overview	Shri. J. Bastin
7	Wind Analysis - Data collection, Validation, Processing and Reporting	Smt. G. Arivukkodi
8	Forecasting of Wind and Energy Production	Shri. K. Boopathi & Shri.A. G. Rangaraj
9	Software tools for Wind data Analysis	Shri. B. Krishnan
Two days Induction Training for MNRE newly recruited Scientists "B" held on 7th & 8th October 2016		
1	Wind Energy Growth in India & Role of NIWE	Shri. M. Joel Franklin Asaria
2	Introduction and Status of Wind Energy Technology	Dr. S. Gomathinayagam
3	Wind Resource Assessment and Techniques	Shri K. Boopathi

S.No.	Topic	Speaker
4	Wind Turbine Testing & Measurement Techniques	Shri S.A. Mathew
5	Wind Turbine Certification & Standards	Shri A. Senthil Kumar
6	Solar Radiation Recourse Assessment	Dr. G. Giridhar
19th International Training Course on "Wind Turbine Technology and Applications" held during 1st to 28th February 2017 and Special International Training Course on "Wind Turbine Technology and Applications" Specially for African Countries held during 1st to 24th February 2017		
1	Wind Energy Technology and its status	Dr. P. Kanagavel
	Wind Energy Development in India and Role of NIWE	
2	Overview of Wind Turbine Components	Shri. J. C. David Solomon
3	Wind Turbine Generators	Shri. M. Anvar Ali
4	Control and Protection System in Wind Turbine	Shri. S. Arulselvan
5	Wind Turbine Foundation	Dr. Rajesh Katyal
	Small Wind Turbine Testing and Hybrid Systems	
6	Wind Resource Assessment and Techniques	Shri. K. Boopathi
	Forecasting of Wind and Energy Production	
7	Wind Measurement and Instrumentation	Shri. B. Krishnan
8	Guidelines for Wind Measurements	Shri. A. G. Rangaraj
9	Wind Data Measurements and Analysis	Smt. G. Arivukkodi
10	Design and Layout of Wind Farms	Shri. J. Bastin
11	Type Certification of Wind Turbine and Overview of Design Requirements as per IEC 61400 – 1	Shri. A. Senthilkumar
12	Wind Turbine Testing & Measurement Techniques	Shri. S. A. Mathew
13	Instrumentation for Wind Turbine Testing	Shri. M. Saravanan
14	Power Curve Measurements and Safety & Function Testing	Shri. Bhukya Ram Das
15	Grid Integration of Wind Turbine	Smt. Deepa Kurup

S.No.	Topic	Speaker
16	Indian Government Policies and Schemes	Shri. Mohammed Hussain
17	Offshore Wind Energy - An overview Environmental Aspects of Wind Turbine Technology	Shri. M. Joel Franklin Asaria
19	Solar Radiation Resource Assessment	Dr. G. Giridhar
21st National Training Course on "Wind Energy Technology" held during 20th to 24th March 2017		
1	Wind Energy Technology and its Status Wind Energy Development and Role of NIWE	Dr. P. Kanagavel
2	Wind Resources Assessment & Techniques	Shri. K. Boopathi
3	Wind Turbine Components	Shri. J. C. David Solomon
4	Certification of Wind Turbine	Shri. A. Senthilkumar
5	Indian Government Policies and Schemes	Shri. Mohammed Hussain
6	Wind Turbine Foundation Small Wind Turbines and Hybrid Systems	Dr. Rajesh Katyal
7	Design and Layout of Wind farms	Shri. J. Bastin
8	Wind Electric Generators & Types	Shri. M. Anvar Ali
9	Wind Turbine Testing & Measurement Techniques	Shri. S. A. Mathew
10	Control and Safety System of Wind Turbine System	Shri. S. Arulselvan
11	Offshore Wind Energy : An overview	Shri. Joel Franklin Asaria
12	Forecasting of Wind and Energy Production	Shri. A. G. Rangaraj

AWARDS & HONORS

Awards & Honors - Institutional - NIWE

Citation and shield received for NIWE from Parivarthan Jan Kalyan Samiti during All Indian Raj Bhasha Conference and Workshop 2016 held at Kovalam, Trivandrum inaugurated by Hon'ble Dr. Prasanna Kumar Patsaani, Member of Parliament, Lok Sabha & Coordinator, Parliamentary 2nd Sub Committee on Official Language towards implementation of Official Language Hindi in Government Office held during 26th-28th May 2016.


अखिल भारतीय राजभाषा हिंदी सम्मेलन एवं कार्यशाला 2016

परिवर्तन जन कल्याण समिति-दिल्ली (पंजी०)

कार्यालय - 23/672, भूतल, डी.डी.ए. फ्लैट, मदनगीर, नई दिल्ली-110062

Tel.: 09899112882, Email : ceoparivartan@gmail.com; dpsinghrathore@gmail.com

प्रशस्ति पत्र 2016

पवन ऊर्जा प्रौद्योगिकी केन्द्र, पल्लिकरणै चेन्नई को सरकारी, कार्य एवं प्रचार–प्रसार में राजभाषा हिंदी के विशेष प्रयोग के लिए परिवर्तन जनकल्याण समिति–दिल्ली अत्यन्त गर्व के साथ राजभाषा विशिष्ट सम्मान शील्ड से सम्मानित करती है। समिति आशा करती है कि इस संस्थान द्वारा भविष्य में भी इसी प्रकार राजभाषा हिंदी कार्यान्वयन के लिए सराहनीय कार्यकलाप होते रहेंगे।

दिनांक: 28.05.2016
स्थान: तिरुवनन्तपुरम, केरल

डॉ. प्रसन्न कुमार पाटसाणी
कार्यक्रम संरक्षक एवं संसद सदस्य, लोक सभा

देशपाल सिंह राठौर
संस्थापक अध्यक्ष

Citation and shield received for NIWE from "All India Official Language Conference & Brainstorming Camp" being organised in Munnar (Kerala) by "Rajbhasha Seva Sansthan", inaugurated by Hon'ble Dr. A. Sampath, Member of Parliament, Lok Sabha and Member-"Committee of Parliament on Official Language", towards implementation of Official Language Hindi in Government Office held during 1st - 3rd June 2016.

Education Leadership Award

- NIWE has been awarded "Education Leadership Award" in the ABP News National Education Awards held on 23rd June 2016 in the World Education Congress at Mumbai in recognition of leadership, development, marketing an institute and industry interface of an Educational Institute.

Awards & Honors - Individual

Dr. P. Kanagavel, Additional Director and Head, ITCS has been awarded the "Ariviyal Kalanjiyam (Eminent Scientist) Award" confered by MTS Academy (Mylai Thiruvalluvar Tamil Sangam), Chennai on 11th September 2016. The Award received from Honourable Justice Shri. A.K. Rajan former Judge, Madras High Court of Chennai.

Dr. P. Kanagavel, Additional Director and Head, ITCS has been conferred "Indian Sustainable Leadership Award" at the India Sustainability Leadership Summit & Awards held on 23rd November 2016 organized by Sustainable Maharashtra at Mumbai.

Change Agent Award of the Year 2016

Dr. P. Kanagavel, Additional Director & Head, ITCS, has been Awarded "Change Agent of the year 2016" by Life Academy, Sweden. Has been chosen among the one thousand trained Change Agents in 80 Countries in the year 2016. He has received the award of $1000 US Dollars for use in a project to continue to develop the organization and country in a sustainable way. This award has been started in the year 2015 and Dr. P. Kanagavel is the Second Winner of this award.

MEETINGS / TRAININGS / SEMINARS / CONFERENCES ATTENDED BY NIWE STAFF

Dr. S. Gomathinayagam, Director General

- Standing Committee Meeting on Energy "Examination of the Demands for Grants of MNRE" on 4th April 2016.
- Meeting of the Committee to review MNRE guidelines for Installation of Prototype Wind Turbine Models in MNRE, New Delhi on 7th April 2016.
- Visited Kayathar to explore additional lands at Tuticorin/Kayathar and at nearby places for expansion of NIWE activities on 15th & 16th April 2016.
- Combined Press Conference of Ministry of Power, Coal & MNRE and issue of Appreciation Letters at Delhi on 4th May 2016.
- Chaired R&D Meeting (Dept of Physics, School of Mechanical & Construction Engineering) of Vel Tech Dr. RR & Dr. SR Technical University, Chennai on 8th May 2016.
- Meeting on "CEA notification on the connectivity to the Grid (LVRT)" at NIWE, Chennai on 12th May 2016.
- Attended "All India Official Language Conference and Brainstorming Camp" at Munnar during 1st to 3rd June 2016.
- Discussion held with DG, MEDA regarding conducting of oneday workshop on "Small Wind Energy and Hybrid Systems & its relevance to Telecom Sector" at Pune on 6th & 7th June 2016.
- Revised List of Models & Manufacturers Meeting (RLMM) at NIWE on 8th June 2016.
- Participated in the "Hands on Sand," event organized by VESTAS at Marina Beach, Chennai on 15th June 2016 and delivered special address at Vestas Office.
- Second Meeting of the National Lab Policy on Renewable Energy Sector at MNRE, Delhi on 22nd June 2016.
- Briefing Meeting of the Standing Committee on Energy at MNRE, Delhi on 23rd June 2016.

- Meeting of Study-visit of the Committee on Papers Laid on the Table, Rajya Sabha at Kodaikanal on 27th & 28th June 2016.
- Operation Review Meeting of NIWE at MNRE, Delhi on 29th June 2016.
- 26th Governing Council Meeting of SSS-NIBE at MNRE, New Delhi on 29th June 2016.
- SWES workshop at Pune on 1st July 2016.
- Dashboard Meeting with Hon'ble MoS (I/C) for Power, Coal, NRE and Mines at New Delhi on 30th July 2016.
- Review of Birds Study Meeting at Chennai on 2nd August 2016.
- Governing Council of NISE at New Delhi on 3rd August 2016.
- Finance Committee of NIWE at MNRE, New Delhi on 4th August 2016.
- Steering Committee Meeting of 2nd Renewable Energy Global Investors meet & Expo – REINVEST 2017 at New Delhi on 11th August 2016.
- Meeting on New Development Bank at New Delhi on 16th August 2016.
- 1st Meeting of R&D Sectoral Project Appraisal Committee (RDSPAC) at MNRE on 19th August 2016.
- Meeting with USA delegates to discuss and pursue the US-India Bilateral Cooperation initiatives at MNRE chaired by Secretary on 29th August 2016.
- Standing Committee on Energy at Parliament House – Role of PSUs/Institutions under MNRE in the development of RE Schemes on 30th August 2016.
- Technical Committee Meeting on “Performance Evaluation Unified SRRA Project” at NIWE on 30th September 2016.
- Meeting held for the purpose to formulate GIS based Energy Map for India under the Chairmanship of Advisor (Energy), Shri A.K.Jain, IAS., Niti Aayog at New Delhi on 4th October 2016.
- Recruitment Rules Committee Meeting held at NIWE, Chennai on 5th October 2016.
- RLMM Meeting at NIWE, Chennai on 14th October 2016.
- Standing Parliamentary Committee meeting at Cochin on 24th October 2016.
- High Level Meeting with Mr. Nagesh Iyer at Hyderabad on 26th & 27th October 2016.
- 66th Governing Council Meeting at TEDA, Chennai on 1st November 2016.
- Participated in Wind Solar Summit : Session Roadmap – to achieve wind-solar-Hybrid capacity target of 10 GW on 11th November 2016.
- Town Official Language Implementation Committee (TOLIC) Meeting at NIOT on 28th November 2016.
- Participated as Speaker in the Session on "Ushering Green Energy and Renewables" at L&T Auditorium, Chennai conducted by MCCCI on 3rd December 2016.

- NABL-MR Meeting at NIWE on 6th December 2016.
- Meeting at GIZ, New Delhi - Discussion for proposals under GIZ Line of Credit on Green Energy Corridor & LVRT on 8th December 2016.
- Meeting with Secretary, MNRE - to review the activities of NIWE & its future roadmap on 20th December 2016.
- Windfarm visit alongwith CMD, TEDA at WTRS, Kayathar on 5th January 2017.
- Review Meeting of RD&D programme on New & Renewable Energy on 25th January 2017.
- "15th Arivukalanjiyam Awards 2017" at University of Madras, Chennai on 28th January 2017.

Dr. Rajesh Katyal, Deputy Director General

- Attended "Global Procurement Summit 2016" organized by All India Management Association at India Habitat Centre, New Delhi on 21st & 22nd April 2016.
- Meeting of the Technical Committee as a Technical Member, "To review the technicality and to recommend the modalities of allowing type tested grid tied small wind turbines for off-grid/battery charging applications under SWES scheme" at MNRE, New Delhi on 14th June 2016.
- Meeting of the 13th Small Wind Turbine Empanelment Committee as a Member at NIWE, Chennai on 9th September 2016.
- Moderated the panel discussion on wind turbine technology present and future at 10th Renewable Energy Expo 2016 at Greater Noida, jointly organized by NIWE and UBM.
- Meeting held at Gujarat State Coastal Zone Management Authority (GSCZMA), Ahmedabad, to obtain Coastal Regulation Zone (CRZ) clearance for Installation of LiDAR in the identified zones at Gulf of Khambhat in Gujarat and Tamil Nadu on 15th October 2016.
- Meeting of European Union funded offshore project on "Geophysical and Geotechnical Survey and studies with FOWIND, FOWPI (COWI) and EU consultants held at MNRE, New Delhi on 29th November 2016.
- Meeting with Additional Chief Secretary, Energy and Petrochemicals departments, Government of Gujarat at Gandhinagar, Gujarat, to present and discuss the progress of the LiDAR based offshore wind measurement campaign in Gujarat on 1st December 2016.
- Meeting for consultation on the issues relating to offshore exploration and mining under the Chairmanship of Secretary, Mines at Royal Plaza, Ashoka Road, New Delhi on 10th January 2017.
- 165th meeting of Expert Appraisal Committee for projects related to infrastructure Development, Coastal Regulation Zone, Building/Construction, Industrial Estate and Miscellaneous projects at MoEF&CC, New Delhi on 16th & 17th January 2017.
- Meeting with MNRE officials and MoEF officials at New Delhi on 9th March 2017.

- National meeting on Lab policy for Testing, Standardization and Certificate at MNRE, New Delhi on 10th March 2017.

Dr. G. Giridhar, Deputy Director General & Head

- International Energy Conference at Vadodara.
- One day workshop on "Small Wind Energy Hybrid Systems and its relevance to Telecom Sector" on 1st July 2016.
- Attended "Renewable Energy & Efficiency Week 2016-Expert Workshop and Energy Transition day" during 31st October to 4th November 2016 at Berlin, Germany organized by GIZ, New Delhi.

S.A. Mathew, Director & Head

- Training on "A Guide to Wind Farm Performance" by M/s. DNVGL at Bangalore on 7th & 8th November 2016.
- One Day Management Development Programme on "Financing Renewable Energy Projects" organized by Tata Energy Research Institute (TERI) at TERI University, Delhi on 9th December,2016.
- National Training Seminar on "Adaptation of Thermal Power Plants to Fluctuating Renewable Energies" by Indo-German Energy Forum at Hyatt Regency, New Delhi. on 16th December 2016.
- Attended the programme on "Managerial Effectiveness" organized by Indian Institute of Management (IIM) at Ahmedabad during 9th to 14th January 2017.
- Conference on "Renewable Energy Roundtable with the theme on "Transforming the Energy Landscape in India" organized by Dun & Bradstreet in association with NELCO at ITC Chola, Chennai on 7th February 2017.
- Training on "Arts of Listening" organized by Auroville Retreat at Pondicherry on 18th & 19th February 2017 and during 24th to 26th February 2017.
- Training program on "Electrical Safety & Inspection of Electrical Installations under IE Rules" organized by National Power Training Institute (NPTI) at NPTI, Bangalore during 27th February to 3rd March 2017.

A. Senthil Kumar, Director & Head

- Attended a one day knowledge forum on "Power Quality and Noise Measurements" conducted by M/s. Atalon Chennai organized by NIWE & IWTMA held at NIWE, Chennai on 4th April 2016.
- Committee meeting on review of MNRE Guidelines for installation of Prototype Wind Turbines Models held at MNRE, New Delhi on 7th April 2016.
- Video Conferencing organized by Ministry of Power held at NIWE, Chennai on 21st April 2016.

- Meeting of Certification Body – Wind Turbines and other meetings at M/s. TUV Rheinland Industrie Service GmbH, Cologne, Germany during 21st to 24th June 2016.
- Third meeting on LVRT for compliance of orders of Hon'ble CERC in respect of petition no.420/MP/2014 and other provisions of CEA/CERC regulations at TANTRANSCO office, Chennai on 5th July 2016.
- Meeting held with 3 Assistant Secretaries (I.A.S. officers) during their visit to NIWE to acquaint themselves with the NIWE activities on Wind & Solar on 29th August 2016.
- First meeting of the committee formulated by MNRE to discuss and suggest the methodology / protocol to be followed including the list of documents required towards enlisting of Wind Turbine Generator (WTG) manufacturers / models by MNRE as per the provisions of the draft guidelines for onshore wind energy development, at MNRE on 7th & 8th September 2016.
- Technical workshop at 10th Renewable Energy India Expo 2016 organized by NIWE & UBM held at India Expo Centre, Greater Noida on 8th September 2016.
- Project Evaluation Committee meeting for the project proposal on prototype development and certification, organized by Technology Development Board, Department of Science and Technology, Ministry of Science and Technology, New Delhi held at company project site & manufacturing facility.
- Meeting at MNRE to discuss and suggest the methodology / protocol to be followed including list of documents required towards enlisting of Wind Turbine Generator (WTG) manufacturers / models by MNRE as per the provisions of the draft guidelines for onshore wind energy development, held at MNRE on 19th & 20th September 2016.
- Second meeting of the committee formulated by MNRE to discuss and suggest the methodology / protocol to be followed including list of documents required towards enlisting of Wind Turbine Generator (WTG) manufacturers / models by MNRE as per the provisions of the draft guidelines for onshore wind energy development, held at MNRE, New Delhi on 27th September 2016.
- Meeting with Dr. T. Harinarayana, Director General, Gujarat Energy Research & Management Institute (GERMI) at NIWE, Chennai on 27th September 2016.
- Meeting on "Feasibility Study on Wind Farm and ESS" with Korean Delegation team of six officials at NIWE, Chennai on 20th October 2016.
- Attended the presentation on "Gantner Instruments & Condition monitoring" delivered by officials of M/s. Gantner Instruments GmbH & Gantner India at NIWE, Chennai on 24th November 2016 .
- Participated in the two days training programme for "Technical Committee Members" organized by Bureau of Indian Standards (BIS) at National Institute for Training for Standardization (NITS), Noida during 15th - 16th December 2016.

- Review meeting of NIWE held at MNRE, New Delhi, Chaired by Secretary, MNRE on 21st December 2016.
- Attended the training session on "Updation of tasks on the Dashboard portal" at MNRE, New Delhi on 27th December 2016.
- First meeting of the internal Committee for reviewing & evaluating the R&D project proposals at NIWE, Chennai on 23rd March 2017.
- 7th ET 42 Committee meeting of Bureau of Indian Standards (BIS) held at NIWE, Chennai on 24th March 2017.
- Meeting held with Team of Officials from Forum of Regulators from CERC, POSOCO, SRLDC, REMC (Tamil Nadu) at NIWE, Chennai on 27th March 2017 .

M. Anvar Ali, Additional Director & Head

- Workshop on challenges in Grid integration with wind power at Sriperampathur, Chennai on 7th April 2016.
- Meeting on Demo of new design in Vertical Axis wind turbine by Dr. Amitah Sharma, an US technocrat at NIWE, Chennai on 25th May 2016.
- Programme on NABL and ISO Audit at WTRS, Kayathar during15th to 18th June 2016.
- Workshop on "Small Wind Turbine & Telecom Tower Workshop" at Pune during 29th June to 1st July 2016.
- Co-ordinated with the SNA officials for field visit on special training course "Wind resource assessment and Wind Energy Technology" at WTRS, Kayathar & Kanniyakumari during 22nd to 25th August 2016.
- Co-ordinated with the 18th International training course participants for field visit & Ayyanaruthu SS real time monitoring & to explain Wind Farm Grid evacuation facilities at WTRS, Kayathar & Kanniyakumari during 30th to 3rdSeptember 2016.
- Conference on "International Energy Conference" (Switch Global Expo) Organized by MNRE & Government of Gujarat at Vadodara, Gujarat during 5th to 10th October 2016.
- IGEP fair to establish and manage NIWE stall in the joint pavilion "Husum Wind India 2016" at Inter solar India at Mumbai during 18th to 22nd October 2016.
- Meeting on "Internal Audit – NABL –ISO/IEC 17025:2005" at WTRS, Kayathar on 18th & 19th November 2016.
- Meeting on "Wind Turbine Condition Monitoring System (CMS) of Gmbh" at NIWE, Chennai on 24th November 2016.
- Special training programme on WRA & SWES to SNA officials of NE Regions and other States at Hotel Donyi Polo Ashok, Itanagar, Arunachal Pradesh on 16th & 17th February 2017.

K. Boopathi, Additional Director & Head

- Meeting on the captioned Line of Credit project in the Chamber of Mrs.Mukta Shekhar, Director/DPA-I & Spl. Projects, Ministry of External Affairs, New Delhi on 22nd April 2016.
- Meeting/discussion with TANGEDCO officials in connection with Wind Power Forecasting services on 1st June 2016.
- Participated as a Speaker during Capacity Building program on the Integration of Renewable Energy Resources (RES) into the Grid for the Power Utilities operating in Northern Region organized by M/s.Mercados Energy Market at New Delhi on 14th June 2016.
- Participated in a one day workshop on Small Wind Energy and Hybrid Systems & its Telecom Towers scheduled at Pune on 1st July 2016 at Pune.
- Carried out site selection for the project Relocating 100m mast for validating Wind Power Forecasting at Trichy, Tamil Nadu on 14th July 2016.
- Meeting/discussion on Wind Resource in the State of Assam with Additional Chief Secretary, Power Department, Assam at Guwahati on 16th July 2016.
- Committee Meeting on Wind-Solar Hybrid Policy at MNRE, New Delhi on 22nd July 2016.
- Committee Meeting in connection with Guidelines for development of Onshore Wind Power Project at MNRE, New Delhi on 28th July 2016.
- National Conference on Energy Data – Management, Modeling & GIS Mapping and has given presentation on GIS usage in Wind Energy at New Delhi on 10th August 2016.
- Standing Committee Meeting at MNRE on 30th August 2016.
- Workshop on Offshore Wind Project development for Engineers at Bangalore on 31st August 2016.
- Renewable Energy India Expo Conference organized by UBM at Noida on 7th & 8th September 2016.
- 19th AGM of NIWE at MNRE on 20th September 2016.
- Participated in the Tamil Nadu Renewable Energy Integration International Conference at Chennai on 22nd & 23rd September 2016.
- Site inspection work has been carried out to find new location, near shore mast, at Kanyakumari during 28th September to 2nd October 2016.
- Meeting to formulate GIS based Energy map for India at NITI, New Delhi on 4th October 2016.
- Attended training on Modeling and Forecasting Techniques organized by NCMRWF at Noida during 3rd to 6th October 2016.
- Provided induction training on Wind Resource Assessment & Techniques for MNRE newly recruited Scientist at NIWE, Chennai on 7th October 2016.

- Carried out site visit for R&D study in Idukki district, Kerala on 16th & 17th October 2016.
- Committee Meeting on Wind/Solar Hybrid Policy at MNRE, New Delhi on 20th October 2016.
- Review meeting on the status of implementation of 50m WMS in NE region at Shillong, Meghalaya on 25th November 2016.
- First Review Meeting of State Pr Secretaries and SNAs at New Delhi during 23rd & 24th January 2017.
- Coordination Committee Meeting for Wind Power Forecasting at Coimbatore on 3rdFebruary 2017.
- Wind Evaluation Committee Meeting under the Chairmanship of Additional Chief Secretary to Government (Power), Kerala at Trivandrum on 7th February 2017.
- Meeting on forecasting of Wind and Solar Power Potential at MNRE, Delhi on 10th February 2017.
- Carried out site selection for establishment of WMS in the State of Arunachal Pradesh on 18th February 2017.

Dr. P. Kanagavel, Additional Director & Head

- Attended first Industrial Advisory Board (IAB) Meeting to Syllabus for the academic year 2016-17 at Saveetha School of Engineering, Saveetha University, Thandalam Campus on 2nd July 2016.
- Coordinated the field visit of participants of the special training course on "Wind Resource Assessment and Wind Energy Technology" at WTRS, Kayathar & Kanyakumari held during 22nd to 25th August 2016.
- Attended the 4th Fraunhofer Innovation and Technology Platform at New Delhi on 1st & 2nd September 2016.
- Attended the Meeting of the Governing Council of 'Skill Council for Green Jobs (SCGJ)', New Delhi on16th September 2016.
- Inaugurated the Science Expo "Velocity" 2016 as Chief Guest organized at Kaligi Ranganathan Montford Matriculation Higher Secondary School, Perambur, Chennai on 15th October 2016.

M. Joel Franklin Asaria, Additional Director

- Co-ordinated the Study visit of 18th International Training to Ayyanaruthu SS real time monitoring & to explain Wind Farm Grid evacuation facilities at WTRS, Kayathar & Kanyakumari during 30th August to 3rd September 2016.

Deepa Kurup, Additional Director

- Two days workshop on "Smart Grid and Wind Power (SGWP)" organised by Central Power Research Institute, Bangalore on 9th & 10th March 2017.

N. Raj Kumar, Deputy Director (Technical)

- Video Conferencing organized by Ministry of Power held at NIWE, Chennai on 21st April 2016.

- Attended the presentation on "ABB PowerStoreTM and its capabilities" delivered by Mr. Abilash E.T. Nair, ABB India Ltd, Bangalore held at NIWE, Chennai on 16th November 2016.
- Attended the presentation on "Gantner Instruments & Condition monitoring" delivered by officials of M/s. Gantner Instruments GmbH & Gantner India at NIWE, Chennai on 24th November 2016.
- Participated in WebEx on "New Features of Windsim-8 Software" delivered by Mr. Arne R. Gravdahi, Ph.D CTO & Founder, M/s. Windsim, Norway held at NIWE, Chennai on 8th December 2016.
- Attended the program on launching of online training program for "Solar Photovoltaic Design and Installation" and workshop on "Utilization of Solar – Wind Energy for Specific Institutions" at NIWE, Chennai on 13th December 2016.
- Participated in the 4 days training programme on "Requirements of ISO/IEC 17025:2005 & Internal audit" at NIWE Chennai during 18th - 21st January 2017.
- First meeting of the internal Committee for reviewing & evaluating the R&D project proposals at NIWE, Chennai on 23rd March 2017.
- Meeting held with Team of Officials from Forum of Regulators from CERC, POSOCO, SRLDC, REMC (Tamil Nadu) at NIWE, Chennai on 27th March 2017.

A.G. Rangaraj, Assistant Director (Technical)

- Second LVRT meeting on compliance of honorable CERC order and other provisions of CEA/CERC regulations at SRPC, Bangalore on 18th April 2016.
- Participated in the meeting on training/education/capacity building at Green Energy Corridors, New Delhi on 23rd & 24th May 2016.
- Meeting/discussion with TANGEDCO officials in connection with Wind Power Forecasting services on 1st June 2016.
- SOLAR forecasting meeting at NIWE, Chennai on 3rd August 2016.
- Participated in the meeting organized by IWPA in connection with forecasting & scheduling of wind power in Tamil Nadu at Coimbatore on 7th & 8th September 2016.
- Participated in the Tamil Nadu Renewable Energy Integration International Conference at Chennai on 22nd & 23rd September 2016.
- Attended training on Modeling and Forecasting Techniques organized by NCMRWF at Noida during 3rd to 7th October 2016.
- Discussed with German delegates on Wind Power Forecasting at NIWE, Chennai on 18th October 2016.

- Meeting on Wind Power Forecasting services with IWPA, CE/NCES & field officials on various meter related issues at Nagercoil during 10th to 12th November 2016.
- Attended closed half day round table consultation on Wind Energy sector to brainstorm on key issues to achieve 60,000 MW target for wind energy by 2022 at Hyderabad on 16th November 2016.
- Purchase committee meeting on finalization of technical specification of NIWE server at NIWE, Chennai on 20th February 2017.

M. Saravanan, Deputy Director (Technical)

- Training on "Estimation of Uncertainty in Measurements" organized by Standardization Testing Quality Certification (STQC) at Centre for Electronics Test Engineering (CETE), Noida during 23rd to 25th May 2016.
- Training programme on "Laboratory Quality Management and Internal Audits as per IS/ISO 17025" organized by Bureau of Indian Standards (BIS) at BIS, Hyderabad during 10th to 13th January 2017.
- Training program on "Electrical Safety & Inspection of Electrical Installations under IE Rules" organized by National Power Training Institute (NPTI) at NPTI, Bangalore during 27th February to 03rd March 2017.

Bhukya Ramdas, Deputy Director (Technical)

- Six Days training programme on designing of Solar Power Plants, DPR Preparation, financial analysis of solar plants and solar software, such as PVSyst, TSOL, INSEL and wind-solar related software such as SAM and TRNSYS by M/s. Steinbeis Solar Centre at NIWE, Chennai during 16th o 18th June 2016 in first phase and during 21st to 23rd June2016 in second phase.
- Training on "A Guide to Wind Farm Performance" by M/s. DNVGL at Bangalore on 7th & 8th November 2016.
- Training programme on "Laboratory Quality Management and Internal Audits as per IS/ISO 17025" organized by Bureau of Indian Standards (BIS) at BIS, Hyderabad during 10th to 13th January 2017.
- Training program on "Electrical Safety & Inspection of Electrical Installations under IE Rules" organized by National Power Training Institute (NPTI) at NPTI, Bangalore during 27th February to 03rd March 2017.

J. Bastin, Assistant Director (Technical)

- Kickoff meeting in connection with Bird migration study at KREDL, Bangalore on 6th April 2016.
- Had discussion with Dr. Rudramoorthy, Principal, PSG college of Technology, Coimbatore in connection with installation of Urban Wind Monitoring station on 20th May 2016.
- Carried out site selection for installation of 80m mast at Manamelkudi, Ammapattinam & Kattumavadi on 26th May 2016.

- 1st ESRI India Regional User Conference 2016 (RUC) and Exhibition at Hyderabad on 4th August 2016.
- Participated in the Tamil Nadu Renewable Energy Integration International Conference at Chennai on 22nd & 23rd September 2016.

Prasun Kumar Das, Assistant Director (Technical) Contract

- Faculty Development Program on "Machine Learning & Data Analytics" at New Delhi during 23rd - 27th May 2016.
- Conference on "100% Renewable Energy Future for North East", Guwahati on 11th & 12th August 2016.
- Attended the meeting on "Future Strategy of Providing Forecasting to Energy Sector" organised by IITM, Pune on 24th October 2016.

G. Arivukkodi, Assistant Engineer

- Attended training on Modeling and Forecasting Techniques organized by NCMRWF at Noida during 3rd to 7th October 2016.

B. Krishnan, Assistant Engineer

- Carried out site visit in Perungudi & Kalunirkulam sites, Tirunelveli dist. to study the pass effect on Wind flow pattern towards installation of 50m WMS during 27th to29th April 2016.
- Attended Energy Auditors training at National Productivity Council, Chennai during 13th to 17th September 2016.
- Carried out site visit for R&D study in Idukki district, Kerala on 16th & 17th October 2016.

T. Suresh Kumar, Assistant Engineer

- Carried out site inspection work at Bhuj, Gujarat for Kandla Port Trust during 5th to 7th April 2016.
- Attended 2 days training programme at Itanagar, Arunachal Pradesh on 16th & 17th February 2017.
- Carried out site selection for establishment of WMS in the state of Arunachal Pradesh on 18th February 2017.

S. Arulselvan, Assistant Engineer

- Attended the Video Conferencing organized by Ministry of Power at NIWE, Chennai on 21st April 2016.
- Meeting of Certification Body – Wind Turbines and other meetings at M/s. TUV Rheinland Industrie Service GmbH, Cologne, Germany during 21st to 24th June 2016.
- Second meeting for compliance of orders of Hon'ble CERC regarding LVRT and other provisions of CEA/CERC regulations, conducted by SRPC, at Bangalore.

- 3rd meeting on LVRT for compliance of orders of Hon'ble CERC in respect of petition no.420/MP/2014 and other provisions of CEA/CERC regulations at TANTRANSCO office, Chennai on 5th July 2016.
- Attended the Presentation on "Gantner Instruments & Condition monitoring" delivered by officials of M/s. Gantner Instruments GmbH & Gantner India at NIWE, Chennai on 24th November 2016.
- Attended meeting held with Team of Officials from Forum of Regulators from CERC, POSOCO, SRLDC, REMC (Tamil Nadu) at NIWE, Chennai on 27th March 2017.

C. Stephen Jeremias, Assistant Engineer

- Residential Training programme on "Leadership Competencies for Organizational Excellence" at Leh, Ladakh during 8th to 12th August 2016.
- Conference on "GIS-Enabling a Smarter World" from M/s. ESRI India for its 1st ESRI India Regional User Conference 2016(RUC) and Exhibition and Developers meet at Hotel Marigold, Begumpet, Hyderabad on 3rd & 4th August, 2016.
- One day workshop for Social Media Nodal Officers at New Delhi at Power Finance Corporation, Connaught place, New Delhi on 16th January 2017.
- Meeting on "ERNET and National Knowledge Networks (NKN) hosted the 43rd Asia Pacific Advanced Network (APAN)" at New Delhi during 12th to 17th February 2017.
- Training on "Hands and on Paloalto Firewall" at Chennai on 21st March 2017.

S. Paramasivan, Junior Engineer

- One day training programe on Tax related issues organized by Prof. S. Sampath, Corporate Consultant, New Delhi at NIWE, Chennai on 15th July 2016.
- Windsim Software Training on "New Features of Windsim-8 Software" by Mr. Arne R. Gravdahi, Ph.D, CTO & Founder, M/s. Windsim, Norway at NIWE, Chennai on 8th December 2016.

R. Vinodkumar, Junior Engineer

- Carried out site visit in Perungudi & Kalunirkulam sites, Tirunelveli to study the pass effect on Wind flow pattern towards installation of 50m WMS from 27th to 29th April 2016.
- Carried out site selection for Urban Wind Monitoring at KCG college of Technology, Karapakkam on 20th May 2016.
- Carried out site selection for installation of 80m mast at Manamelkudi, Ammapattinam & Kattumavadi on 26th May 2016.
- Carried out site selection in Tirunelveli, Nagercoil & Kanyakumari for relocation of 100m mast for Wind Power Forecasting during 1st & 2nd July 2016.
- Attended 2 days training programme at Itanagar, Arunachal Pradesh on 16th & 17th February 2017.

- Carried out site selection for establishment of WMS in the state of Arunachal Pradesh on 18th February 2017.

Naveen Muthu, Junior Engineer

- Two days Acoustics Measurements training provided by Bruel & Kjaer at NIWE on 29th & 30th March 2017.

WRA Scientists & Engineers

- Imparted training on "Wind Resource Assessment" for ANERT officials at NIWE, Chennai on 9th & 10th November 2016.
- The following staff members attended Advance Excel & Power Point software training at NIWE, Chennai during 13th to 15th October 2016.
  - Mr.K.Boopathi, Additional Director and Unit Head
  - Mr.A.G.Rangaraj, Dy.Director (Tech)
  - Mr.J.Bastin, Asst.Director (Tech)
  - Mrs.G.Arivukkodi, Assistant E
  - Mr.T.Sureshkumar, Assistant Engineer
  - Mr.B.Krishnan, Assistant Engineer
  - Mr.R.Vinodkumar, Junior Engineer

OS&IB Unit

- All Unit staff has attended the "Workshop / training on operation / demo of LiDAR Windcube V_3-V_2 instrument" as a part of capability building, conducted by M/s Meteopole Renewable Energy at NIWE Office, Chennai on 4th & 5th May 2016.
- Team of Engineers attended the "Training and workshop on Open Source Quantum GIS, Mobile based Data Collection and Web GIS Application" at NIWE, Chennai during 30th May to 1st June 2016.

Project Engineers, SRRA

- A Solar Software training program on INSEL and TRNSYS by M/s. Steinbeis, Chennai at NIWE, Chennai on 14th & 15th September 2016.
- Attended training in National Centre for Medium Range Weather Forecasting at Noida, Uttar Pradesh on NWP modelling and solar forecasting during 2nd to 6th October 2016
- 5 days program of Training of Assessor (TOA) organized by Skill Council for Green Jobs during 6th to 10th February 2017.
- "Solar Power Plant Modeling" classes conducted by the officials of GIZ, New Delhi 20th, 23rd & 27th February 2017.

R. Girirajan, AD (F&A) & K. Tamilselvi, AAO

- Attended an International Training Programme on "Budgeting, Accounting & Financial Management" organized by M/s. National Institute of Financial Management (NIFM) during 22nd August 2016 to 02nd September 2016.
- Attended a training programme on "PFMS Module for Central Sector Schemes in various cities" organized by M/s. Pr. Cum Pay & Accounts Office on 9th & 10th January 2017.
- Attended the training programme on "Government e-Market (GeM)" organized by Department of Commerce (Supply Division), Nugambakkam, Chennai on 18th October 2016.

R. Girirajan, AD (F&A) & V. Shanmugam, EA

Attended a six days programme on "Project Management Globally Recognized IPMA Level C (Certified Project Manager)" organized by M/s. International Project Management Association (IPMA) during 26th – 29th December 2016.

B. Muthulakshmi

Attended a three days training programme on "Professional Diploma in Public Procurement (PDPP)" organized by M/s. All India Management Association (AIMA) during 18th - 20th November 2016.

Seminar

S.A. Mathew, N. Raj Kumar, M. Saravanan, Bhukya Ramdas, S. Paramasivan attended Seminar on knowledge forum on Power Quality and Noise Measurements as per the requirements of IEC 61400-21 & 61400-11 by M/s. Atalon Innovative Measurements Solutions at NIWE, Chennai on 4th April 2016.

Global Procurement Summit 2016

D. Lakshmanan, R. Girirajan, K. Tamilslevi attended "Global Procurement Summit 2016 (GPS 2016) organized by M/s. All India Management Association (AIMA) on 21st & 22nd April 2016.

Working principle of Offshore LiDAR

S.A. Mathew, A. Senthil Kumar, N. Raj Kumar, M. Saravanan, Bhukya Ramdas, S. Paramasivan, C. Stephen Jeremias attended the Presentation on "Working principle of Offshore LiDAR covering the installation and commissioning process" by Mr.Chipten Valibhay of M/s. Meteopole at NIWE. Chennai on 5th May 2016.

Provident Fund, ESIC, Bonus & Gratuity Workshop

D. Lakshmanan, R. Girirajan, K. Tamilslevi attended the workshop on "Provident Fund, ESIC, Bonus & Gratuity" organized by M/s. Princeton Academy on 20th May 2016.

Training and Workshop

S.A. Mathew, M Anvar Ali, M. Saravanan attended training and workshop on "Mobile based Data Collection, Quantum GIS and Web GIS Application" by M/s. Digicollect at NIWE, Chennai on 30th May to 1st June 2016.

Evaluation Committee Meeting

Dr. S. Gomathinayagam chaired & Dr. Rajesh Katyal attended the Evaluation Committee Meeting to review, scrutinize and recommend the 55 nos. of R&D project proposals in thrust areas of small wind energy and hybrid systems for 2016-17 received by the Ministry at NIWE, Chennai on 25th June 2016.

19th Management Review Meeting

A. Senthil Kumar, N. Raj Kumar and S. Arulselvan attended 19th Management Review Meeting of Quality Management System held at NIWE on 26th July 2016 Director & Head, S&C presented the QMS works, carried out S&C unit..

24th Research and Development Council (RC) of NIWE

Dr. Rajesh Katyal, A. Senthil Kumar attended 24th Research and Development Council (RC) of NIWE at NIWE, Chennai on 12th September 2016

38th Governing Council Meeting

Dr. G. Giridhar, A. Senthil Kumar, K. Boopathi attended 38th GC meeting at New Delhi on 20th September 2016.

DIG SILENT software training

A.G. Rangaraj, B. Krishnan, T. Suresh Kumar, S. Arulselvan attended DIG SILENT software training at NIWE, Chennai during 26th to 30th September 2016.

Government e-Market (GeM) Training

B. Muthulakshmi, V. Shanmugam, M.S. KarunakaranAttended the training programme on "Government e-Market (GeM)" organized by Department of Commerce (Supply Division), Nungambakkam, Chennai on 18th October 2016.

Training on First Aid

S.A. Mathew, M. Saravanan, Bhukya Ramdas, S. Paramasivan attended training on "First Aid" both theoretical and practical provided by M/s. Safecorp Safety Services LLP at WTTS, Kayathar on 15th November 2016.

Taining on "Working at Height"

S.A. Mathew, M. Saravanan, Bhukya Ramdas, S. Paramasivan attended training on "Working at Heights both theoretical and practical provided by M/s. Safecorp Safety Services LLP at WTTS, Kayathar on 16th & 17th November 2016.

Digital Payments Workshop

A. Senthil Kumar, N. Raj Kumar, S. Arulselvan attended the "Digital Payments Workshop" organized by Ministry of Power through Video Conferencing on 28th November 2016.

A. Senthil Kumar, N. Raj Kumar, S. Arulselvan attended "Digital Payment Workshop" organized by DG, NIWE on 30th November 2016.

Structural Engineering Convention-2016

A. Senthil Kumar, N. Raj Kumar attended "Structural Engineering Convention - 2016" organized by CSIR - Structural Engineering Research Centre jointly with IIT Madras & Anna University, Chennai under the auspices of Indian Association for Structural Engineering (IASE) & Indian Concrete Institute (ICI) at CSIR-SERC, Chennai during 21st – 23rd December 2016.

Python and lab view Workshop

A.G. Rangaraj, C. Stephen Jeremias, Project Engineers of SRRA, attended workshop on "Python and lab view for big data analysis and wind solar forecasting activities" at Saveetha Engineering College, Chennai on 6th & 7th January 2017.

NABL training

K. Boopathi, David Solomon, Deepa Kurup, T. Suresh Kumar, Naveen Muthu have attended 4 days NABL training on "Requirements of ISO/IEC 17025-2005 and Internal Audit" organised at NIWE, Chennai during 18th to 21st January 2017.

Right to Information Act

A. Senthil Kumar, N. Raj Kumar S. Arulselvan attedned one day programme on Right to Information Act, 2005 at NIWE, Chennai on 3rd February 2017.

NIWE INTERNATIONAL INTERACTION

International Training Courses

18th International Training Course

The 18th International Training Course on "Wind Turbine Technology and Applications" was successfully organized by the ITCS Unit during 17th August to 9th September 2016. 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. The objective of the International Course is 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 30 Participants from 20 countries - Afghanistan, Azerbaijan, Democratic Republic Congo, Egypt, Ethiopia, Ghana, Gambia, Guyana, Iran, Jordan, Lesotho, Myanmar, Malawi, Nepal, Nigeria, Poland, Sudan, Tanzania, Tunisia and Vietnam.

This programme was inaugurated by Prof. Santosh Kapuria, Director, CSIR - Structural Engineering Research Centre, Chennai and also the Course Material was released by him.

Prof. Santosh Kapuria delivering the Inaugural Address

Chief Guest Shri V. Viswanathan distributing the Course Certificates to the Participant

Shri. V. Viswanathan, Associate Vice President, Special Projects - India, TUV India Private Limited was the Chief Guest for the Valedictory Function and distributed the course certificates to the all the participants.

During the above 24 days of training program, 46 classroom lectures were scheduled, which were handled by NIWE scientists and external experts, Wind Turbine Manufacturers, Wind Farm and Developers, Consultants, Academicians, Utility and IPPs. To provide complete knowledge transfer, arrangements were made for practical training at NIWE Laboratories, study visit to (i) M/s. ReGen Powertech, TADA (ii) Wind Turbine Test Station, Kayathar (iii) Wind Turbine Research Station, Kayathar (iv) Wind Farms of various models, make and capacity (v) M/s. Suzlon CMS, Radhapuram(vi) M/s. Apollo Electrical Works, Kavalkinaru (vii) M/s. RS Wind Tech, Aralvoimozhi (viii) Wind Farms in and around Kanyakumari for knowledge on various working wind turbines. The course structure and organization of training was highly appreciated by the participants. The participants were very much satisfied by the quality of lectures and hospitality they found in India.

Special Training Course for Officials of Uganda

A Special Training Course on "Wind Resource Assessment and Wind Farm Planning" was successfully conducted held during 7th to 18th November 2016. This is a special training course for 3 Officials of Ministry of Energy and Mineral Department (MEMD), Uganda. The course provided an invaluable platform for hands on practical training on Introduction to Wind Resource Assessment, Wind Resource Assessment techniques, Site Selection for Wind Monitoring Stations (WMS), Wind Resource Mapping, Installation, Instrumentation and Commissioning of WMS, Met Mast and Modern Measurement Techniques including measurement using remote sensing instruments (SODAR & LiDAR), Data Analytics and Processing, Software tools for Wind data Analysis, Design and Layout, Forecasting and Wind Energy Production.

This training course was inaugurated by Dr. Jagmohan Singh Raju, IAS, Chairman and Managing Director, Tamil Nadu Energy Development Agency (TEDA) in presence of Dr. S. Gomathinayagam, Director General, National Institute of Wind Energy (NIWE).

Participants at Wind Resource Assessment / Mapping Lab

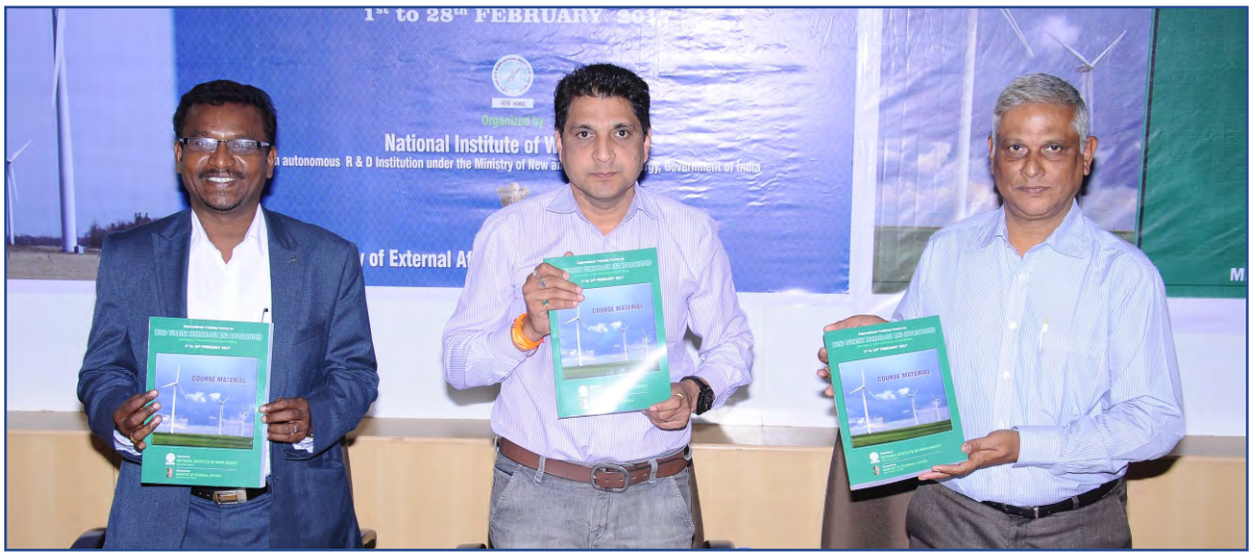
As part of the training, study visits to Wind Turbine Test / Research Station located at Kayathar to showcase the120m met mast and Tenkasi for SODAR instrument used for wind resource assessment were arranged.

Dr. S. Gomathinayagam, Director General, NIWE distributed the course certificates to the participants after hearing the feedback of all the participants in the valedictory function.

Participants with NIWE Officials

Special African International Training Course

Successfully conducted the 24 days International Training Course on "Wind Turbine Technology and Applications" specially organized for African Countries held during 1st to 24th February 2017; all aspects of Wind Power starting from introduction to wind and its technology, wind resource assessment, installation, operation and maintenance aspects of wind farm along with financial analysis and CDM benefits was addressed. This is a special training course for African Countries sponsored by the Ministry of External Affairs (MEA), Government of India under AIFS-III. The course was attended by 26 participants from 8 countries (Ghana, Ethiopia, Madagascar, Namibia, Seychelles, Tanzania, Tunisia & Uganda).



Release of Course Material

The training was inaugurated by Dr. Rajesh Katyal, Deputy Director General and Head, OW&IB, NIWE and Dr. G. Giridhar, Deputy Director General and Head, SRRA, NIWE.

During the 24 days training, 42 classroom lectures were handled to provide complete knowledge transfer, practical training at NIWE Laboratories, study visit to i) M/s. Gamesa Wind Turbine manufacturing factory, Mamandur for large wind turbine manufacturing process (ii) WTTS / WTRS, Kayathar for large and small wind turbine testing facility (iii) M/s. Suzlon Wind Farms, Radhapuram for knowledge on SCADA System working wind turbines (iv) Leitwind Wind Farms, Alangulam to witness the physical material and operation activities and (v) CSIR-Structural Engineering Research Centre, Wind Engineering Laboratory, Chennai to see the Wind Tunnel and other facilities. The course structure and organization of training was highly appreciated by the participants. The participants were very much satisfied by the quality of lectures and hospitality they found in India.

Dr. Rajesh Katyal, Deputy Director General and Head, OW&IB, NIWE distributed the course certificates to all the participants.

Dr. Rajesh Katyal distributing the Course Certificate to the participant

19th International Training Course

Dr. Rajesh Katyal inaugurating Course

Successfully conducted the 28 days 19th International Training Course on "Wind Turbine Technology and Applications" held during 1st to 28th February 2017 addressing all aspects of Wind Power starting from introduction to wind and its technology, wind resource assessment, installation, operation and maintenance aspects of wind farm along with financial analysis. This is a special training course for ITEC / SCAAP partner Countries sponsored by the Ministry of External Affairs (MEA), Government of India under ITEC / SCAAP programme. The course was attended by 27 participants from 18 countries (Bangladesh, Cameroon, Ethiopia, Iraq, Jamaica, Jordan, Liberia, Malawi, Mozambique, Myanmar, Nigeria, Panama, Philippines, Syria, Thailand, Tanzania, Sudan and Vietnam)

During the 28 days training program, 42 classroom lectures were scheduled apart from practical training at NIWE Laboratories, study visit to i) M/s. Gamesa Wind Turbine Manufacturing facility, Mamandur for large wind turbine manufacturing process (ii) WTTS / WTRS, Kayathar for large

Group photo of Participants during RS Windtech Study visit

and small wind turbine testing facility (iii) M/s. Suzlon Wind Farms, Radhapuram for knowledge on SCADA System (iv) M/s. Leitwind Wind Farms, Alangulam to witness the operating wind turbines v) M/s. RS WindTech Engineers to know the operation and maintenance process (vi) M/s. Appollo Engineering Works to know the Controllers and Transformers used for Wind Turbines.

Dr. S. Gomathinayagam, Former Director General, NIWE was the Chief Guest for the valedictory function and distributed the course certificates to all the participants.

Visits Abroad

Shri. K. Boopathi, Additional Director & Head, WRA **&**
Shri. B. Krishnan, Assistant Engineer, WRA

- Carried out site visit in South & Central Vietnam for ground reality verification for 38 MW & 30 MW wind farm during 3rd to 7th April 2016.
- Attended WindSim User Meet 2016 and visited Mingyang China Power Company, Beijing, China during 23rd to 28th October 2016.

Shri. R. Karthik attended 14th BSRN Science Review workshop organized by WMO at Canberra, Australia during 26th -29th April 2016.

Shri. A. Senthil Kumar, Director & Head, S&C and Shri. S.Arulselvan, Assistant Engineer, S&C participated in the meeting of Certification Body – Wind Turbines and other meetings at M/s. TUV Rheinland Industrie Service GmbH, Cologne, Germany during 21st to 24th June 2016.

Dr. G. Giridhar attended "Renewable Energy & Efficiency Week 2016-Expert Workshop and Energy Transition day" organized by GIZ, New Delhi at Berlin, Germany during 31st October to 4th November 2016.

Dr. P. Kanagavel participated and presented a paper "Wind Energy Growth in India - An Overview" in the"15th World Wind Energy Conference and Exhibition (WWEC 2016) held at Tokyo University, Tokyo during 31st October to 2nd November 2016.

GENERAL INFORMATION

MANAGEMENT COMMITTEE		
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 (Ex-Officio)
2.	Financial Adviser, MNRE	Member (Ex-Officio)
3.	Director General, NIWE	Member (Ex-Officio)

FINANCE COMMITTEE		
Members of the Finance Committee (To review the financial performance of the Institute)		
1.	Joint Secretary (WE) & Financial Adviser, MNRE, New Delhi	Chairman (Ex-Officio)
2.	Principal Secretary to Government Energy Department, GoTN, Chennai	Member
3.	Joint Secretary (Wind Energy), MNRE, New Delhi	Member (Ex-Officio)
4.	Director General, NIWE, Chennai	Member
5.	Director (Wind Energy), MNRE, New Delhi	Member (Ex-Officio)
6.	Deputy Secretary (Finance) MNRE, New Delhi	Member (Ex-Officio)
7.	Shri. D. Lakshmanan, Deputy Director General (F&A), NIWE, Chennai	Member Secretary

Empanelment Committee on Small Wind Turbine		
1.	Dr. S. Gomathinayagam, Director General, NIWE (till 31.1.2017) Dr. Rajesh Katyal, DG (AC) & Head, OS&IB, NIWE (from 1.2.2017)	Chairman
2.	Chairman & Managing Director Tamil Nadu Energy Development Agency	Member
3.	Managing Director, Rajasthan Renewable Energy Development Agency	Member
4.	Shri. G. Upadhyay, Sr. Director (Wind), MNRE	Member
5.	Smt. K.A. Fathima, Former Senior Director C-DAC, Trivandrum	Member
6.	Shri. J.P.Singh, Former Director, MNRE	Member
7.	Shri. Rajendra Kharul, Director & CEO Synergy Infrasys Management Pvt. Ltd.	Member
8.	Shri. A Hari Bhaskaran, Deputy Director (Technical), WRA & MNRE (S&T) Co-ordinator	Member-Secretary
MNRE - Committee for Evaluating and Recommending the R&D proposals in thrust areas of Small Wind Energy Hybrid Systems - Members		
1.	Dr. S. Gomathinayagam, Director General, NIWE (till 31.1.2017)	Chairman
2.	Dr. Rajesh Katyal Director General (AC) & Head, OS & IB, NIWE (from 1.2.2017)	Chairman
3.	Shri. Jami Hossain, Wind Force - Expert	Member
4.	Prof. A.P. Haran, Park College of Engineering, Coimbatore	Member
5.	Shri. M.K. Deb, CECL, Bhopal- Expert	Member
6.	Shri. A. Hari Bhaskaran, Deputy Director (Technical), WRA & MNRE (S&T) Co-ordinator	Member Secretary
MNRE – "Workgroup for recommending clearance procedures to be adopted for Development of Offshore Wind Energy in India" in accordance with "National Offshore Wind Energy Policy"		
1.	Joint Secretary (Wind Energy), MNRE	Chairman
2.	Shri. Mukesh Mangal, Director (IS-I), MHA	Member
3.	Representative from MEA	Member
4.	Shri. Naveen Kumar, Director, NAVY-I, MoD	Member
5.	Shri. Prasant Lokhande, Director, MoPNG	Member
6.	Shri. Lalit Bakolia, Addl. Director MoEF and Climate Change	Member
7.	Shri. Shyam Lal Barik, DDG (Technical), DG, Shipping	Member
8.	Dr. Rajkumar, Group Director, AOSG-EPSA, SAC, DoS	Member
9.	Shri. Sudhir Kumar, CE, DGH	Member
10.	Shri. Gangesh Upadhyay, Sr. Director, MNRE	Member
11.	Dr. Rajesh Katyal, DG (AC) , OS & IB, NIWE	Member
12.	Shri. P.K. Dash, Scientist 'C', MNRE	Member Secretary

RESEARCH AND DEVELOPMENT COUNCIL

Members of the Research and Development Council of NIWE
(To guide NIWE on laying down Research direction to serve the Indian Wind Energy Sector)

1.	Shri. S.K. Soonee, CEO, Power System Operation Corporation Ltd, New Delhi – 110 016	Chairman
2.	Joint Secretary (WE), 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.	Shri. 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.	Shri. S. C. Bhan, Scientist-E, India Meteorological Department, New Delhi – 110 003	Member
7.	Shri. Ganesh Prasad, GM (R&D), M/s. Engineers India Ltd, New Delhi – 110 066	Member
8.	Shri. N.K. Singh, Addl. General Manager, Bharat Heavy Electricals Ltd, Hyderabad – 502 032	Member
9.	Chairman, Indian Wind Turbine Manufacturers Association, Chennai.	Member
10.	Dr. S. Gomathinayagam, Director General, National Institute of Wind Energy (NIWE), Chennai – 600 100 (till 31-01-2017)	Member
11.	Shri. Rajesh Katyal, Director General (AC) & Head, OS&IB National Institute of Wind Energy (NIWE), Chennai – 600 100	Member Secretary

REVISED LIST OF MODELS AND MANUFACTURERS OF WIND TURBINES (RLMM) COMMITTEE

Members of the Revised List of Models and Manufacturers of Wind Turbines (RLMM) Committee

1.	Dr. S. Gomathinayagam, Director General, NIWE (till 31.1.2017)	Chairman
2.	Dr. Rajesh Katyal, Director General (AC), NIWE (from 01.02.2017)	Chairman
3.	Shri. J.K.Jethani, Scientist – D, MNRE	Member
4.	Shri.B.V.Rao, Director (Technical), IREDA	Member
5.	Shri. V. Balaji, DGM, SRLDC	Member
6.	Shri. Sarvesh Kumar, Hon.Chairman, IWTMA, Chennai	Member
7.	Dr. K. Kasthurirangaian, Chairman, IWPA, Chennai	Member
8.	Shri. A. Senthil Kumar, Director & Head, S&C, NIWE	Secretary

PROTOTYPE WIND TURBINE MODELS COMMITTEE

Members of the Prototype Wind Turbine Models Committee

1.	Dr. S. Gomathinayagam, Director General, NIWE (till 31.01.2017)	Chairman
2.	Dr. Rajesh Katyal, Director General (AC), NIWE (from 01.02.2017)	Chairman
3.	Shri. Mohamed Hussain, Director, MNRE & Head, WTRS, NIWE	Member
4.	Shri. Siddhartha Bhatt, Additional Director, CPRI, Bangalore	Member
5.	Shri. D.V. Giri, Secretary General, IWTMA, Chennai	Member
6.	Shri. A. Senthil Kumar, Director & Head, S&C, NIWE	Member - Secretary

HINDI PROMOTION COMMITTEE

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 (till 31.1.2017)	Chairman
2.	Dr. Rajesh Katyal Director General (AC) & Head, OS&IB, NIWE (from 01.02.2017)	Chairman
3.	Shri. D. Lakshmanan, Deputy Director General, F&A, NIWE	Member Secretary
4.	Dr. P. Kanagavel, Additional Director & Head, ITCS, NIWE	Member
5.	Shri. R. Girirajan, Assistant Director, F&A, NIWE	Member

FINANCE AND ADMINISTRATION

Serving as the artery connecting scientific units of Wind Technology & Solar Resources with Management.

- Budget & Revised Estimates for grants-in-aid, Allocation & re-appropriation of funds, Expenditure management & budget control, Project financial management.
- Statutory compliances on Service Tax and Income Tax etc., Dealing with audits, Drawing up balance sheet, laying of audited accounts on the table of Parliament.
- Framing of Rules, Schemes and Grievance Redressal, Contract Management, Legal issues, Court Cases & RTI, Recruitment , Promotion and upgradations.
- Statutory compliances on EPF, Gratuity, Contract Labour, Societies Registration, Bills of Establishment, Facility Management, Activities related to Official Language. Maintenance of Vehicle, Security and Housekeeping.
- Stores & Purchase section which is part of Finance & Administration is committed to organize procurement of items required for projects of the Institute in time, at competitive rates consistent with requirement, availability of finance and in a transparent manner. Procurements (Indigenous & Imports) & Service Contracts.

Trainings Organized

- Organized one day Training Programme on "Tax Related Issues" by Prof. S. Sampath, Corporate Consultant, New Delhi held on 15th July 2016.
- Organized one day Training programme on "Right to Information Act, 2005" by Shri. K. Govindarajulu, Joint Director, ISTM held on 3rd February 2017.

Vigilance Awareness Week

Vigilance awareness week for the year 2016 was observed in NIWE from 31st October 2016 to 5th November 2016 and all the employees took a pledge is directed by the Central Vigilance Commission.

Committee for prevention of sexual harassment of women at work place

In accordance with 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 meeting conducted on 8th March 2017. No complaints received during the year 2016-17.

Women's Day

Women's day was celebrated, for the first time, in NIWE on 8th March 2017. On this occasion competitions were conducted in NIWE, Prizes were distributed to the winners. The Chief Guest Dr. Yashodha Shanmugasundaram, Educationist & Former Vice Chancellor, Mother Teressa Women's University gave talk on "Empowerment of Women".

Promotions during the year 2016-17

Sl. No.	Name	Previous Cadre and Scale of Pay	Promoted Cadre and Scale of Pay	Date of Promotion
1.	Shri M. Anvar Ali	Additional Director PB Rs.15600-39100 +GP Rs.7600/-	Director PB Rs.37400-67000 +GP Rs.8700/-	01.01.2016
2.	Shri A.G. Rangaraj	Assistant Director (Tech) PB Rs.15600-39100 +GP Rs.5400/-	Dy. Director (Tech) PB Rs.15600-39100 +GP Rs.6600/-	01.01.2016

Sl. No.	Name	Previous Cadre and Scale of Pay	Promoted Cadre and Scale of Pay	Date of Promotion
3.	Shri S. Paramasivan	Junior Engineer PB Rs.9300-34800 +GP Rs.4200/-	Assistant Engineer PB Rs.9300-34800 +GP Rs.4800/-	13.01.2016
4.	Shri M. Malaravan	Sr. Driver PB Rs.5200-20200 +GP Rs.2400/-	Transport Co-ordinator PB Rs.9300-34800 +GP Rs.4200/-	01.04.2016
5.	Smt. Anuradha Babu	Executive Staff Officer PB Rs.9300-34800 +GP Rs.4600/-	Executive Staff Officer PB Rs.15600-39100 +GP Rs.5400/-	18.04.2016
6.	Shri D. Lakshmanan	Director (F & A) PB Rs.37400-67000 +GP Rs.8700/-	Dy. Director General (F&A) PB Rs.37400-67000 +GP Rs.8900/-	02.07.2016
7.	Smt. Deepa Kurup	Dy. Director (T) PB Rs.15600-39100 +GP Rs.6600/-	Additional Director PB Rs.15600-39100 +GP Rs.7600/-	01.01.2017
8.	Shri M. Saravanan	Assistant Director (Tech) PB Rs.15600-39100 +GP Rs.5400/-	Deputy Director (Tech) PB Rs.15600-39100 +GP Rs.6600/-	01.01.2017
9.	Shri Bhukya Ramdas	Assistant Director (Tech) PB Rs.15600-39100 +GP Rs.5400/-	Deputy Director (Tech) PB Rs.15600-39100 +GP Rs.6600/-	01.01.2017

Official Language Act

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

Hindi fortnight was celebrated in NIWE during 14th to 28th September 2016. Various competitions were conducted and prizes distributed.

During the year 2016, 06 regular staff members passed in Praveen examination, Conducted by Hindi Teaching Scheme, Dept of Official Language, MHA.

Continuous Hindi Classes are conducted in the NIWE campus to improve upon spoken Hindi and also to prepare staff members for appearing in the Hindi examinations (Probodh / Praveen / Pragya) towards implementation of Official Language policy of the union.

International Yoga Day

In consonance with the GoI instructions, International Yoga Day was celebrated in NIWE on 21st June 2016. Yoga Session was conducted in NIWE.

In continuation, an Yoga Centre was inaugurated on 19th July 2016 in NIWE and classes are being conducted in the campus of NIWE twice a week for all the regular staff members.

Right to Information Act

During the year 2016-17, 09 applications were received seeking informations under RTI Act, 2005 and requisite details have been given. 01 application appeal has been preferred against the decision of CPIO.

Implementation of Persons with Disabilities Act 1995

The following facilities are 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.

New Appointees

Sl.No.	Name	Designation	Unit	Date of Joining
1.	Shri. A. Mani	Driver	F&A	16.11.2016
2.	Shri. M. Nandakumar	Technician	ESD	16.02.2017
3.	Shri. B. Senthilkumar	Technician	OS & IB	23.02.2017
4.	Shri. T. Sankara Rao	Junior Engineer	OS & IB	03.03.2017

Details of Employees (Retired on Superannuation / Resigned)

Sl.No.	Name	Unit	Retired/ Resigned	Date of Retired/ Resigned
1.	Dr. S. Gomathinayagam, Director General	Scientific & Technical Research	Retired on Superannuation	31.01.2017
2.	Shri. V. Shanmugam, Executive Assistant	Finance and Administration (F&A)	Resigned	30.03.2017
3.	Smt. J. Rekha, Junior Executive Assistant	Scientific & Technical Research	Resigned	30.11.2016

HUMAN RESOURCE

Details of Employees as on 31.03.2017

Sl. No.	Name	Cadre
Finance & Administration (F&A)		
1.	Shri D. Lakshmanan	Deputy Director General (F&A)
2.	Shri R. Girirajan	Assistant Director (F&A)
3.	Smt. K. Tamilselvi	Admin. & Accounts Officer
4.	Smt. B. Muthulakshmi	Executive Secretary II
5.	Shri M. Selvakumar	Record Keeper
6.	Shri M Malaravan	Transport Co-ordinator
7.	Shri A. Mani	Driver
Scientific & Technical Research (S&T)		
1.	Smt. Anuradha Babu	Executive Staff Officer
2.	Shri M.R. Gunasekaran	Executive Secretary II
Offshore Wind & Industrial Business (OS & IB)		
1.	Dr. Rajesh Katyal	Deputy Director General / Director General (Additional Charge)
2.	Shri T. Sankara Rao	Junior Engineer
3.	Shri B. Senthilkumar	Technician
Knowledge Sharing and Management & Small Wind Energy and Hybrid System (KSM and SW & HS)		
1.	Shri J.C. David Solomon	Additional Director
2.	Smt. Deepa Kurup	Additional Director
3.	Shri R. Naveen Muthu	Junior Engineer
Wind Resource Assessment (WRA)		
1.	Shri K. Boopathi	Additional Director
2.	Shri A.G. Rangaraj	Deputy Director (Technical)
3.	Shri J. Bastin	Assistant Director (Technical)
4.	Smt. M.C. Lavanya	Assistant Director (Technical)
5.	Smt. G. Arivukkodi	Assistant Engineer
6.	Shri T. Suresh Kumar	Assistant Engineer
7.	Shri R. Vinod Kumar	Junior Engineer

Sl. No.	Name	Cadre
Information Training & Customized Service (ITCS)		
1.	Dr. P. Kanagavel	Additional Director
Wind Turbine Testing (WTT)		
1.	Shri S.A. Mathew	Director
2.	Shri M. Saravanan	Deputy Director (Technical)
3.	Shri Bhukya Ramdas	Deputy Director (Technical)
4.	Shri M. Karuppuchamy	Assistant Engineer
5.	Shri A.R. Hasan Ali	Assistant Engineer
6.	Shri Y. Packiyaraj	Assistant Engineer
7.	Shri S. Paramasivan	Assistant Engineer
8.	Shri K.A. Haji Abdul Ibrahim	Record Keeper
Standards & Certification (S&C)		
1.	Shri A. Senthil Kumar	Director
2.	Shri N. Rajkumar	Deputy Director (Technical)
3.	Shri B. Krishnan	Assistant Director (Technical)
4.	Shri S. Arulselvan	Assistant Engineer
Engineering Service Division (ESD)		
1.	Shri M. Anvar Ali	Director
2.	Shri C. Stephen Jeremias	Assistant Engineer
3.	Shri M. Nandakumar	Technician
Employees on Deputation from MNRE		
1.	Shri A Mohamed Hussain	Deputy Director General
2.	Dr G Giridhar	Deputy Director General
3.	Shri Joel Franklin Asaria	Additional Director
4.	Shri A. Hari Baskaran	Deputy Director (Technical)
Contract Staff in SRRA		
1.	Shri Prasun Kumar Das	Assistant Director (Technical) (Contract)
2.	Shri R Karthik	Assistant Director (Technical) (Contract)

NIWE OFFICIALS ON EXTERNAL COMMITTEES, BODIES AND MEMBERSHIP OF ASSOCIATIONS

Dr. S. Gomathinayagam

- Institution of Engineers (India), Fellow 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.

Dr. Rajesh Katyal

- Institution of Engineers (India), Fellow.

A. Senthil Kumar

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

Dr. 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
- Advisor, Arivukkan - a Monthly Science Magazine

G. BADRI NARAYANA & CO.,
Chartered Accountants

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 (NIWE) formerly known as Centre for Wind Energy Technology (C-WET), Velachery – Tambaram, Pallikaranai, Chennai, which comprise the Balance sheet as at 31.03.2017, 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 receipts and payments 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.

Landline : +91 44 4210 7583
Mobile : +91 9884 06 9157
+91 9941 91 9941

81 (Old # 61), Peters Road,
1st Floor, Royapettah, Chennai - 600 014.
E-mail : gbadrinarayanaandco@yahoo.com

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 there under.

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, 2017;

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.

iv. NIWE has provided requisite disclosures in the financial statements as regards its holding and dealings in Specified Bank Notes as defined in the Notification S.O. 3407(E) dated the 8th November, 2016 of the Ministry of Finance, during the period from 8th November 2016 to 30th December 2016. Based on audit procedures performed and the representations provided to us by the management we report that the disclosures are in accordance with the books of account maintained by the NIWE and as produced to us by the Management.

Particulars	SBN	Other Notes	Total
Cash in Hand as on 8th Nov, 2016	-	NIL	NIL
Add : Withdrawals from bank a/c's	-	3,75,000	3,75,000
Add : Permitted Receipts	-	8,779	8,779
Less : Deposits in bank a/c's	-	8,779	8,779
Less : Permitted Payments	-	-	-
Cash in Hand as on 30th Dec, 2016	-	3,75,000	3,75,000

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.

e) According to the information and explanations given to us, in respect of statutory dues, NIWE has generally been regular in depositing statutory dues, including Provident Fund, Income-tax, Service Tax as well as compliance of the respective laws and other material statutory dues applicable to it with the appropriate authorities.

For *G Badri Narayana & Co*
Chartered Accountants
(Firm Registration No: 010743S)

Gattupalli Shravan
Partner
M No: 226441

Place: CHENNAI
Date:

NATIONAL INSTITUTE OF WIND ENERGY

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

Chennai - 600 100

BALANCE SHEET AS AT 31st MARCH 2017

(Amount in Rs.)

FUND AND LIABILITIES	Schedule	31st March 2017	31st March 2016
CAPITAL ASSET FUND	1	39,92,33,180	32,62,04,080
RESERVES AND SURPLUS	2	33,40,64,685	45,84,73,569
CURRENT LIABILITIES AND PROVISIONS	3	39,68,24,702	28,55,42,809
TOTAL		1,13,01,22,567	1,07,02,20,458
ASSETS			
FIXED ASSETS			
(a) Created out of Central Government Grants	4	24,16,12,037	30,50,16,662
(b) Out of Internal Generation Grants		15,76,21,143	2,11,87,418
CURRENT ASSETS, LOANS AND ADVANCES	5	73,08,89,387	74,40,16,378
TOTAL		1,13,01,22,567	1,07,02,20,458
SIGNIFICANT ACCOUNTING POLICIES	13	-	-
NOTES ON ACCOUNTS	14	-	-

For National Institute of Wind Energy

As per our Report attached
For G.Badrinarayana & Co.,
Chartered Accountants
Firm Regn No.010743S

Sd/-	Sd/-	Sd/-	Sd/-
R. Girirajan	D.Lakshmanan	Dr. Rajesh Katyal	Shravan Gattupalli
Asst. Director (F&A)	Dy. Director General (F&A)	Director General (AC)	Partner
			Membership No.226441

NATIONAL INSTITUTE

(An Autonomous R & D Institution under Ministry of
Chennai

RECEIPTS AND PAYMENTS ACCOUNT

RECEIPTS			31st March, 2017	31st March, 2016
I.	**Opening Balances**			
	(a)	Cheques in hand		
	(b)	Bank balances		
		i) In Current Account	58,89,815	1,00,470
		ii) In Savings Bank Account	17,06,30,459	8,49,78,626
		iii) In Deposit Accounts	43,20,00,000	41,00,00,000
	(c)	Stamps in hand	3,708	8,887
			60,85,23,983	**49,50,87,983**
II.	**Grants Received / UnUtilised Grants**			
	(a)	From Government of India for Grant	25,00,00,000	13,70,00,000
	(b)	From Government of India / 25 kW Grid / ITC Programme	33,50,000	
	(c)	Sale of Fixed Assets	(10,326)	8,417
	(d)	From Government of India - North East Project	-	8,06,00,000
	(e)	From Government of India for SRRA Project	1,19,00,000	2,00,00,000
III.	**Income on Investments**			
IV.	**Interest Received**			
	(a)	On Bank deposits	4,31,84,253	3,64,93,245
	(b)	On Bank deposits (SRRA)	13,59,488	14,68,007
V.	**Other Income**			
	(a)	Fees for services	5,96,02,000	5,06,52,861
	(b)	Fees for services (SRRA)	9,25,000	1,00,25,000
	(c)	Income from publications	39,90,931	16,42,131
	(d)	Energy receipts	2,00,40,766	1,55,24,924
	(e)	Misc. Income	2,71,76,463	2,12,31,391
	(f)	Misc. Income (including SRRA Icome)	47,88,746	19,12,617
	(g)	Award Fund - IREDA	1,00,00,000	20,350
VI.	**Amount borrowed**			
VII.	**Any other receipts**			
	(a)	Fees received in advance on CFA	12,25,000	-
	(b)	Fees received in advance on Consultancy projects	5,79,79,426	6,50,17,250
	(c)	Fees received in advance on Consultancy projects (SRRA)	56,00,000	65,00,000
	(d)	Security deposit received - Internal Generation	-	61,090
	(e)	Security deposit received Grant	-	9,91,100
	(f)	Earnest money deposit received Grant	53,44,178	26,96,341
	(g)	Service tax realised	7,800	71,936
	(h)	TDS to be remitted	17,19,950	7,39,765
	(i)	TDS to be remitted (Including SRRA)	42,467	31,531
	(j)	Expenses / Salary Payable / S. Creditor	3,08,73,078	-
	(k)	Sundry Creditor (SRRA / Branch Division)	(30,55,338)	3,27,269
	(l)	Receivable from Debtors/other payments/Branch division	29,99,652	4,13,83,270
	(m)	Performance Guarentee - Grants	7,03,875	25,18,733
	(n)	Performance Guarentee - SRRA	3,27,269	-
			54,00,74,678	**49,69,17,227**
		TOTAL	**1,14,85,98,660**	**99,20,05,210**

OF WIND ENERGY

New and Renewable Energy, Government of India)
600 100

FOR THE YEAR ENDED 31st MARCH 2017

(Amount in Rs.)

PAYMENTS			31st March, 2017	31st March, 2016
I.	**Expenses**			
	(a)	Employee related Expenses	4,67,48,633	4,56,76,769
	(b)	Administrative Expenses	5,33,56,495	4,49,79,093
II.	**Payments made against funds for various projects**			
	Out of CFA			
	(a)	In house R&D project expenses	2,78,46,176	2,80,65,850
	(b)	Seminar & Information dissemination	19,01,816	21,21,663
	Out of Grants for projects			
	(a)	WRA Lakshadeep Islands 2008-09	-	4,80,000
	(b)	Wind Shear Assessment expenses 120 Mast	7,95,080	13,38,400
	(c)	North-Eastern Project 2006-07 & 2010-11	23,66,066	13,65,492
	(d)	Study on Uncovered / New areas (2003-04 to 2013-14)	3,38,37,977	41,66,239
	(e)	Solar Radiation Resource Assessment	-	1,72,09,618
	(f)	Offshore Wind Resource Assessment	6,68,204	60,680
	(g)	Spl Training Programme	6,53,434	-
	(h)	Smart grid Integrated	52,493	-
III.	**Investment and Deposits made**			
IV.	**Expenditure on Fixed assets & Capital Work-in-Progress**			
	(a)	Purchase of Fixed assets (Grants)	2,27,17,616	3,14,77,185
	(b)	Purchase of Fixed assets (Internal Generation)	14,59,93,957	1,00,09,523
	(c)	Purchase of Fixed assets (SRRA)	8,27,195	28,51,473
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 IE	1,68,759	3,55,247
	(b)	Refund of Security deposits / Performance Guarantee Grant	12,57,004	15,03,312
	(c)	Refund of Security deposits SRRA / Performance Guarantee	72,888	
	(d)	Refund of Earnest Money Deposits	39,86,410	51,92,086
	(e)	Expenditure on Consultancy Projects	6,83,13,835	4,68,57,338
	(f)	Expenditure on Consultancy Projects SRRA	2,19,03,679	69,26,427
	(g)	Advance & Deposits from Grants	2,63,60,176	1,07,85,454
	(h)	Advance & Deposits from SRRA	(24,14,871)	(22,17,806)
	(i)	Advance & Deposits from Internal Generation	(3,57,26,968)	2,23,35,664
	(j)	Payment of TDS (Grants)	1,55,993	77,041
	(k)	Payment of TDS (Internal Generation)	5,83,772	9,82,484
	(l)	Payment of TDS (SRRA)	31,531	12,37,058
	(m)	Service tax remittances	1,89,429	5,562
	(n)	Receivable from Debtors/other payments /Branch Division	-	3,84,27,242
	(o)	Receivable from Debtors/other payments /Branch Division SRRA	-	7,62,033
	(p)	Festival advance paid	(16,650)	(900)
	(q)	Transfer of fees received in advance	10,25,000	-
	(r)	Transfer of fees received in advance	6,04,02,000	5,00,01,000
	(s)	Transfer of fees received in advance from SRRA	9,25,000	1,04,50,000
VII.	**Closing Balances**			
	(a)	Cheques in hand		
	(b)	Bank Balances		
		i) In Current Account	20,53,693	15,03,573
		ii) In Savings Bank Account	8,70,48,830	17,50,16,702
		iii) In Deposit Accounts	5,69,500,000	42,70,00,000
		iv) In Deposit Accounts (SRRA)	50,00,000	50,00,000
	(c)	Stamps in hand	14,009	3,708
		TOTAL	**1,14,85,98,660**	**99,20,05,210**

For National Institute of Wind Energy

As per our Report attached
for G Badrinarayana & Co.,
Chartered Accountants
Firm Regn No.010743S

Sd/-
R. Girirajan
Asst. Director (F&A)

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

Sd/-
Dr. Rajesh Katyal
Director General (AC)

Sd/-
Shravan Gattupalli
Partner,
Membership No.226441

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 2017

(Amount in Rs.)

INCOME	Schedule	IE	CFA	31st March 2017	31st March,2016
Income from Scientific & Technical Consultancy Services	6	80,467,766	-	80,467,766	75,502,785
Income from publication	7	3,990,931	-	3,990,931	1,522,131
Interest Earned	8	27,529,954	9,602,633	37,132,587	35,284,686
Other Income	9	31,708,522	465,589	32,174,111	22,356,043
Grants from Government of India allocated for Revenue expenditure during the year		-	173,350,000	173,350,000	82,577,418
Closing stock		5,003,584	-	5,003,584	5,878,291
TOTAL (A)		**148,700,757**	**183,418,222**	**332,118,979**	**223,121,354**
EXPENDITURE					
Opening stock		5,878,291	-	5,878,291	5,280,287
Establishment Expenses	10	52,933,449	-	52,933,449	47,506,717
Other Administrative Expenses	11 (A)	-	53,356,495	53,356,495	44,979,093
Consultancy Project Expenses	11 (B)	68,313,835	-	68,313,835	53,460,184
On Advances/Deposits/Prepaid/ EMD,SD,PG's etc.,		-	49,751,982	49,751,982	-
In house project expenditure		-	68,121,246	68,121,246	37,598,325
TOTAL (B)		**127,125,575**	**171,229,723**	**298,355,298**	**188,824,606**
Balance being excess of Income over Expenditure (A-B)		21,575,182	12,188,499	33,763,681	34,296,748
Prior period adjustment	12	-	-	-	3,756
Transfer to Capital Asset Fund	4	145,993,957	-	145,993,957	10,009,523
Transfer to Welfare Fund		302,135	-	302,135	323,583
BALANCE BEING DEFICIT / SURPLUS TRANSFERRED TO GENERAL RESERVE FUND		**(124,720,910)**	**-**	**(124,720,910)**	**23,967,398**
UN-UTILIZED GRANTS OUT OF GOVT. GRANTS FOR REVENUE EXPENDITURE		**-**	**12,188,499**	**12,188,499**	**-**
SIGNIFICANT ACCOUNTING POLICIES	13	-	-	-	-
NOTES ON ACCOUNTS	14	-	-	-	-

For National Institute of Wind Energy

As per our Report attached
for G.Badrinarayana & Co.,
Chartered Accountants
Firm Regn No.010743S

Sd/-
R. Girirajan
Asst. Director (F&A)

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

Sd/-
Dr. Rajesh Katyal
Director General (AC)

Sd/-
Shravan Gattupalli
Partner
Membership No.226441

नीवे NIWE

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 under the 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

Phone / दूरभाष : +91-44-22463982 / 22463983 / 22463984 Fax / फैक्स : +91-44-22463980

E-mail / ईमेल : info.niwe@nic.in Website / वेबसाईट : http://niwe.res.in