वार्षिक रिपोर्ट
ANNUAL REPORT
2017-18

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

ANNUAL REPORT
2017-18

NATIONAL INSTITUTE OF WIND ENERGY
AN AUTONOMOUS R&D INSTITUTION, MNRE, GOVERNMENT OF INDIA
CHENNAI - 600 100

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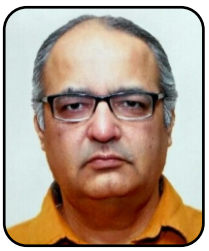

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Dr. K. Balaraman
Director General, NIWE
(41st)

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From the Director General's Desk . . .

Development of wind power in India began in the 1980s and India was the first country in the world to set up a Ministry exclusively for Non-Conventional Energy Resources in 1992 itself. Although a relative newcomer to the wind industry compared with Denmark or the US, domestic policy support for wind power has led India to become the country with the fourth largest installed wind power capacity in the world. India is running one of the largest and most ambitious renewable capacity expansion programs in the world and is aiming at integrating 35 % renewable energy into the grid by 2020. Towards achieving this goal, we are working on reliable prediction of power from RE sources to enable absorption of clean energy. NIWE, with its experience of forecasting wind power for Tamil Nadu during the previous year is working on fine-tuning it's model with real time measurement of wind power generation and ground measurements using Wind Monitoring Station from wind farms. Power forecasting for three other wind rich States are in the offing. Renewable energy is poised to become a mainstay in the Indian as well as world energy requirement having achieved the grid parity in terms of the price and meeting the advanced grid requirements. This has opened new chapter in the grid management and interesting avenues for harnessing it. One such avenue is offshore wind development in India which has a long coastline. Tapping into the offshore wind business is an interesting chapter unfolding in India.

WIND RESOURCE ASSESSMENT AND OFFSHORE

NIWE has made significant strides during the year 2017-18 in offshore activities with installation of Remote Sensing instrument LiDAR for wind measurements at Gulf of Khambhat off Gujarat coast. The LiDAR was installed on the platform jointly by NIWE / FOWIND team. The offshore structure and Remote sensing device LiDAR has been configured to measure the wind profile at 12 different heights suitable to the wind turbines available for offshore. The offshore LiDAR has been successfully installed and the data is being successfully transmitted to NIWE's server. NIWE has further initiated Tidal measurements at the LiDAR platform at Gulf of Khambhat. The instrument measures the Tide level by using RADAR principle. NIWE is in the process of exploring the largest seabed areas off Gujarat and Tamil Nadu coasts with an objective to identify the potential subzones / blocks for promotion of offshore wind farm development in the country.

As per the 'Guidelines for Development of Onshore Wind Power Projects' released by MNRE, NIWE has been directed to develop and maintain an online registry of wind turbines and collate these performance related data sets. Towards this end, geo-tagging of wind turbine across the country in initiated with unique code for each turbine.

Reliable background information on the availability of renewable resource and its geographical variation will play a major role in achieving the government's ambitious targets. Studies have also revealed that solar and winds are almost complementary to each other. Hybridization of these two technologies would help in minimizing the variability apart from optimally utilizing the infrastructure including land & transmission system and a hybrid potential map in this regard would be very much helpful for the stakeholders to identify suitable sites for further investigation.

As on March 2018, 56 nos. of Wind Monitoring Stations are operational in 11 States under various wind monitoring projects funded by the MNRE as well as various entrepreneurs. 10 wind monitoring station have been installed and commissioned during the year. NIWE has also initiated the identification of telecom towers (150 nos.) in association with M/s. BSNL (for 83 locations) and M/s. Airtel (for 67 locations) for wind resource assessment in the North East. NIWE has undertaken the task of identifying the district wise indicative wind potential, Transmission Companies (STU & CTU) based on land grading (Rank I/II/III) that would help State Nodal Agencies (SNAs) in identifying the technical potential of the States. During this period, many consultancy projects on Wind Resource Assessment have been completed and reports have been submitted during this period.

TESTING AND FORECASTING

NIWE accredited under NABL for wind turbines tested according to International Standards. In this regard, an agreement was signed between NIWE & M/ s. Inox Wind Ltd., and NIWE & M/s. Para Enterprises Pvt. Ltd. for Power Curve Measurements. Under Small Wind Turbine activities, NIWE has signed MoU for Type testing with M/s. Windstream Energy Technologies India Pvt. Ltd. at Wind Turbine Research Station, Kayathar, Tamil Nadu.

NIWE has signed MoU with ISRO SAC for 'Development of wind and solar power forecasting using High Resolution Numerical Model'. In addition, NIWE has signed MoUs with Gujarat, Rajasthan, Andhra Pradesh and Karnataka for providing pilot forecasting services to respective States. The Centre for Excellence (CFE) in Variable Generation Forecasting (Wind & Solar Generation) has been established at NIWE.

WIND TURBINE RESEARCH STATION

Wind Turbine Research Station is having cumulative installed capacity of 6400 kW wind turbine 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.

The performance of the hybrid system was monitored during the windy season 2017 by Solarisation of wind farm at WTRS, Kayathar by a hybrid study on grid integration. This model of Solarisation

(wind – solar grid connected hybrid) of wind farm is first of its kind in India. The research knowledge and experience on the field performance of large scale integration of solar PV power with Wind Farm (wind energy) will throw new light to maximize the connected capacity and flat power supply to grid for increasing the net (wind-solar) capacity utilization factor (CUF) of the plant during season/off-season periods.

STANDARDS AND CERTIFICATION

MNRE has approved NIWE as Type Certification Body in India for all the wind related issues. During 2017-18, based on the directives from MNRE, Internationally accredited certification services are made available in India by NIWE through strategic tie-ups.

NIWE is entrusted with the preparation of Indian Standards on wind turbines under the Committee, viz., Wind Turbines Sectional Committee (ETD 42) and NIWE provided technical support in preparation of Six Indian Standards on Wind Turbines and out of which one has been finalized. NIWE provides technical support to ETD division of BIS regularly on the works related to International Electrotechnical Commission (IEC). Based on the efforts taken by NIWE and MNRE, Bureau of Indian Standards (BIS) has already obtained the membership for India in IECRE system.

RESEARCH AND DEVELOPMENT

Research and development in NIWE is planned through the Research outreach programmes, viz., Research funded Proposal, Pan India Research Network and Energy Storage Mission Document, etc.

NIWE established 'Pan-India Research Network' with an intention to create a hub of synergy for all wind related research in India for taking up industry identified issues by a consortia of Academia with support from MNRE through NIWE. The Information Technology division is working to build its skills in the area of Data Analytics, Design Thinking, Machine Learning and Internet of Things (IoT), which are foreseen as Critical areas of expertise that NIWE will need in this era of big data.

SOLAR RADIATION RESEARCH ASSESSMENT

It is a momentous occasion to state that FOUR Solar Radiation Resource Assessment (SRRA) stations have been included in the BSRN Global Network out of nine in Asia. The Baseline Surface Radiation Network (BSRN) is the project under the umbrella of World Climate Research Program (WCRP) aimed at detecting important changes in the Earth's radiation field at the Earth's surface. Radiation measurements are indispensable for climate research as they provide the best check for the theory of radiative transfer in the Earth's atmosphere and can be used for the evaluation and improvement of models designed for weather and climate prediction. Furthermore, long-term measurements of surface radiation provide an opportunity for the detection of climate change. Quality Controlled data of 5 SRRA stations were provided to 3 stake holders under SDSAP policy.

INFORMATION, TRAINING AND CUSTOMIZED SERVICES

The Information, Training and Customized Services unit has conducted a total of 8 Training courses, (3 National and 5 International training courses). The unit had already successfully organized 28 International and 27 National Training courses including special and customized training courses since 2004. The other activities are:

NIWE is regularly publishing quarterly bilingual NIWE's newsletter 'PAVAN', which disseminates information about the activities & services of NIWE. The PAVAN aims to keep the Industry professionals, students and researchers updated about the progress in wind energy sector.

NIWE Library is fully computerised with automation software along with Online Public Access Catalogue (OPAC) facilities. It has more than 2100 books on renewable energy in general and wind energy in particular and all major National / International Journals & Magazines related to wind energy and other allied engineering disciplines.

Global Wind Day 2017 : Global Wind Day is a worldwide event that occurs annually on 15th June and NIWE has been celebrating the Global Wind Day on every 15th June since 2009.

NIWE Foundation Day 2018 : NIWE has celebrated its 21st Foundation Day on 21st March 2018. As a part of Foundation Day celebration, this day was announced as an 'Open Day' for general public to visit the scientific laboratories of NIWE through advertisements inviting public to visit NIWE's facilities. Also, NIWE had celebrated the first year of the awards instituted by NIWE under the sponsorship of IREDA namely IREDA-NIWE Annual Awards for Wind Energy during NIWE Foundation Day.

IREDA – NIWE Awards for Wind Energy 2018 : Indian Renewable Energy Development Agency (IREDA), New Delhi signed a Memorandum of Understanding (MoU) with NIWE for the creation of a corpus for the IREDA-NIWE Annual Awards in Wind Energy. The awards are to promote innovation, research & development, manufacturing, developing & harnessing Wind Energy at the State and National levels and to motivate individuals, stakeholder to strive for the best in the field. Accordingly, NIWE has instituted the IREDA-NIWE Annual Awards in Wind Energy, under the three broad categories in Wind Energy to recognize, celebrate the achievement and excellences, viz., (i) Best Performing State Nodal Agencies for the year, (ii) Best Institution of Higher Learning in Wind Energy and (iii) Best Research Work.

As part of our commitment to knowledge transfer and capacity building, several invited lectures have been delivered by our officials in both external forum as well as internal course programs.

Four of our higher officials visited abroad for business development, participation in International Conference and Committees.

NIWE has been awarded Shield & Citation for having secured First position for best performance in the progressive use of Official Language Hindi during the year 2015-17 in the 55th Town Official language implementation Committee (TOLIC) meeting held at Chennai.

Dr. K. Balaraman
Director General

CHARTER

The National Institute of Wind Energy (NIWE) serves as the technical focal point for wind energy technologies and was established at Chennai in 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.

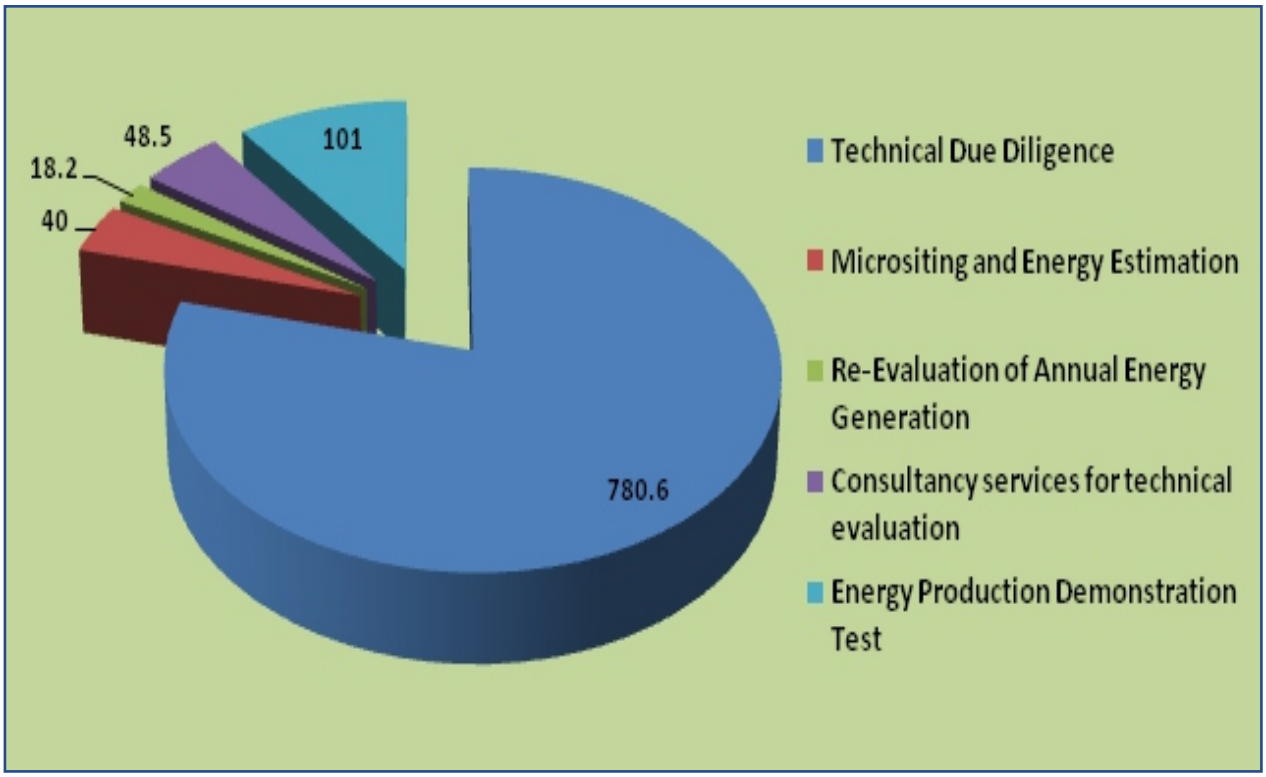
Mission

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.

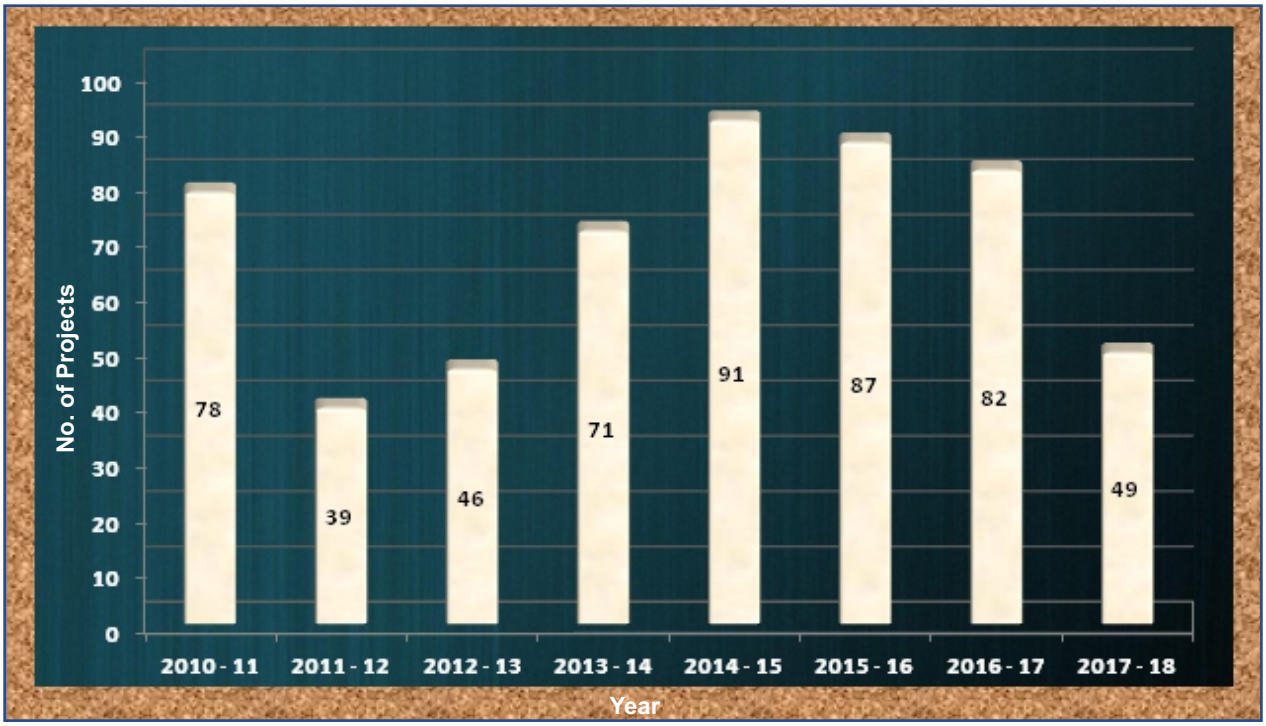
Objectives

- 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 programs to achieve and maintain reliable and cost effective technology in wind power systems.
- To analyze and assess wind resources, based on the measured data from the wind masts along with 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 training programs for the personnel working in the wind energy sector for both in India and abroad.
- 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.

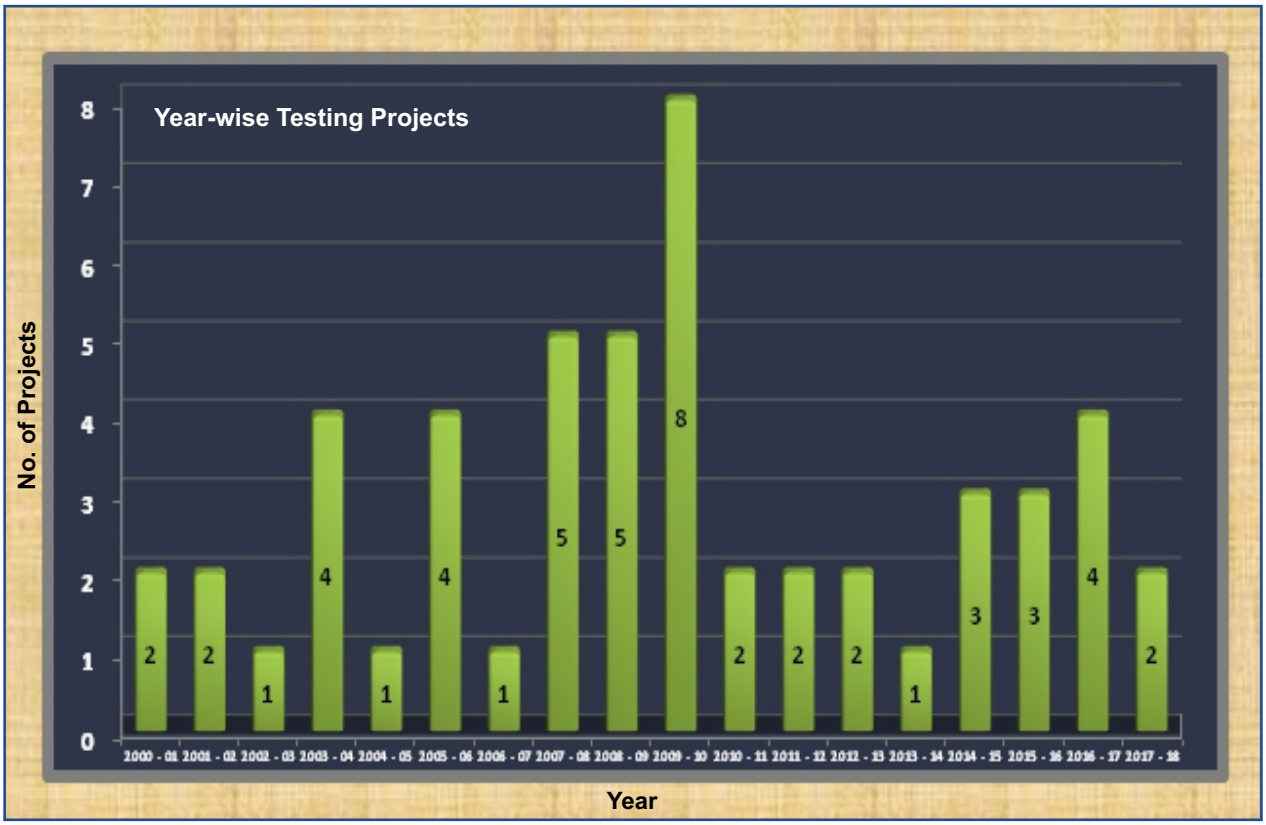
NIWE'S MISSION HIGHLIGHTS



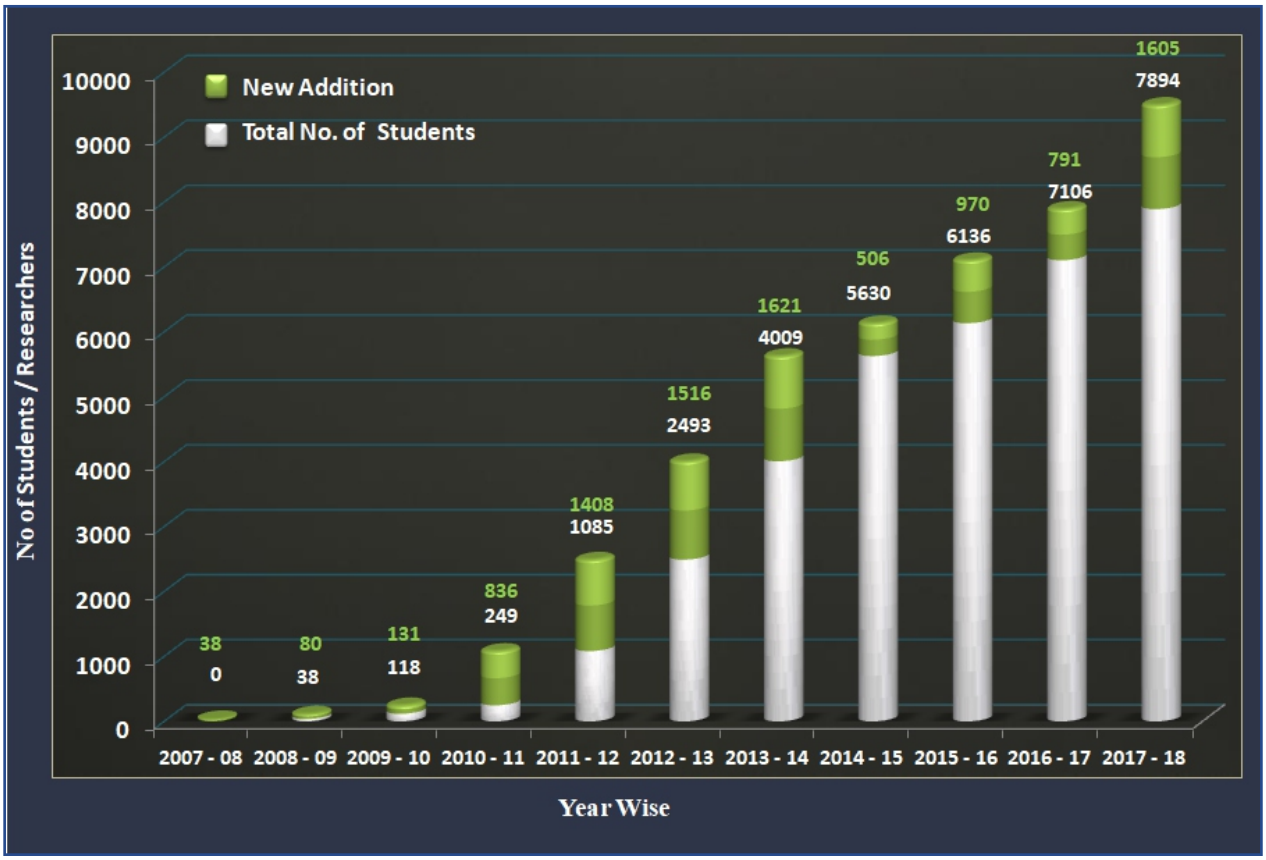
Wind Resource Projects in MW



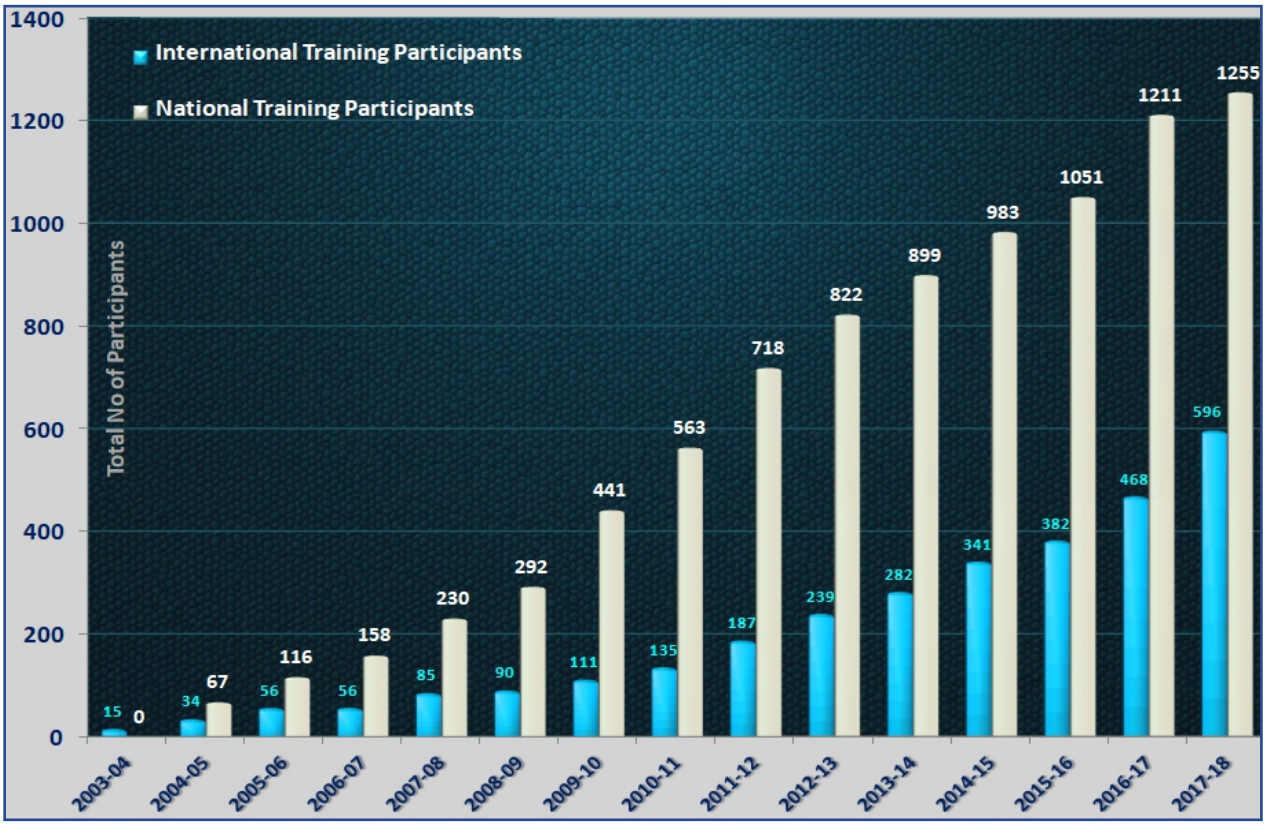
Verification of Wind Monitoring Station Project



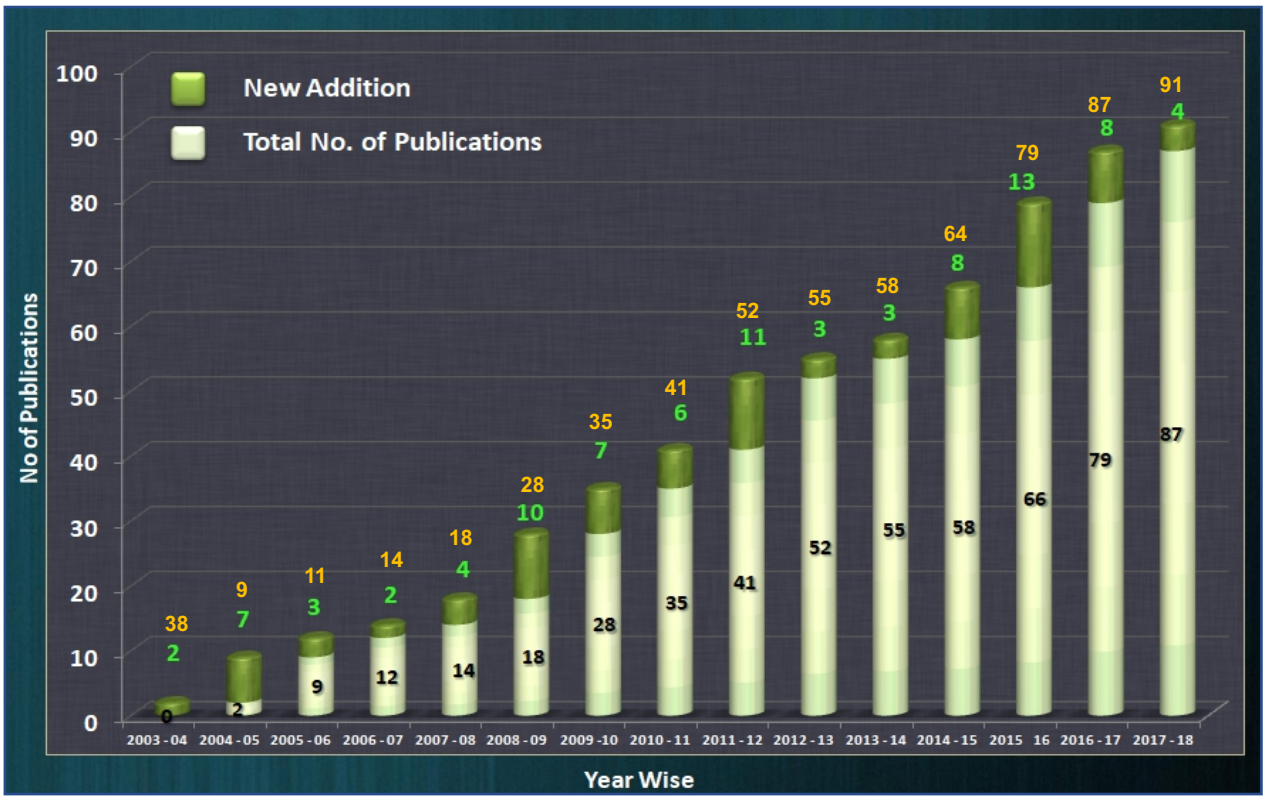
Wind Turbine Testing Projects



RE Awareness created among Students



National & International Training Courses

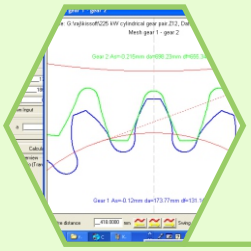


NIWE Publications

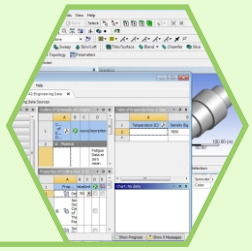
TOWARDS MISSION AND OBJECTIVES

WIND RESOURCE ASSESSMENT & OFFSHORE

TESTING & FORECASTING



STANDARDS & CERTIFICATION



WIND TURBINE RESEARCH STATION

RESEARCH AND DEVELOPMENT / INFORMATION TECHNOLOGY / INFORMATION, TRAINING AND CUSTOMIZED SERVICES

ENGINEERING SERVICES DIVISION

SOLAR RADIATION RESOURCE ASSESSMENT

WIND RESOURCE ASSESSMENT & OFFSHORE

WIND RESOURCE ASSESSMENT ACTIVITIES

The Wind Resource Assessment and Offshore unit has made significant strides during the year. As on 31.03.2018, 856 wind monitoring stations were established throughout the country including the North Eastern region, under National Wind Monitoring Programme. In addition, the unit has initiated Wind Resource Assessment studies using existing telecom towers of M/s. Airtel / M/s. BSNL in the North East. The on-line Registry / Geo-tagging of wind turbines and identification of district wise potential of the States to facilitate development of grid infrastructure towards meeting the 60 GW target were other major initiatives of the unit.

This year also marked the beginning of offshore activities with installation of Remote Sensing instrument LiDAR for wind measurements at Gulf of Khambhat off Gujarat coast. Besides this, Geophysical survey in association with First Offshore Wind Project for India (FOWPI) was completed in 70 sq. km area in the identified Zones at Gulf of Khambhat off Gujarat coast. On similar lines, the unit proposes to conduct wind resource assessment by installing one LiDAR and Geophysical and Geotechnical survey at Gulf of Mannar, Tuticorin. The unit also proposes to expand its offshore activities by installing 4 LiDAR based Wind Monitoring Stations (WMS) along Gujarat and Tamil Nadu coasts which will help in identifying and notifying the sub zones for offshore wind power development.

WRA in Uncovered / New Areas

As on March 2018, 56 WMS are operational in 11 States under various wind monitoring projects funded by the MNRE as well as various entrepreneurs.

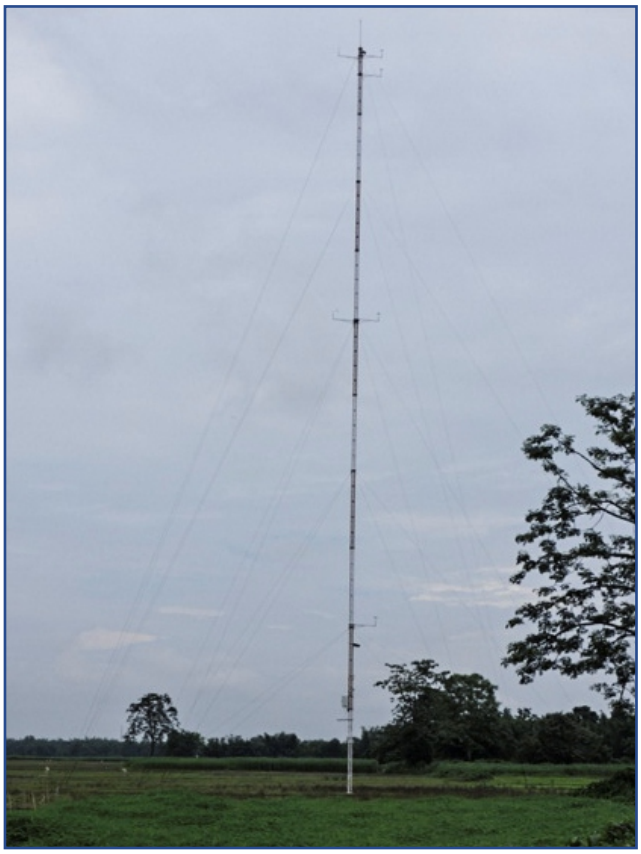
The following no. of Wind Monitoring Stations are operational during the year:

Sl. No.	State	No. of WMS
1.	Assam	7
2.	Chhattisgarh	10
3.	Gujarat	1
4.	Manipur	2
5.	Meghalaya	9
6.	Mizoram	4
7.	Nagaland	3
8.	Tamil Nadu	11
9.	Telangana	4
10.	Tripura	4
11.	Uttarakhand	1
	TOTAL	**56**

The following no. of Wind Monitoring Stations have been closed:

Sl. No.	State	No. of WMS
1.	Madhya Pradesh	1
2.	Meghalaya	2
3.	Rajasthan	1
4.	Tamil Nadu	3
5.	Tripura	1
	TOTAL	**8**

NIWE has also initiated the identification of telecom towers (150 nos) in association with M/s. BSNL (for 83 locations) and M/s. Airtel (for 67 locations) for wind resource assessment in the North East.

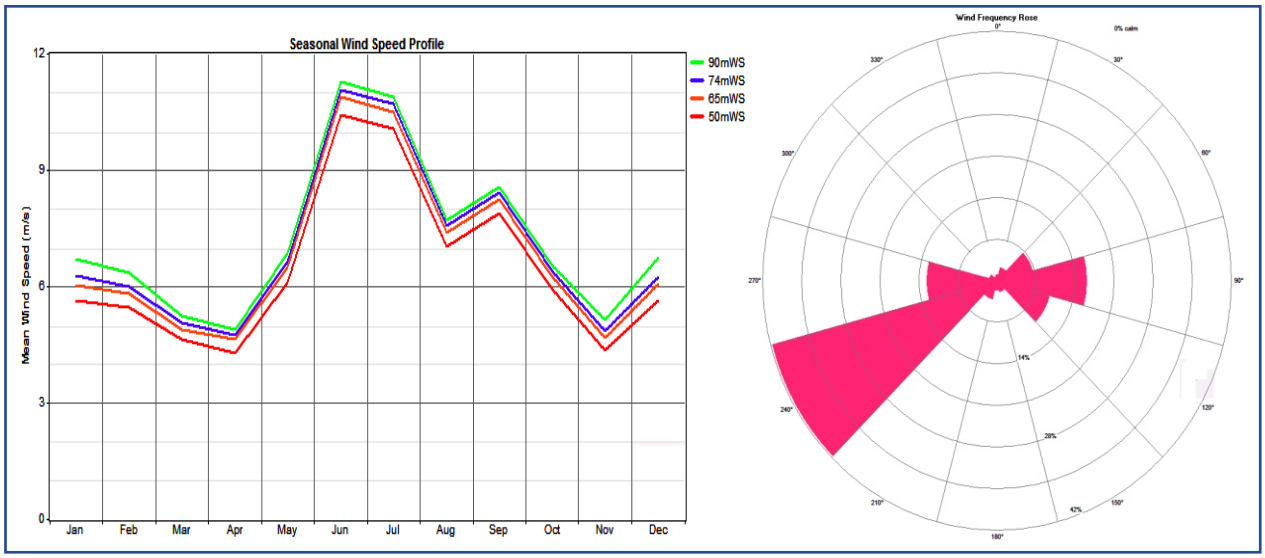


50m wind monitoring station of "Bhurbanda"- Assam

Geo-tagging of Wind Turbines Installed across the Country

MNRE / NIWE has identified an estimated wind power potential of 302 GW at 100 m agl, which would have a capacity utilization factor greater than 20%. As on 31st March 2018, the wind turbine installed capacity in India stands at 34135.68 MW. These installations are mainly spread across the States of Tamil Nadu, Andhra Pradesh, Telangana, Karnataka, Gujarat, Rajasthan, Maharashtra, Madhya Pradesh and Kerala. India has a lot of untapped wind power potential, and has target to achieve 60 GW of wind installed capacity by 2022.

As per the 'Guidelines for Development of Onshore Wind Power Projects' released by MNRE vide F. No. 66/183/2016-WE dated 22.10.2016, NIWE has been directed to develop and maintain an online registry of wind turbines and collate the performance related data sets. This project proposes



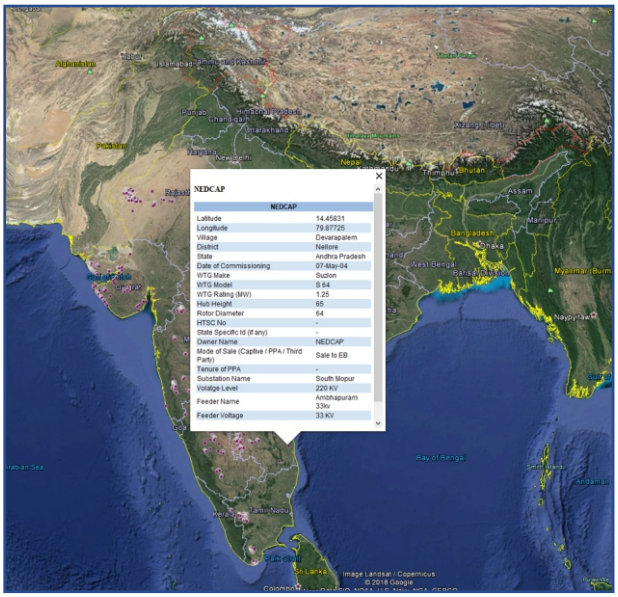
Time series & wind rose

to develop a geo-tagged data base / online registry of wind turbines installed and proposed to be installed across the country with the support of Central and State agencies. The proposal is data-centric and presently, NIWE is working to devise the methodology for the static data collection and suitable procedure / guidelines for dynamic data collection. This project would be helpful,

a. To create a database of static information of wind turbine installations (installed and proposed to be installed in the country) like location of the wind turbine, type of wind turbine, its rating along with critical technical information and year of commissioning, etc.

b. To map the spatial / geographical distribution of the installed wind turbines vis-à-vis the potential areas.

c. This will also facilitate in wind power forecasting.



Wind turbine static information on geo-spatial platform

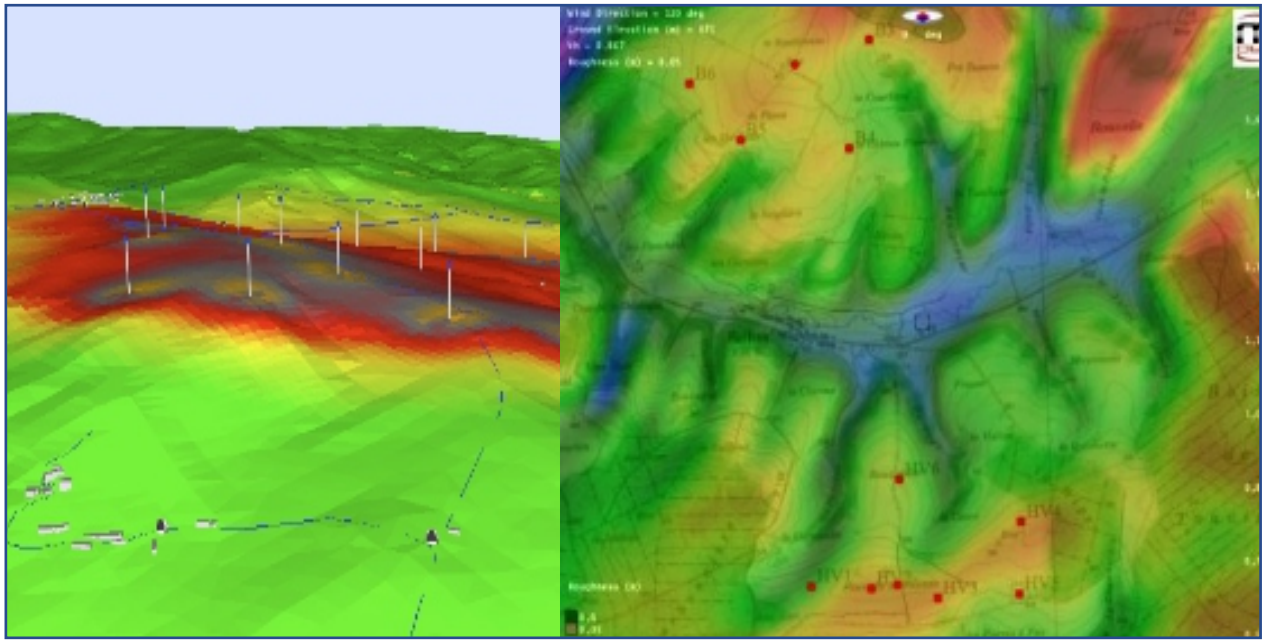
A framework has been devised to enable data collection in consultation with the relevant stakeholders and consolidation at a single point (at NIWE). A unique identification code which will help in identification of wind turbine will be evolved. This 'unique ID' mechanism will have to be seamlessly integrated at some point in the wind turbine commissioning process, starting from the submission of the project proposal to the issue of the commissioning certificate. This may be made mandatory for the successful implementation of the project.

The required information for about 15000 MW of wind turbines has been received by end of March 2018 and the verification of the same is underway. The web portal for the online registry is under preparation.

Wind Resource Assessment Studies (Consultancy Projects)

The consultancy projects under taken and completed during this period are as follows :

- Verification of procedure of wind monitoring for 49 sites
- Wind Power Density zone classification at 50 m agl (above ground level) for 4 sites
- Energy Estimation for the 32 wind farm projects
- Energy Production Demonstration Test for 3 projects
- Tender document preparation for 2 projects
- Continuous monitoring and real time wind data acquisition from 2 stations in 2 States are in progress. Monthly data analysis, verification and preparation of Interim reports are under progress.



Sample - Wind Flow Modelling

Identification of District wise wind potential zones

NIWE has undertaken the task of identifying the district wise indicative wind potential in the eight windy States to facilitate PGCIL (CTU) in assessing the evacuation and transmission infrastructure requirement for achieving wind power capacity target. The district wise potential has been estimated for various pockets based on land grading (Rank I/II/III) and will also help State Nodal Agencies (SNAs) in identifying the technical potential of the States.

OFFSHORE ACTIVITIES

Offshore Wind Measurements at Gulf of Khambhat

NIWE has installed its first offshore wind monitoring station at Gulf of Khambhat, off Gujarat Coast. Windcube V2 LiDAR was installed during October 2017 and commissioned on 1st November 2017. The LiDAR was installed on the platform developed jointly by NIWE / FOWIND team on 31.10.2017. The measurements were commenced from 01.11.2017 after configuring the LiDAR instrument. The offshore structure and Remote sensing device LiDAR are shown in Figures below.

Monopile platform at Gulf of Khambhat

LiDAR at Offshore Platform

LiDAR has been configured to measure the wind profile at 12 different heights suitable to the wind turbines available for offshore. The offshore LiDAR has been successfully installed and the data is being successfully transmitted to NIWE's server.

NIWE has further initiated Tidal measurements at the LiDAR platform at Gulf of Khambhat. The instrument measures the Water level by using RADAR principle. It consists of two antennas for transmitting and receiving pulses. Transmitting antenna emits the pulses and the reflected pulses

RADAR – Tide level sensor

LiDAR substructure after installation of RADAR level sensor

will be received by another antenna. The tidal measurements will be useful to better understand the water level and sea-state conditions for designing of offshore wind farm development in the said area.

Geophysical Survey for Offshore Wind Farms

First Offshore Wind Project in India (FOWPI), a project funded by European Union lead by M/s COWI A/s, Denmark has been working on various aspects of wind farm development such as Met ocean Modeling, Geophysical Studies, Foundation report, Environmental Impact Assessment (EIA) for a designated capacity of 200 MW wind farm in a 70 Sq. Km at Gulf of Khambhat off Gujarat Coast near LiDAR location. The Survey has been done by Fugro Survey India. The survey covers the geophysical aspects like Bathymetry, Seabed Topology, Sub – bottom profile for finding the seabed sedimentation, geo hazards, sea bed depressions, and ferro-metallic anomalies in and under sea bed. The survey started during the month of December 2017 and completed by January 2018. The Survey vessel MV Kamrup is shown in Figure below.

Offshore LiDAR based Wind Measurements at Gulf of Mannar

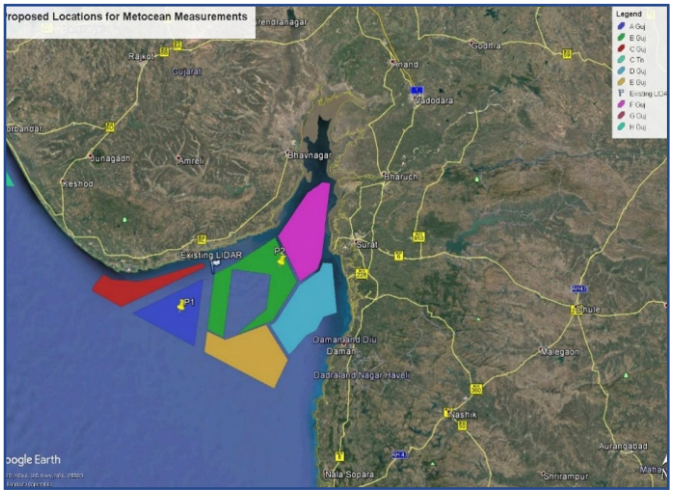
NIWE has initiated installation of offshore wind monitoring station at Gulf of Mannar Off Tamil Nadu Coast. The geotechnical survey at the point of installation of LiDAR platform will be carried out, which will provide useful pointers in designing the offshore substructure (monopile + platform) for mounting the LiDAR for carrying out offshore wind resource assessment.

Onshore LiDAR based Wind Measurements at Dhanushkodi

NIWE has installed 100 M tall Wind Monitoring Station at Dhanushkodi, Rameswaram at Tamil Nadu Coast. Recently, Wind Resource Assessment and Offshore team carried out one month wind

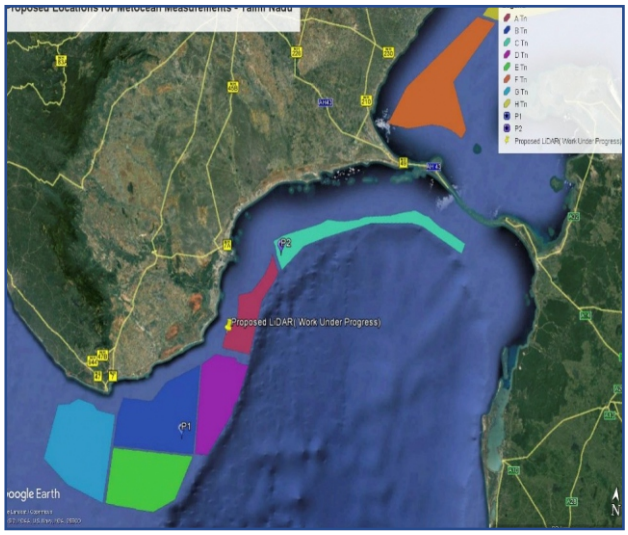
measurement using LiDAR for Validation of Mast Data along with LiDAR data at various altitudes. The Study carried out will further provide useful pointers for future in planning, designing the offshore substructure (monopile + platform) for mounting the LiDAR for carrying out offshore wind resource assessment.

Met-Ocean measurements (Wind, Wave, Tide, Current, Water level, etc) at Gulf of Khambhat and Gulf of Mannar for fostering the growth of offshore wind in the country

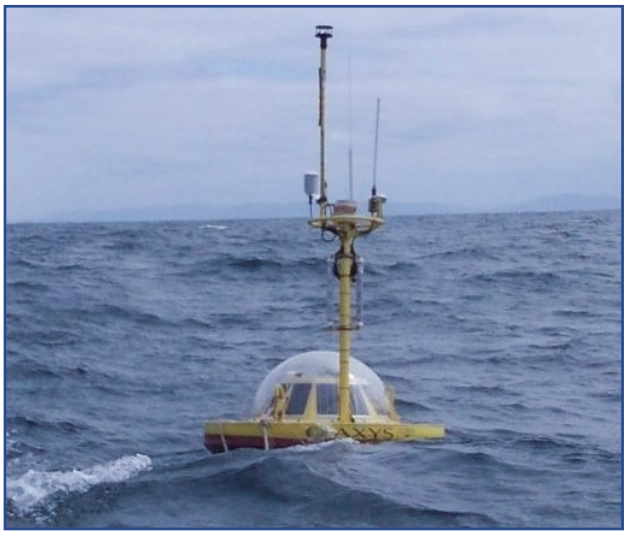


Proposed met-ocean locations in Gulf of Khambhat, Gujarat

NIWE in the process of exploring the largest seabed areas off Gujarat and Tamil Nadu coasts with an objective to identify the potential subzones / blocks for promotion of offshore wind farm development in the country. For the purpose, it is proposed to procure 4 more LiDARs (2 for Gujarat and 2 for Tamil Nadu) to carry out extensive wind resource assessment. In addition to this, NIWE proposes to carry out the Oceanographic / Hydrographic measurements, which include Water level, Wave Height and period, Current speed and direction and other derived parameters such as Significant Wave Height, Wave period, etc., in and around the wind LiDAR platforms or suitable locations off the Gujarat coast and Tamil Nadu coast to understand the sea-state conditions, which are envisaged as essential and necessary to design the foundation of the Offshore wind turbines. Based on the study, NIWE will plan the installation & other survey activities to understand the Weather Window for Operation and Maintenance planning.



Proposed met-ocean locations in Gulf of Mannar, Tamil Nadu


Typical diagram of met-ocean Buoy

NIWE-FOWPI Met - ocean workshop

NIWE and First Offshore Wind Project in India (FOWPI) have been jointly working on strengthening the country's offshore wind energy sector with capacity building activities and providing technical assistance in preliminary implementation of first off-shore wind project of India, on a seabed area of 70 sq. km. with a tentative capacity sizing of 200 MW near the Gulf of Khambhat, Gujarat.

Met-ocean Studies has been carried out by COWI A/s under FOWPI project for the proposed site area of 70 sq.km. in Zone B (identified under FOWIND project). NIWE and FOWPI jointly conducted Met – Ocean workshop at NIWE on 2nd June 2017, to share the outcome of the Met Ocean studies, with the stakeholders. The workshop facilitated the transfer of knowledge and technological know-how from the EU experience in offshore wind energy sector and its adaptability to the Indian context. It was attended by 50 participants from various government organizations and wind turbine manufacturers.

NIWE-FOWPI Metocean workshop

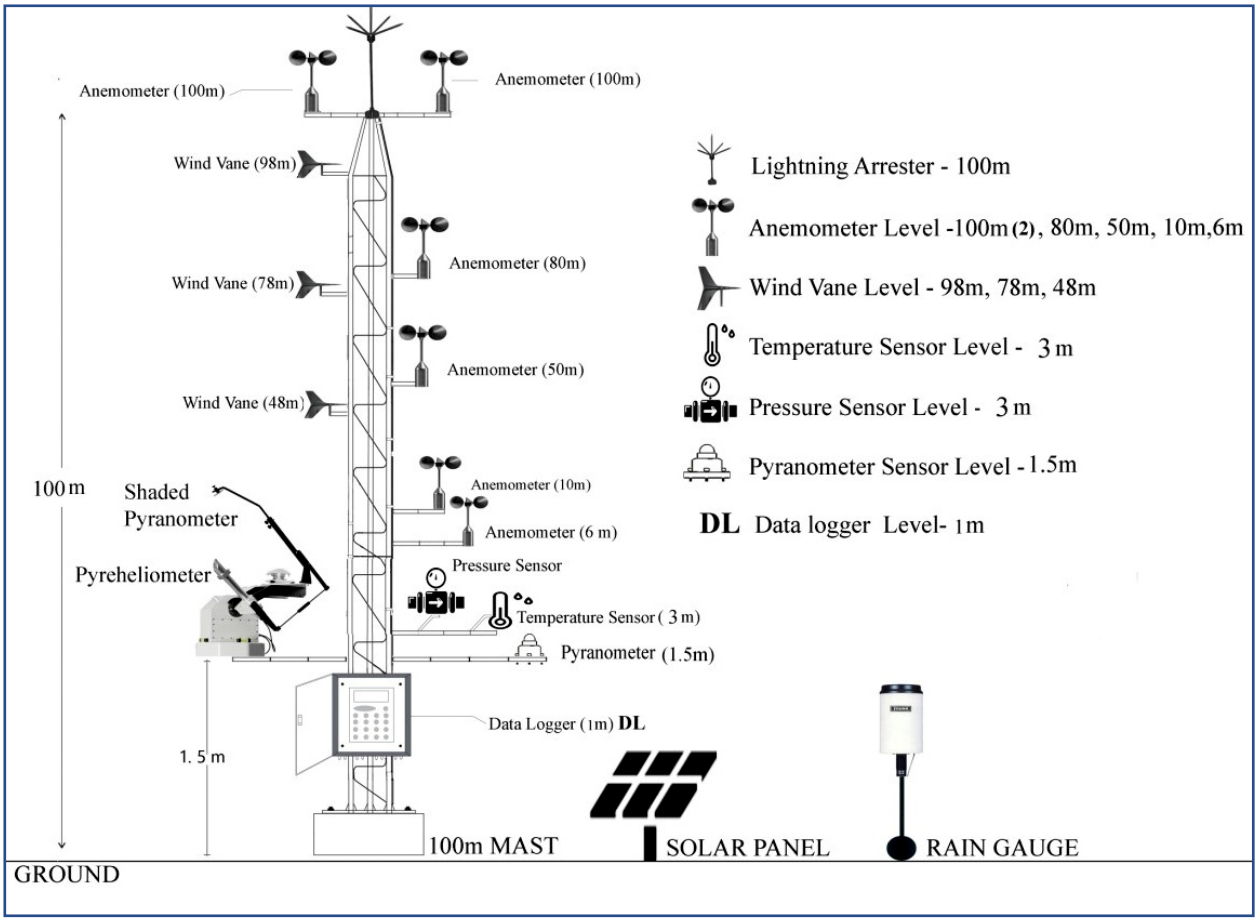
FOWPI – EU Workshop on 'Foundation Design for Offshore Wind Farms in India'

NIWE and the First Offshore Wind Project of India (FOWPI - Project Management Team) jointly organized a half-day event on 'Foundation Design for Offshore Wind Farms in India' on 20th March 2018 to showcase the outcome of the studies carried out by FOWPI.

The workshop facilitated the transfer of knowledge and technological know-how from the EU experience in offshore wind energy sector and its adaptability to the Indian context.

Integrated Wind and Solar Resource Assessment through Mapping and Measurements

Reliable background information on the availability of renewable resource and its geographical variation will play a major role in achieving the government's ambitious targets. As the wind speed increases with respect to height, the hub height extension is being looked into one of the effective solutions to enhance the energy yield from the wind turbines. With the technical advancements, the modern day turbines have reached the hub height of 120 m to 130 m and further enhancement in hub height is foreseen, which would require higher height maps. Studies have also revealed that solar and



Typical Layout for Integrated Wind - Solar Station

winds are almost complementary to each other. Hybridization of these two technologies would help in minimizing the variability apart from optimally utilizing the infrastructure including land & transmission system and a hybrid potential map in this regard would be very much helpful for the stakeholders to identify suitable sites for further investigation. NIWE proposes to prepare indicative Renewable Energy potential maps (wind maps at 120 m & 150 m and Hybrid maps) through advanced numerical meso-scale modeling techniques and validate the maps with integrated wind and solar, wind monitoring station and remote sensing in-situ ground measurements to move towards achieving the ambitious goals as envisaged by the government.

Visitor

Officials from CUEL Ltd., Bangkok, Thailand visited WRA&O unit to study offshore wind energy development in India.

TESTING & FORECASTING

The Testing services offered by NIWE are accredited by National Accreditation Board for Testing and Calibration Laboratories (NABL) as per the requirements of ISO/IEC 17025. NIWE is the only Test Laboratory in India accredited for providing the services related to Type testing of Wind Turbines in the context of wind turbine type certification in compliance with relevant and defined standards and rules. NABL is a full member in ILAC (International Laboratory Accreditation Cooperation) as well as APLAC (Asia Pacific Accreditation Cooperation) through Mutual Recognition Arrangements (MRA).The mutual evaluation and acceptance of other MRA partner laboratory accreditation systems facilitate acceptance of NIWE's test results between countries to which MRA partners represent.

NIWE's testing services conform to National and IEC standards and as per the requirements of International schemes recognized by the Government of India. The services offered are delivered to various stake holders are as per International practices which are prompt and reliable.

NIWE's Wind Turbine Test Station (WTTS) at Kayathar in Tamil Nadu was established with the technical assistance of RISØ 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 wind monitoring stations in front of each test bed, designed to heights of 75 meters and 50 meters for acquiring 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 sensors and transducers. 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 nine nos. of 200 kW Micon make wind turbines 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.

TESTING

NIWE has established a test facility at Wind Turbine Test Station (WTTS), Kayathar, Thuthukudi District, Tamil Nadu, 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 as per International standards IEC 61400-1, IEC 61400-12-1, IEC 61400-13.

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

The above mentioned tests are also carried out at customer sites, if the site meets the requirements of IEC Standards regarding terrain, obstacles, sector for measurements and wind conditions.

Earth Pit Resistance Measurement of 1000 kW WT at Richadewda, Ratlam District, Madhya Pradesh of M/s. XYRON TECHNOLOGIES LTD.

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


Agreement signed between NIWE & INOX for Power Curve Measurement of Inox 2000 kW WT with 113 rotor diameter

Testing Projects

- Type Testing of XYRON 1000 kW wind turbine at Richadewda, Ratlam District, Madhya Pradesh. The measurements have been completed as per the signed agreement and the draft test reports are under preparation.
- An agreement was signed between NIWE & M/s. Inox Wind Ltd on 18th August 2017 for Power Curve Measurements of INOX 2000 kW wind turbine with 13 meter rotor diameter at Ranipat Village, Muli Taluk, Surendranagar District, Gujarat. The measurements are under progress.
- An agreement was signed between NIWE & M/s. Para Enterprises Pvt. Ltd. on 4th September, 2017 for Power Curve Measurements & Special Measurements for Loads of Pioneer 750 kW wind turbine W49-HH60, a wind turbine with 49 meter rotor diameter at Poigai Village, Tenkasi Taluk, Tirunelveli District, Tamil Nadu. The measurement are under progress.


Instrumentation work of Inox 2000 kW WT with 113 rotor diameter at Ranipat Village,
Muli Taluk, Surendranagar (Dist), Gujarat of M/s. INOX WIND LTD.

- Site Feasibility Study (SFS) for the proposed Type Testing of Pioneer 750 kW wind turbine at Cheliyanallur Village, Manur Taluk, Tirunelveli District, Tamil Nadu of M/s. PARA Enterprises Pvt. Ltd. has been carried out.

Future Plans

- Establishment of Low Voltage Ride Through (LVRT) Testing facilities – LVRT test facility as per CEA (Technical standards for connectivity to the grid) for carrying out LVRT testing on wind turbines.
- Bench marking of costs for assessment of Capital Costs and O&M Costs for Wind Energy Technology for estimating Tariff as per the requirements of CERC/SERC.
- Testing Facility for active power control, reactive control, frequency response and other grid requirements in wind turbines – One Grid Emulation Facility for wind turbine for testing grid compliance of wind turbines as per CEA -Technical standards for connectivity to the grid.
- Testing Facility Accreditation as per the new IECRE regulations.
- Power Curve Guarantee Test (PCGT) for larger wind turbines.
- Acoustic Noise Measurements on wind turbines as per the IEC Standard 61400-11.
- Up-gradation of testing laboratory's Quality Management System as per the requirement of ISO / IEC 17025:2017.

Small Wind Turbine

Testing of Small Wind Turbines (SWT) are carried out as per the IEC Standards at WTTS, Kayathar, Tuticorin District, Tamil Nadu. The following tests are carried as per IEC 61400-2 and IEC 61400-12-1.

1. Power Curve Measurements
2. Safety Tests
3. Duration Tests

Testing Projects

- An agreement has been signed for Type testing of SM2 (1 kW) at Wind Turbine Research Station, Kayathar, Tuticorin District, Tamil Nadu of M/s. Windstream Energy Technologies India Pvt. Ltd.

- Type Testing of model Vaata Smart, Vertical Axis WT (5.5 kW) has been initiated at Wind Turbine Research Station (WTRS), Kayathar of M/s. Vaata Smart Ltd. The Instrumentation work is under progress.

FORECASTING

The Centre for Excellence (CFE) in Variable Generation Forecasting (Wind & Solar Generation) has been established at NIWE, Chennai. As a part of CFE project, NIWE has developed the version 0.0 of day ahead indigenous forecasting model using the generation data and NWP data. In addition, NIWE has also created an operational forecast system with simulation tools, to predict the wind power up to 7 days ahead. In order to improve the forecasting model, NIWE has signed MoU with ISRO SAC for 'Development of Wind and Solar Power Forecasting using High Resolution Numerical Model'. Currently, NIWE is developing the indigenous Intra-day forecasting model and also carrying out various activities to improve / fine-tune the day ahead model from the inputs received during the delivery of pilot operational forecasts to RE SLDCs. NIWE has signed MoUs with Gujarat, Rajasthan, Andhra Pradesh and Karnataka for providing pilot forecasting services to respective states. The pilot forecasting services have already initiated for the entire state of Gujarat.

Important Events

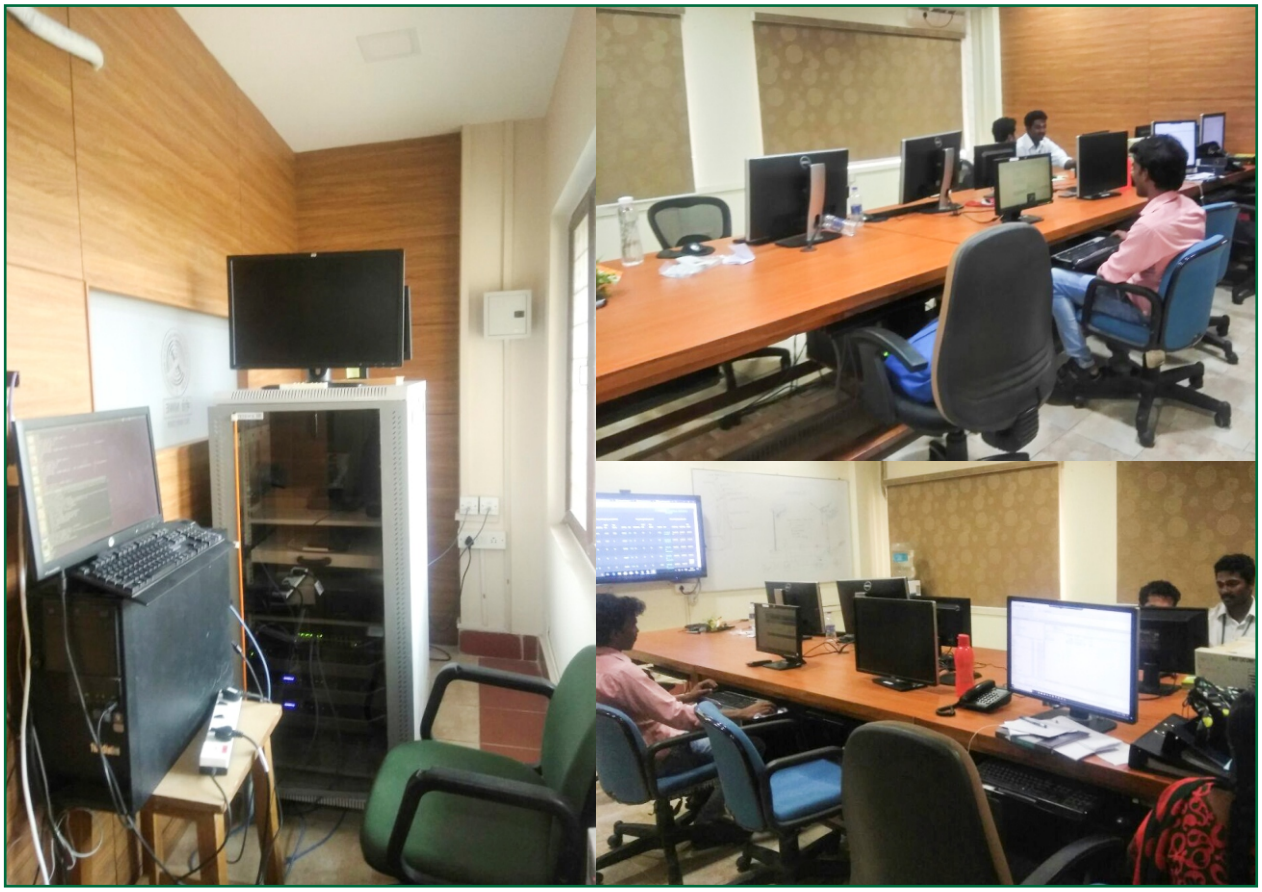
- NIWE has developed the generalized framework of Wind Power Forecasting model with statistical / mathematical model, calibration, and dynamic model selection module.
- Simulation algorithm developed to simulate the results of historical model, calibration module, Dynamic model selection module outputs.
- Validation and improvement of NWP models through bias correction and real time measurements.

Future Plans

- Initiation of Pilot Wind and solar Power Forecasting services to RE rich State.
- Validation & improvement of developed indigenous Wind Power Forecasting model.
- Advanced techniques for VG Forecasting.

Establishment of Centre for Excellence in Renewable Forecasting at NIWE

- The Variable Generation (VG) Forecasting lab for offering specilized services under forecasting to the stakeholders.
- New workspace has been created in the forecasting lab to have better interaction amongst the forecasting team.
- The new server has been procured and configured to deliver operational forecast.



Server Room VG Forecasting Laboratory

- Various trainings are being imparted to the forecasting team for handling the operational wind power forecasting system.

Forecasting Status

- Training of the model with actual generation data has been carried out and testing of the model is under progress.
- Forecasting Model is being developed for Gujarat State.
- Improvement of the NWP physical model and to reduce the uncertainty, various discussions have been done with NCMRWF and ISRO- SAC scientists.

Achievements

- Drafting of specifications for LVRT equipment as per CEA Technical Standards for connectivity to the grid.
- Completion of testing projects as per agreed terms with customer.
- Maintenance of International accreditation as per the requirements of ISO/IEC 17025:2005.
- Attended the Internal Audit for ISO 9001:2008 on Testing & Forecasting held on 1st September 2017 at Chennai and on 4th September 2017 at WTTS, Kayathar.

- Attended the Twentieth Management Review Meeting for ISO 9001:2008 Quality Management System held on 27th September 2017 at NIWE, Chennai.
- Attended the First Periodic Audit of QMS to ISO 9001-2008 by DNV-GL held on 9th October 2017 at WTTS, Kayathar.
- The team visited Gujarat SLDC, Jetpur Sub-SLDC, Gandhinagar Sub-SLDC, backup SLDC for understanding the data management / monitoring system in Gujarat during 3rd to 5th November 2017.
- Internal audit has been conducted as per ISO/IEC 17025:2005 standard held on 30th November 2017 at WTTS, Kayathar.
- The team has attended the Internal Audit – NABL - ISO / IEC 17025:2005 held on 11th December 2017 at NIWE, Chennai.
- The team has attended Twelfth Management Review Meeting pertaining to ISO/IEC 17025:2005 held on 19th December 2017 at NIWE, Chennai.

Glimpse of International Workshop

- As directed by MNRE and as a part of the Capacity building, NIWE has designed and organised the International Workshop on 'Current Practices in Wind and Solar Forecasting' during 22nd January 2018 at Hotel Trident, Chennai.

The International Workshop has enabled interactions with 22 National and International VG forecasting specialists in the areas of Wind & Solar Forecasting, Hybrid Approach in Wind / Solar Forecasting, Advancement in Physical Model of Wind / Solar power Forecasting and Forecasting and Allied Issues. The interactions between forecasters and utilities creating awareness about the science involved, capacity building for forecasters with new techniques which were demonstrated with better accuracies has summarized a way forward for improving the competencies of personnel along with innovation and implementation of new VG forecasting techniques.

Visitors

- Mr. Albert Bosch, Engineer, M/s. Vortex, Spain has been deputed to NIWE for discussion with Forecasting officials to take necessary corrective actions to improve the accuracy of forecast during 9th to 21st June 2017.
- Testing & Forecasting officials had meeting with Mr. B.B. Mehta, Chief Engineer, SLDC, Gujarat at NIWE, Chennai regarding establishment of operational Wind Power Forecasting System for Gujarat on 22nd January 2018.
- Dr. Jordi Nadal and Mr. Parvindar Batth, AIA Officials visited NIWE and delivered a lecture on 'Overview of Machine Learning' to Testing & Forecasting team on 23rd January 2018.
- Mr. Kashish Bambani, Chief Engineer, PGCIL visited NIWE regarding discussion with Forecasting Officials on REMC project on 12th December 2017.

WIND TURBINE RESEARCH STATION

NIWE established Experimental Wind Turbine Research Station at Kayathar, Thuthukudi District of Tamil Nadu which is 600 kilometer away from Chennai in south of Tamil Nadu. The Experimental Research Station was established in one of the Windy Pass area namely Senkottai Pass which is considered as best windy area in Tamil Nadu. This station was spread over approximately 100 acres of land with an installed capacity of 6400 kW which comprises of nine number of 200 kW Wind Electric Generators (WEG) (29 years old wind turbines), one 600 kW Wind Electric Generator (WEG) (Type -2), one 2000 kW Wind Electric Generator (Variable Speed WEG) (Type-4) and one 2000 kW Wind Electric Generator (DFIG WEG) (Type-3) for conducting various R&D related activities. In addition to Type Testing facilities of Large WEG, Small Wind Turbine performance testing facilities at the Test Beds was also created with all infrastructure at the Research Station. NIWE owned R&D infrastructure machines at Kayathar comprises first generation (200kW) WEG`s to the latest generation (2000 kW variable speed & DFIG models) WEG. Various Strategic efforts are being experimented to improve the machines overall efficiency for the first generation WEG`s (200 kW) after complete renovations of the machines. Additional R&D facility was created for grid integration of Wind – Solar Hybrid in one of the 200 kW MICON WEG by adding 75 kWp Solar Power with existing available land, transformer and transmission lines etc. and on line Wind data collection from 3 different wind monitoring stations of different heights 50m,75m and 120m.

Regular Preventive and Breakdown Operation & Maintenance of Wind Electric Generators at WTRS, Kayathar

Regular preventive and breakdown Operation & Maintenance works carried out in all aspects for the renovated 29 years old first generation 9 nos. of 200 kW MICON WEG`S, 2000 kW KENERSYS WEG, 2000 kW INOX WEG and 600 kW SUZLON WEG at Wind Turbine Research station, Kayathar for continuous & uninterrupted working of all the WEG`s during the windy season of 2017 and total energy generated is fed into the grid.

Monitoring of Grid Integration Solar PV power with Existing Wind Electric Generator on hybrid mode at WTRS, Wind Farm

After completion of works on solarisation of wind farm by a hybrid study on grid integration of 75 kW solar PV power with one of the 29 years old under performing 200 kW MICON wind electric generator at WTRS, Kayathar for maximum utilisation of connected grid load and flat power supply during peak windy season period by utilising existing land, transformer, transmission line etc. The performance of the hybrid system was monitored during the windy season 2017. This model of solarisation (wind – solar grid connected hybrid) of wind farm is first of its kind in India. The research knowledge and experience on the field performance of large scale integration of solar PV power with Wind Farm (wind energy) will throw new light to maximize the full load grid connected capacity and flat power supply to grid for increasing the net (wind-solar) capacity utilization factor (CUF) of the plant during season / off-season periods. The mathematical modelling of the above integration of 75 kWp solar power with 200 kW wind electric generator have been completed.

Shri. Rajeev Kapoor, I.A.S., Secretary, MNRE, New Delhi visited the R&D facilities of WTRS/WTTS, Kayathar and inaugurated Grid Integration of 75 kWp Solar PV power plant with existing 200 kW MICON wind electric generator using existing land, transformer and transmission line etc., on 8th April 2017.

Secretary MNRE inaugurating Wind-Solar Hybrid Power Plant, WTRS, Kayathar

Industrial Visit by Educational Institutions

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

- 40 PG students of Mechanical and Electrical & Electronics Dept. from Indian Institute of Technology, Chennai on 9th April 2017.
- 26 UG students and 4 staff members of Dept. of Electronics and Communication Engineering of Kalasalingam Institute of Technology, Krishanankoil, Virudhunagar on 22nd May 2017.

- 9 delegates of 19th International Training Program on Wind Turbine Technology and Application on 14th July 2017.
- 110 students and 6 staff from Savitha Engineering College, Chennai on 17th July 2017.
- 36 students and 2 staff from Tamil Nadu Agricultural University College, Coimbatore on 18th August 2017.
- 18 delegates of 20th International Training Programme on Wind Turbine Technology and Application on 25th August 2017.
- 11 M.Tech. students and one faculty from Department of Renewable Energy, Rajasthan Technical University, Kota, Rajasthan on 3rd October 2017.
- 20 participants of Special International Training Course on Design, Installation & Maintenance of Small Wind Turbine on 3rd November 2017.
- 18 M.Tech. (Energy) students and 2 faculty members from Central University of Jharkhand, Ranchi on 7th November 2017.
- 28 delegates from Special International Training Programme for African Countries on Wind Turbine Technology and Application on 1st December 2017.
- 46 students and 10 faculty members from Electrical & Electronics Engineering Department from Francis Xavier Engineering College, Tirunelveli on 6th December 2017.
- 28 delegates of 21st International Training Course on 'Wind Turbine Technology and Applications' on 9th February 2018.
- 44 students and 4 faculty members from Francis Xavier Engineering College, Tirunelveli on 17th February 2018.
- 30 students and 3 faculty members from St. Xavier`s Catholic College of Engineering, Tirunelveli of Electrical Electronics Engineering Group on 2nd March 2018.
- 43 students and 2 faculty members from MEPCO Engineering College, Sivakasi of Electrical Electronics Engineering Group on 2nd March 2018.
- 18 students and 1 faculty member from National Power Training Institute (NPTI), Neyveli during 26th to 30th March 2018.

Visit of ICF, Fraunhofer to WTRS, Kayathar for VPP Project

Trainees from National Power Training Institute (NPTI), Neyveli

International Training Delegates visiting WTTS / WTRS / R&D facilities at WTRS, Kayathar

STANDARDS AND CERTIFICATION

Wind energy sector is rapidly growing in India with the 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. MNRE approved National Institute of Wind energy (NIWE) as Type Certification Body in India for all the wind related issues.

CERTIFICATION

Certification - Renewals Completed in 2017-18

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

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

Also completed two projects on revision of Provisional Type Certificates of wind turbine models viz., V 39 – 500 kW with 47m rotor diameter & Pawan Shakthi- 600 kW during the year.

In addition, 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 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, S&C unit has taken up the following Certification Projects along with M/s. TUV Rheinland:

- Witnessing of Safety and Function test and personal safety for a wind turbine model at the test site as a part of Type Certification.

- Evaluation of Grid Code Compliance of a wind turbine models as per CEA Technical standard for connectivity to the Grid

In addition to the above, the unit has taken up a technical due - diligence project from IREDA during the year and the project is under progress.

STANDARDS

Bureau of Indian Standards (BIS) is the National Standards Body which issues Indian Standards. A committee viz., Wind Turbines Sectional Committee (ETD 42) has been formulated by BIS for the preparation of Indian standards on wind turbines, under the Chairmanship of Director General, NIWE. S&C unit, which is a part of BIS ETD 42 committee, provides the technical support to BIS in all the standards related works and for the preparation of Indian Standards on wind turbines by providing support to BIS. Six Indian standards on wind turbines have already been finalized. Based on the contribution, during the year, one Indian standard has been finalized.

Electro-technical Division Council Meeting

Director & Group Head, S&C attended the Electro-technical Division council committee meeting along with Director General, NIWE at Bureau of Indian Standards (BIS) Head Quarters, New Delhi on 20th December 2017.

Wind Turbines Sectional Committee (ETD 42) Meeting

During the year, S&C unit organized 8th meeting of Wind Turbines Sectional Committee (ETD 42) of Bureau of Indian Standards (BIS) held at NIWE, Chennai on 23rd March 2018 under the chairmanship of DG, NIWE. In addition, S&C unit provided the technical support also to BIS for conducting the meeting. Director & Group Head, S&C, participated in the said ETD 42 Committee meeting and explained the status of various Standards related works being carried out by NIWE.

Contribution to IEC / IECRE

S&C unit provides the technical support to ETDC division of BIS regularly, on the works related to International Electrotechnical Commission (IEC) standards by reviewing various draft IEC standards / documents and also preparing voting recommendations for those draft IEC standards / documents for IEC TC 88 Committee.

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 already obtained the membership for India in IECRE system. S&C unit is providing the technical support regularly to Central Marks Department (CMD) of BIS on IECRE related works. During the year, review of six draft documents of IECRE has been completed and voting recommendations for the same have been prepared by S&C unit and sent the same to BIS for further forwarding to IECRE.

Prototype Wind Turbine Models

MNRE amended guidelines dated 2nd June 2016 for installation of prototype wind turbine models in India are being implemented by S&C Unit. It facilitates the installation of Prototype wind turbine models in India to carry out the Type Testing for obtaining Type Certificate and also to carry out the developmental works. S&C unit provides the technical support to the committee in the verification of the documentation on the prototype wind turbine models provided by various wind turbine manufacturers. The guidelines 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.

During the year, the unit has issued recommendation letters, in connection with grid synchronization for two prototype wind turbine models with a rated capacity of 2100 kW & 2600 kW for the purpose of Type testing.

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, S&C unit has successfully undergone the First Periodic Audit and recommended for continuation of certification issued by DNV-GL. The continual improvement and maintaining the Quality Management System are ongoing. Also organized the 20th Management Review (MR) meeting of Quality Management System as per ISO 9001:2008 at NIWE, Chennai on 27th September 2017.

In connection with upgradation of Quality Management System to ISO 9001:2015, S&C unit organized the three days Awareness – cum – Internal Auditor Training Program on ISO 9001:2015 conducted by M/s. DNV GL – Business Assurance India Private Limited for NIWE Staff during 3rd to 5th May 2017.

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

S&C unit providing the technical support to MNRE to scrutiny of various documents including Type Certificate documentation provided by various wind turbine manufacturers in connection with RLMM.

Director & Group Head, S&C along with Director General attended the RLMM committee meeting to review, evaluate and recommend the WTG manufacturer / models for inclusion in the RLMM list held at MNRE, New Delhi on 9th January 2018.

Issuing renewed Certificate to M/s. RRB Energy Limited

Awareness – cum – Internal Auditor Training Program on ISO 9001:2015 for NIWE Staff

25th R&D Council meeting held at NIWE, Chennai

First Periodic Audit of QMS as per ISO 9001:2008 conducted by DNV-GL

8th BIS ET 42 meeting held at NIWE, Chennai

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

41st Governing Council meeting of NIWE held at NIWE, Chennai on 17.03.2018

RESEARCH AND DEVELOPMENT

R&D supports time bound and mission oriented Research & Development programs to achieve world class, reliable and cost effective technology in wind power systems. The efforts continue to improve its knowledge and skills through continuous learning to keep pace with state-of-the-art technology and excels through its effective networking with other Academic & Research Institutions.

Research and Development unit is planned through the following outreach programs:

1. Research Funded Proposal
2. Research Council of NIWE
3. Pan India Network
4. Energy Storage Mission Document
5. Student Internship & Final year Project
6. Information Technology unit of NIWE

1) Research fund proposal

The objective is to develop and strengthen the facilities and capabilities; evolve strategies; and promote, conduct, coordinate, and support research and development programs to achieve and maintain reliable and cost-effective technology in wind power systems.

To meet the above objective, research proposals are received from various research / academic institutions, universities, industry, research scholars and consultancy organizations under the areas of Wind Turbine Components / new and Alternate Materials for Construction, Hybrid Systems, Research in Wind Resource Assessment, Condition monitoring of Wind Turbine.

In the year 2017-18, NIWE received 44 RFP proposals from various Institutions / organisation for funding. The proposals were placed in the evaluation committee and the feedback of the proposals were sent to the proponents respectively.

2) Research Council of NIWE

The unit coordinated successfully NIWE's Twenty- Sixth meeting of its research council on 07.03.2018 under the chairmanship of Shri.S.K.Soonee, Adviser & former Chief Executive Officer (CEO) Power System Operation Corporation Limited (subsidiary of POWERGRID).

In-house project titled 'Establishment of Small Wind Turbine Hub Facility for Design and Component Testing at the Renewable Demonstration Lab in Wind Turbine Research Station(WTRS), Kayathar' was given principle approval by the RC. The objective is to create SWT hub Facility for Design and component Test at WTRS, Kayathar consisting of Small Wind turbine Design Assessment Laboratory, Maker's Space, Blade Testing Laboratory, Drive-train Testing Laboratory, Wind Turbine field Testing Setup to facilitate researcher, stakeholders to carry out innovative design and developments in Small Wind Turbines.

Similarly, an in-house proposal titled 'Establishment of National Research and Test Centre for Offshore Wind Turbines at Dhanushkodi' was also given principle approval by the RC and the objective of the center is to create an indigenous offshore wind turbine testing facility and to gain expertise on offshore wind utilization in India.

The in-house project titled 'Small Wind Turbine International hands on workshop & Conference' was given principle approval by the RC committee, the main objective of the conference is the exchange of open source technical advances, share experiences and discuss global best practices to enable the technology to expand rural wind electrification globally, with a particular emphasis on India.

The RC Committee have given principle approval for the project titled 'Establishment of Testing Facility for active power control, reactive control, frequency response and other grid requirements in Wind Turbines'. The objective of the proposal is to establish test facility with rated capacity of 5MVA as per the requirements of CEA (Technical Standards for Connectivity to the Grid), IEC test cases and some specific manufacturer's requirements. It was further informed that the following requirements would be addressed through the facility: Active power Control test; Reactive power; power factor and voltage control testing; Frequency response test ; Other Grid Requirements like Grid condition simulation (strong and weak) , Protection system testing (OV,UV and Hz limits), Balanced & Unbalanced Low/High Voltage fault ride through test , Power Quality characteristics.

The in-house proposal 'Development of LVRT for Sub-Megawatt Class Wind Turbine' (R&D proposal submitted to MNRE) was given in-principle approval by RCand the objective of the

proposed was to meet the need for conventional constant speed wind turbine to be made LVRT compliant by new design approaches with power electronics convertors and controllers and requests from Industry were received towards the same

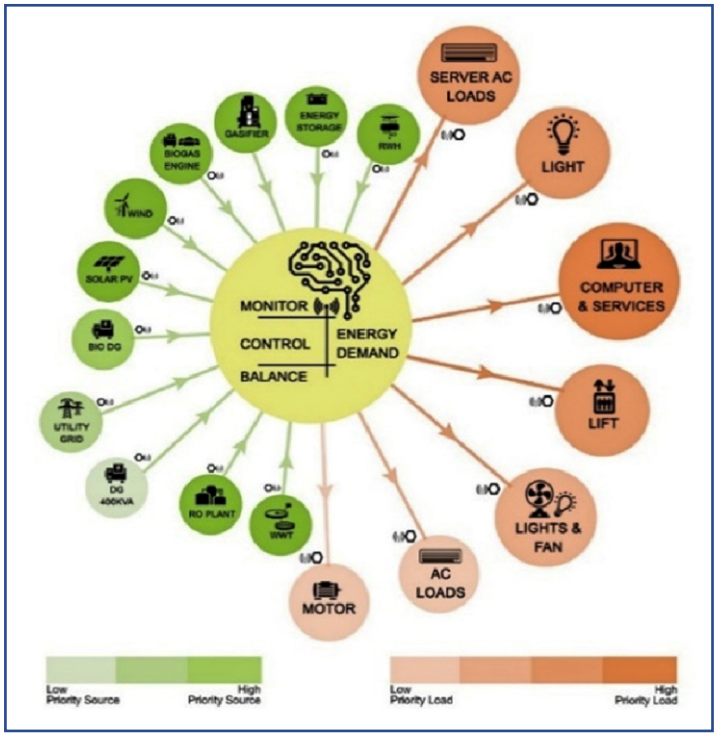
The in-house project 'Blade Test Facility for Wind Turbines', is to develop and test of large Wind Turbine blades. The main objectives shall focus in the areas of material evaluation, quality checks and testing of the blades, the facilities of which are currently not available in the country.

3) Establishment of Smart RE-Micro Grid with Integrated Resource and Building Management System (IRBM) at NIWE's Chennai Campus

The recent development in Internet of Things (IoT), Artificial Intelligence (AI) and reliable smart sensors have come of age in the past few years. These technologies can be integrated to manage different RE technologies seamlessly based on energy demand and load profile without any restrictions to time of day or comfort thus fostering development of Micro Grid.

Apart from energy, water and waste management is also important for a sustainable today. Hence the smart integration of these vital resources is also needed to achieve a low ecological footprint of the respective campus.

By considering the above, a proposal has been approved for 'Establishment of Smart RE-Micro Grid with Integrated Resource and Building Management system (IRBM) at National Institute of Wind Energy, Chennai Campus' to make the campus an Energy Net Positive and with low ecological footprint.



Source and Load Priority Sample Chart

To establish a smart RE-Micro Grid with priority source - load management, along with water conservation and waste management and thereby establishing the NIWE as grid independent and low ecological footprint campus.

The project will provide a platform to undertake various Research and development studies such as RE sources effective utilization and integration, Micro grid Energy Management, Performance and stability Analysis, load Forecasting, Grid integration, Power quality issues, Management of Micro Grids using smart Internet of Things ((IoT) technologies, study of power flow in micro grid, Energy Accounting and Measurements etc. which improves energy security and better understanding of smart Microgrid.

4) Establishment of Pan-India Research Network

NIWE through its R&D Council have been continuously supporting (Technical & Financial Assistance) and guiding various Government / Private Educational Institutions, Organizations, Manufacturing Industries in their R&D activities related to Wind Engineering & Technology. The R&D Council of NIWE comprises of multi-disciplinary expert panel from various renowned research/ technical institutions and Government agencies in the country. During the last meeting of the R&D Council of NIWE, it was decided to establish a Pan-India Research Network i.e., all the OEM's of WT's, researchers and institutions conducting work in Wind engineering / Technology to be brought to one common platform, which will open an indigenous research network in India. The intention is to create the hub of synergy for all wind related research in India, where Industry identified issues will be taken up for research by a consortia of Academia with support from MNRE through NIWE.

To create the aforesaid platform, various Government/ Private Educational Institutions, Organizations, Manufacturing Industries, were asked for their support and co-operation by making available a contact person within their Institute for joining us in our networking meetings and taking the research network forward with NIWE. The first meeting of the PAN India Research Network is expected to happen in the 1st Quarter of FY 2018-19 in Chennai.

5) Energy Storage Mission document

The unit has contributed towards the drafting of the Energy Storage Mission document as desired by MNRE in the specific area of Standards and Testing. The draft prepared by NIWE as the lead author had been circulated to India Energy Storage Alliance (IESA), National Institute of Solar Energy (NISE) and Central Electricity Authority (CEA) the other members in the sub committee. Final draft is presently under circulation for comments by MNRE.

6) Student Internship & Final Year

Engineering Student Projects & Internships are offered as a means of grooming future professionals for probable entry to wind energy sector & allied fields.

About 30 graduate and post-graduate students are presently pursing Internship and project work at NIWE under the mentorship of NIWE officials.

7) Information Technology unit of NIWE

The IT division is moving towards creating a lean and efficient infrastructure to enable its personnel for better working environment and Productivity. The division is presently working to build its skills in the area of Data Analytics, Design Thinking, Machine Learning and Internet of Things (IoT), which are foreseen as Critical areas of expertise that NIWE will need in this era of big data.

X INFORMATION, TRAINING AND CUSTOMIZED SERVICES

NIWE is one of the only premier institute of its kind in the developing countries and it is NIWE's responsibility to scale up wind energy development not only in the country but also in neighboring 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 programs is providing 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 of the Unit during 2017-18:

Training Programs

One of the prime activities of this Unit is conducting training courses for National and International participants on various aspects of Wind Energy Technology. The unit has already successfully organized 28 International and 27 National Training courses including special and customized training courses since 2004. Till now more than 1200 national participants from all parts of the country and 596 international professionals from more than 80 countries were trained.

During the year 2017-18, total of 8 Training courses conducted (3 National and 5 International training courses) with the lectures of the courses delivered by eminent scientists, engineers and other wind energy professionals with years of experience drawn from NIWE, wind turbine industries and academic institutions. As part of every training, Course Material (compilation of write-ups of all the presentations / lectures) is provided, specially prepared for the benefit of the participants.

National Training Course

The National training courses are designed 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.

Special Training Course for SNA's officials

The ITCS Unit in association with WRA&O Unit had successfully conducted the Special Training Course on 'Wind and Solar Resource Assessment Technology' exclusively for SNA's Officials during 28th February to 7th March 2018. The 8 days course was attended by 18 participants from

Release of Course Material

9 State Nodal Agencies, Arunachal Pradesh Energy Development Agency (APEDA), Arunachal Pradesh, Karnataka Renewable Energy Development Limited (KREDL), Karnataka, Kargil Renewable Energy Development Agency (KREDA), Jammu & Kashmir, Maharashtra Energy Development Agency (MEDA), Maharashtra, Renewable Energy Agency Puducherry (REAP), Puducherry, Tamil Nadu Energy Development Agency (TEDA), Tamil Nadu, Telangana State Renewable Energy Development Corporation (TSREDCO), Telangana, West Bengal Renewable

DG, NIWE distributing the Course Certificate to the participant

Energy Development Agency (WBREDA), West Bengal, Zoram Energy Development Agency (ZEDA). Mizoram. The syllabus of the course was framed to cover the various aspects of Wind and Solar Resource Assessment & Techniques. The lectures were delivered by the NIWE Scientists and Engineers and several external experts to transfer the complete knowledge on the titled course.

Besides the class room lectures, practical sessions were also arranged in the NIWE laboratories and study visit to Renewable energy facilities available in the NIWE campus; and field visit to Wind Turbine Test Station / Wind Turbine Research Station, Kayathar for giving exposure on small and large wind turbine testing process, practical knowledge on working wind turbines apart from visiting wind farms in and around Kayathar / Kanyakumari.

22nd National Training Course

The ITCS unit had successfully conducted the 22nd National Training Course on 'Wind Energy Technology' during 12th to 16th March 2018 to address all aspects of Wind Power starting from

Dr. K. Balaraman, Director General, NIWE delivering the Inaugural Address

Glimpse of Classroom Sessions of the Training

introduction to wind and its technology, wind resource assessment, installation and commissioning, operation and maintenance aspects of wind farms along with financial analysis in a focussed manner. The course was attended by 24 participants from 7 States (Gujarat, Haryana, Karnataka, Maharashtra, Punjab, Tamil Nadu and Uttar Pradesh) with diverse background.

Special National Training Course for NPTI-PGDC Students

The ITCS Unit had successfully conducted the Special Training Course for the 18 students of PG Diploma Course of National Power Training Institute, Faridabad during 12th to 30th March 2018. The class room training was imparted along with the participants of 22nd National Training Course held during 12th to 16th March 2018 and practical training at NIWE and Study visits to Wind Turbine Test Station / Wind Turbine Research Station, Kayathar along with showcasing different Wind Farms in around Kanyakumari was also arranged.

Glimpse of Special National Training Course for NPTI-PGDC Students

Participation in Exhibition

India International Science Festival (IISF) 2017

NIWE had established and managed it's Stall and disseminated the information about the activities and services of the Institute along with the wind energy awareness to the visitors of various discipline in the Mega Science Expo, a part of India International Science Festival (IISF) 2017, organized by IIT Madras, Chennai during 13th to16th October 2017. Information Brochure of NIWE to create more awareness about the activities and services was distributed and the visitors of the Stall were explained and showcased with the various facilities and Technologies of NIWE through Information Panels displayed in the Stall.

Global Wind Day Celebrations 2017

Global Wind Day is a worldwide event that occurs annually on 15th June and NIWE being the technical focal point for the development of wind energy in the country has been celebrating the Global Wind Day on every 15th June since 2009. This year, the event was celebrated with a special lecture by Dr. S. Subba Rao, former Chief Scientist and Head, Information Division, CSIR-CLRI, Chennai. All the staff of NIWE had actively participated the celebration.

NIWE Foundation Day 2018

Glimpse of 21st Foundation Day of NIWE

NIWE has celebrated its 21st Foundation Day on 21st March 2018. As a part of Foundation Day celebration, this day was announced as an 'Open Day' for general public to visit the scientific laboratories of NIWE - Solar Station, Wind Monitoring Station, Biogas plant, Wind Turbine Nacelle, Wind Solar Hybrid System etc., between 9.30 am and 12.30 pm. An Advertisement inviting

Public to Visit NIWE's facilities was given in Daily Thanthi and New Indian Express on 20.03.2018. The visitors were well received by the volunteers of NIWE from different groups deputed for this purpose and explained the facilities of NIWE. Also, IREDA-NIWE Annual Awards for Wind Energy ceremony held and distributed the awards to the winners. The NIWE Foundation Day was celebrated in two sessions as follows:

- Session I (2.00 pm to 3.30 pm) - IREDA & NIWE award in Wind Energy
- Session II (04.30 pm to 5.30 pm) - NIWE Foundation Day Celebration

During the second session, Director General, NIWE distributed mementos to the regular staff and also those who had not availed leave during the year. Under NIWE Welfare fund scheme, he gave the awards to the wards of NIWE Employees who had secured Centum of Marks in various subjects in the Board Examinations.

IREDA – NIWE Awards for Wind Energy 2018

Indian Renewable Energy Development Agency (IREDA), New Delhi has signed a Memorandum of Understanding (MoU) with NIWE for the creation of a corpus fund for the IREDA-NIWE Annual Awards for Wind Energy. The Awards are to encourage innovation, research & development, manufacturing, developing & harnessing Wind Energy at the State and National levels and to motivate individuals, stakeholder to strive for the best in the field.

Accordingly, during 2017-18, NIWE has instituted the IREDA-NIWE Annual Awards for Wind Energy, under the following three broad categories in Wind Energy to recognize, celebrate the achievement and excellences:

(i) IREDA-NIWE Award for the Best Performing State Nodal Agency of the Year

(ii) IREDA-NIWE Award for the Best Institution of Higher Learning in Wind Energy, and

(iii) IREDA-NIWE Award for the Best Research Work

Call for Nominations in each category were uploaded in NIWE / IREDA Websites and advertised through national daily Newspapers, and through groups & mass communications inviting nominations. The nominations received and selection of the awardees of all the three categories for the IREDA-NIWE awards were finalized through an eminent Jury Committee consisting of Technocrats from the Wind Energy field and Mass Media, and the finalized list of Winners was approved by Director General, NIWE. The Awardees were informed of their selection and invited to attend the Award Ceremony of the IREDA-NIWE Annual Awards for Wind Energy 2018, scheduled on 21st March 2018 during the Foundation Day of NIWE, to receive the Award.

Smt. Gargi Kaul, IAAS, Additional Secretary and Financial Adviser, MNRE was the Chief Guest and Shri. Chintan N. Shah, Director-Technical, IREDA was the Guest of Honour at the Awards Function. The Award Ceremony was held on 21.03.2018 at NIWE Chennai.

Ms. Gargi Kaul delivering address

Winners of the Awards:

(a) The Award for the category of Best performing State Nodal Agency of the year 2016 -17 was conferred to New & Renewable Energy Development Corporation of Andhra Pradesh Limited (NREDCAP). Shri. M. Kamalakar Babu, Vice Chairman and Managing Director received the Award with cheque of Rs. 1,00,000/- on behalf of NREDCAP which has promoted 2187 MWs of wind power projects in the State of Andhra Pradesh and the State has stood first in the country for the year 2016-17.

Shri. Kamalakar Babu receives the Best Performing SNA Award

(b) The Award for the Best Institution of Higher Learning in Wind Energy was conferred to Amrita School of Engineering, Coimbatore and the Dean of Amrita School of Engineering, Coimbatore received the Award with cheque of Rs. 1,00,000/- on behalf of Amrita School of Engineering.

The Dean of Amrita School of Engineering receives the Best Institution Award

(c) The Award for Best Research work in Wind Energy Category was jointly awarded to (i) Ms. Anusha KV, for her research work on 'Control of Wind Turbine Driven DFIG in a Stand Alone Micro Grid for Stator Voltage and Frequency Regulation', and

On behalf of Ms. Anusha, her Thesis Adviser receives the Best Research Work Award

Ms. Vishnupriyadharshini receives the Best Research Work Award

(ii) Ms. Vishnupriyadharshini, for her project work on 'Wind Speed Forecasting Based on ARIMA & WRF in Today's Power Grid'. The two Awardees received the award with cheque of Rs. 50,000/- each.

Also, the Chief Guest honoured the former NIWE Staff with mementos, in connection with the NIWE Foundation Day Celebrations 2018.

NIWE's Newsletter – PAVAN

Pavan 55th Issue Image

ITCS, 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. During this period, 53rd to 56th issues were published and circulated and also made available NIWE website. The Newsletter publication has received good feedback over the 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

ITCS Unit has established and is managing the Prof. Anna Mani Information Centre, the state-of-art Library of NIWE, named after the renowned meteorologist, consists around 2100 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 / International Journals & Magazines related to wind energy and other allied engineering disciplines. It is also having around 350 technical reports and 425 conference proceedings and

International Training participants using Library facilities during their training

175 Annual Reports and other information resources like Wind Atlas and data books, Maps, Manuals, Souvenirs, Digital resources, etc. NIWE Library is fully computerised with automation software along with Online Public Access Catalogue (OPAC) facility. It has also membership with leading libraries like IIT, Anna University and American Library for reference purposes. Students, researchers, academicians, and public can access NIWE's Library, free of cost for reference purpose. It is also being used as a Reference Resource by the International Participants during their stay at NIWE while attending the International Training Course.

Visitors

Additional Secretary, MNRE

Shri. Praveen Kumar, IAS, Additional Secretary, MNRE visited NIWE on 1st September 2017 and addressed the NIWE staff.

Joint Secretary, Ministry of External Affairs (MEA)

Mr. Acquino Vimal, Joint Secretary (CNV&I), Ministry of External Affairs, New Delhi visited NIWE on 22nd January 2018 to review the ITEC Programmes being conducted by NIWE as well as the available infrastructure of training programmes.

School /College Students

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 2017-18, the following visits were coordinated.

Schools:

Sl.No.	Name of the Institute	No. of Students	Date of Visit
1	KC High Cambridge International School, Chennai	41	01.08.2017
2	SAN ACADEMEY School, Chennai	89	12.12.2017

Colleges:

1.	Veltech Dr. RR & SR University, Chennai	60	14.06.2017
2.	Prince Shri Venkateshwara Arts & Science College, Chennai	51	25.07.2017
3.	Panimalar Engineering College, Chennai	70	01.08.2017
4.	Jeppiaar Engineering College , Chennai	70	08.08.2017
5.	Rajasthan Technical University, Kota, Rajasthan, visited WTRS, Kayathar	11	04.10.2017
6.	Government College of Engineering, Bargur visited Wind Turbine Research Station (WTRS), Kayathar	41	06.10.2017

Sl.No.	Name of the Institute	No. of Students	Date of Visit
7.	Central University of Jharkhand, Brambe, Jharkhand	41	06.11.2017
8.	Tamilnadu Agricultural University, Coimbatore, Tamil Nadu	37	09.12.2017
9.	Apollo Engineering College, Poonamallee, Tamil Nadu	65	21.12.2017
10.	Pondicherry Engineering College, Puducherry	55	12.01.2018
11.	Apollo Engineering College, Poonamallee, Tamil Nadu	51	19.01.2018
12.	Asian College of Journalism, Administered by the Media Development Foundations, Chennai	01	06.02.2018.

Special Visits

Besides the visit by the Schools and College students, other visits on request by Organizations for their course participants, officials and delegation are entertained by NIWE. During the year 2017-18, the following visits were attended and the participants were showcased the facilities of NIWE with power point presentations.

Sl.No.	Name of the Institute	No. of visitors	Date of Visit
1	Veltech Dr. RR & SR University, Chennai	19	14.06.2017
2	National Institute of Technical Teachers Training & Research(NITTR), Chennai	25	12.07.2017
3	National Institute of Technical Teachers Training & Research(NITTR), Chennai	26	23.08.2017
4	Ordinance Factories Institute of Learning, Chennai	13	06.09.2017
5	Cyient Ltd., Hyderabad	2	08.09.2017
6	Training participants of the programme 'Energy Conservation' from Ordinance Factories Institute of Learning, Chennai	19	06.12.2017
7	Entrepreneurship Awareness Camp Participants funded by DST-NSTEDB, GoI, oragnised by Prathyusha Engineering College, Chennai	70	06.01.2018
8	National Institute of Technical Teachers Training & Research (NITTR), Chennai	50	10.01.2018

Sl.No.	Name of the Institute	No. of visitors	Date of Visit
9	SRM University , Kattankulathur, Tamil Nadu	40	11.01.2018
10	National Institute of Technical Teachers Training & Research (NITTR), Taramani, Chennai	30	30.01.2018
11	International Internship Training program at SEEK Foundation, Chennai	7	05.02.2018
12	National Institute of Technical Teachers Training & Research (NITTR), Chennai	25	16.02.2018
13	National Institute of Technical Teachers Training & Research (NITTR), Chennai	25	01.03.2018
14	"Suryamithra" program participants from G M Shiptech Training Private Limited, Chennai	30	16.03.2018

Students Internship / Project Work / Fellowship

NIWE is offering Internship and project work for the graduate / post graduate students to understand and develop interest in the Wind / Solar Energy Sector.

The students of the following colleges were granted permission for In-plant Training / Internship / project work at NIWE during the period May 2017 to December 2017 and had completed their work.

Internship:

Twelve Engineering students from National Institute of Technology, Tiruchirappalli (1), Coimbatore Institute of Technology, Coimbatore (4), St. Joseph's Institute of Technology, Chennai (1), Delft University of Technology, Netherlands (1), Amrita School of Engineering (1), Indian Institute of Technology, Kanpur(1) and SNS College of Technology , Coimbatore(3) had done their internship at NIWE for a period from 1 week to 3 months period.

Project Work:

9 UG/PG students from St. Joseph College of Engineering, Chennai (1), Veltech University, Chennai (5), Hindustan University, Chennai (1), Gandhigram Rural Institute, Dindigal, Tamil Nadu (1) and Amrita School of Engineering, Coimbatore (1) were permitted to do their Final Year project / Dissertation work at NIWE in different Units under the guidance of the respective Group Heads / Scientists for a period from 2 months to 4 months.

The following foreign student fellowship training application have been processed under Research Training Fellowship for Developing Country Scientists (RTF-DCS)

- Mr. Tchodou Samah Bawong, Design Engineer, Electrical, Directorate of Energy, Ministry of Mines and Energy, Togo.

ENGINEERING SERVICE 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.

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

Detailed work

a. Maintenance and Management of Network ports and Network cables. (as per requirement)

b. Maintenance and Management of Network Switches (15nos.) both Hardware and Software. (as per requirement)

c. Management of NIWE Servers (7nos.). (Daily Basis)

d. Antivirus Management for NIWE systems. (Daily Basis)

e. Firewall Management of both NIWE campus and WTTS Kayathar campus. (Daily Basis)

f. ISP Management of 100Mbps (NKN), 40Mbps (STPI), 10Mbps SRRA(STPI) and 8Mbps WTTS(BSNL). (Daily Basis)

g. Co-ordination of NIC mail. (as per requirements)

h. Maintenance of Desktop Computers, Workstation, Laptops, Printers, Scanners and Servers under Warranty (daily and as per requirement).

i. Maintenance and Management of Surveillance System for NIWE and WTTS (weekly and as per requirement).

j. Management of Biometric System(6nos.) (monthly and as per requirement).

k. Management of EPABX System (as per requirement).

l. Co-ordination for UPS Management system (12kVA, 20kVA, 10kVA, 16kVA, 10kVA and 3kVA) (monthly and as per requirement).

m. Design, Develop and Maintenance of NIWE Website. (daily and as per requirement)

n. Maintenance of NIWE official Social media page (Facebook and Twitter) (daily and as per requirement).

o. Installation and Troubleshooting of Basic Software and critical software for users in NIWE campus and WTTS campus (as per requirement).

p. Support during International, National Training Programs, Internal meetings and Training (as per requirement).

q. Video Conferencing System Management for both NIWE and WTTS (as per requirement).

r. Management of Wi-Fi 121Devices (8 nos.) (as per requirement).

s. AMC System Management (as per complaint form).

t. On-line Application and On-line portal creation (as per requirement).

u. Management of Solar Photo Voltaic(SPV) Power plant 10kVA, 15kVA and 20kVA (daily basis).

v. Backup Management for Tally, Purchase, EDMS, Website and Surveillance System (daily and weekly).

w. Configuration and Maintenance of On-line File Transfer (FTP) for Testing, WRA and SRRA units (as per requirement).

x. File Sharing system for Accounts, Purchase and ESD unit (as per requirement).

y. Complaint form Management (daily basis).

SOLAR RADIATION RESOURCE ASSESSMENT

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

Project Activities

Calibration

Calibration of 24 Pyranometers & 12 Pyreheliometers were carried out under SRRA mode and Calibration of 13 pyranometers & 2 Pyreheliometers were carried out under commercial mode respectively during April 2017- March 2018.

Achievement

Four SRRA stations listed (Tiruvallur, Gurugram, Gandhinagar & Howrah) under prestigious BSRN network

Baseline Surface Radiation Network (BSRN)

The Earth's radiation budget is essential for understanding the thermal structure of the atmosphere and mainly responsible for circulation of the atmosphere, ocean and building conditions for the Earth's climate system. These irradiances also play an important role in the ocean surface energy

budget, influencing the main features of the ocean currents. Even small change in irradiance at the Earth's surface, can result in a significant change in the climate. A normal existing radiometric measurement system is not capable of arriving at the required accuracy for climate research and our knowledge about the spatial distribution of the radiation is insufficient for understanding the present climate. To help overcome these shortcomings, the global radiometric network, i.e., BSRN was launched in 1992. Baseline Surface Radiation network (BSRN) is a project of the Data and Assessments Panel from the Global Energy and Water Cycle Experiment (GEWEX) under the umbrella of the World Climate Research Programme (WCRP) and as such is aimed at detecting important changes in the Earth's radiation field at the Earth's surface which may be related to climate changes.

All the qualified BSRN measurements are centrally archived in the **World Radiation Monitoring Centre (WRMC)** founded in 1992 initially at ETH Zurich, Switzerland and moved in 2008 to the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI), Bremerhaven, Germany. At present there are 64 BSRN standard stations globally. Enrolment in BSRN is only on a site-by-site basis, meeting stringent quality requirements. Participation in the BSRN is accomplished through the WMO representative of the home country. India has 4 SRRA stations and is the second Asian country after Japan to join this elite group.

SRRA Data

Quality Controlled data of 5 SRRA stations were provided to 3 stake holders under SDSAP policy.

Consultancy

- Work order received from MEDA in April 2017 for the establishment of one SRRA station at Chandrapur.
- Final report on solar feasibility study at Anas, Himachal Pradesh prepared for M/s. SJVN Ltd in May 2017.
- Report submitted to ANERT on 30.01.2018 in connection with the wind - solar hybrid feasibility study at Ramakkalmedu, Kerala.
- A team of NIWE officials visited IIM, Trichy on 19.02.2018 for discussion with IIM officials on the implementation of 2MW solar photovoltaic Power plant.

Solar Power Forecasting Activities

- A kick off meeting for the joint collaborative project was held during 03.04.2017-04.04.2017 on Solar Forecasting with GIZ officials and Overspeed GmbH German officials at NIWE, Chennai.
- Group Head, SRRA attended meeting on solar forecasting with SECI, MNRE & NISE officials during the period 27.04.2017-28.04.2017 at New Delhi.
- SRRA team attended meeting with GIZ officials on solar forecasting at GIZ, New Delhi on 29.05.2017.
- Video conferencing carried out periodically with German officials on Solar Forecasting.

NIWE STAFF EXTERNAL PRESENCE

IN TRAININGS, CONFERENCES, WORKSHOP, SYMPOSIUM, SEMINARS & MEETINGS

NIWE officials actively participated / attended, workshops and conducted technical sessions and outreach programmes. NIWE officials also delivered lectures and participated in the International and National Programs organised by Schools, Colleges, Institutions and Industries.

During the year 2017-18, NIWE staff delivered 60 lectures in internal and external forums and 67 lectures covered in National and International training programmes conducted by NIWE. Lectures were mainly focused in the areas of Renewable Energy, Wind Turbine Technology and Applications, Environmental Aspects of Wind Turbine Technology, Solar Energy, Offshore Energy, Wind and Solar Energy Power Forecasting, Smart Grid, Grid Integration, Power Curve Measurements, Wind Turbine Design, Remote Sensing Instruments, Operation and Maintenance of Wind Farms, Wind Turbine Testing, Safety & Function Testing, Micrositing of Wind Farm Layout, Wind and Solar Energy Data Collection & Analysis, Measurements Techniques, Economic Analysis of Wind Power Development, Indian Wind and Solar Atlas, Standard and Certification, Indian Government Policies and Schemes on Renewable Energy, etc.,

PUBLICATIONS

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

Journals / Magazines / Newsletter

1. **Dr. Rajesh Katyal** et al 'First Offshore LiDAR based measurement platform for establishment of Offshore Wind in India at Gulf of Khambhat and at Gulf of Kutch, Gujarat' in Current Science Journal and is under review.
2. Robin Johny K, **David Solomon**, Suresh Kumar C, "Design Optimization and Aerodynamic Performance Analysis of a Small Wind Turbine Blade" International Journal of Engineering Trends and Technology (IJETT) – Volume-44 Number-1 -February 2017.

Conferences

Mrs. G. Arivukkodi presented a technical paper on "Comparison of measured and modeled wind turbine noise in Indian terrain" under the session International Perspectives at the biennial international conferences (seventh conference of the series) on Wind Turbine Noise, organized by INCE-Europe at Willem Burger Complex at De Doelen in Rotterdam, The Netherlands held during 2nd to 5th May 2017 .

MoU SIGNED

MoU Signed

Implementation of forecasting activities in windy states – MoU / NDA signed with windy states

- An Agreement was signed between NIWE, IWPA & TANGEDCO/ TANTRANSCO for development & implementation of Wind Power Forecasting for the entire state of Tamil Nadu dated 31st July 2017.
- An agreement was signed between NIWE & VORTEX for development & implementation of Wind Power Forecasting for the entire state of Tamil Nadu dated 31st July 2017.

- MoU, NDA was signed between NIWE and Gujarat SLDC in connection with pilot Wind Power Forecasting project for the entire state of Gujarat on 21st June 2017.
- MoU/NDA was signed between NIWE & GETCO for initiating a Pilot Project on Wind Power Forecasting for the entire state of Gujarat on 21st June 2017.

MoU / NDA signed between NIWE & RVPN in
Jaipur for initiating a Pilot Project on Wind Power Forecasting

NIWE & Vortex officials during meeting
with TNEB and IWPA officials at Tirunelveli

- MoU, NDA was signed between NIWE and Rajasthan SLDC in connection with pilot Wind Power Forecasting project for the entire state of Rajasthan on 12th September 2017.
- MoU was signed with ISRO-SAC in connection with "Development of Wind and Solar Power Forecasting using High-Resolution Numerical Models" on 3rd November 2017.
- NIWE officials visited Madhya Pradesh SLDC and made a detailed presentation to Madhya Pradesh Urja Vikas Nigam (MPUVN) officials regarding Wind Power Forecasting and Scheduling for the entire state of Madhya Pradesh on 3rd October 2017.

NIWE team had discussion with Prof. Dr. K. Kasthurirangaian, Chairman, IWPA
regarding improving the accuracy of the forecast given by NIWE to TANGEDCO held on July 2017 at TANGEDCO office, Chennai.

- NIWE officials visited Maharashtra State Electricity Transmission Co. Ltd and made a detailed presentation to Hon. Chairman & MD / Maharashtra SLDC officials regarding Wind Power Forecasting and Scheduling for the entire state of Maharashtra on 11th October 2017.
- Finalization of MoU / NDA document are under progress with Madhya Pradesh SLDC, Maharashtra SLDC, Andhra Pradesh SLDC & Karnataka SLDC to initiate the Pilot Wind Power Forecasting service.
- MoU and NDA was signed with M/s EMAMI Limited, Kolkatta on sharing of data from their SPV plant in connection with solar forecasting program on 14th July 2017.
- MoU was signed with M/ SEPL, Faridabad on sharing SPV plant data sharing from their plants in connection with solar forecasting program on 3rd August 2017.
- Signed MoU for the pilot project on wind power forecasting for entire state of Rajasthan at Jaipur, Rajasthan on 12th September 2017.

AWARDS & HONORS

Institutional Awards

- Dr. K. Balaraman, Director General of NIWE received Shield and Certificate award for NIWE for securing First position among Central Government Offices (Smaller) category for the best performance in the progressive use of Official Language during the year 2015-17 in the 55th Town Official Language Implementation Committee (TOLIC) meeting held in Chennai.
- Dr. K. Balaraman, Director General of NIWE received Seva Rathna award from Mayilai Thiruvalluvar Sangam January, 2018.
- Dr. G. Giridhar received Dr. K.C.G. Varghese Excellence Award from the Hindustan Group of Institutions on 29th July 2017.

Individual Awards

- Dr. P. Kanagavel, Additional Director, ITCS Unit has been bestowed with Excellence in Teaching Award 2017 by Madras Library Association (MALA) Awards 2017 on the occasion of 125th Birth Anniversary Celebration of Padmashree Dr. S.R. Ranganatan held at Indian Institute of Technology, Chennai on 12th August 2017. The award is in the form of a Certificate and a Medal.

X INTERNATIONAL INTERACTION

International Training Courses

Special International Training Course on WRA and WFP

ITCS Unit had successfully conducted a 17 days Special International Training Course on 'Wind Resource Assessment and Wind Farm Planning' during 5th to 21st July 2017, sponsored by the Ministry of External Affairs (MEA), Government of India under ITEC programmes. The course provided an invaluable platform for learning detailed knowledge and hands on practical training on Wind Resource Assessment & Techniques, Site Selection for Wind Monitoring Stations (WMS), 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, Wind Resource Mapping, Design and Layout of Wind Farm, Forecasting and Wind Energy Production, Project Implementation and

Release of Course Material of the training

Participants at Kayathar during study visit

Operations & Maintenance aspects of Wind Farms in a focused manner. The course was attended by 10 participants from 6 countries (Afghanistan, Ethiopia, Ghana, Sri Lanka, Sudan and Vietnam).

As part of the training, practical training was also arranged at Wind Resource Assessment Lab, Instrumentation & Commissioning of WMS, Wind Analysis - Data collection, Validation and Processing and Reporting. The participants visited Wind Turbine Test Station / Wind Turbine Research Station located at Kayathar, to give practical exposure on small and large wind turbine testing process apart from visiting wind farms in and around Kanyakumari, where wind turbines are installed in large numbers like coconut trees.

Distribution of Course Certificate to the participant

The course structure and conduction of the training was highly appreciated by the participants who were very much satisfied by the quality of lectures, practical sessions and hospitality of NIWE and India.

20th International Training Course

Inaugural Address given by Dr Rajesh Katyal during Inauguration of the Course

The 20th International Training Course on 'Wind Turbine Technology and Applications' was successfully conducted by the ITCS Unit during 16th August to 8th September 2017. This is a special training course for ITEC Countries sponsored by the Ministry of External Affairs (MEA), Government of India under ITEC programs. The 24 days training course was attended by 18 participants from 10 countries (Afghanistan, Azerbaijan, Ethiopia, Iran, Mauritius, Nepal, Tanzania, Uganda, Vietnam and Zimbabwe). The objectives of the course was to transfer the knowledge and special skills to the international participants, helping in building skilled human

Certificate Distribution during Valedictory function to the participant

resource for advancement of wind energy in the participating countries and also to address all aspects of Wind Power starting from introduction to wind and its technology, wind resource assessment, installation and commissioning, operation and maintenance aspects of wind farms along with financial analysis and also to provide an invaluable platform for exchange of professional and cultural experiences among diverse participants.

The practical training was arranged on Wind Resource Assessment, Instrumentation, Testing and R&D equipment's apart from factory visit to M/s. ReGen PowerTech, TADA where they had the opportunity of listening from the industry experts who are actually in the process of making wind turbines. As part of the study visit, all the participants were taken to southern part of Tamil Nadu to visit Wind Turbine Test / Research Station located at Kayathar, where they got exposure on small and large wind turbine testing process apart from visiting different wind farms of different technology, capacity and make in and around Kanyakumari.

Special International Training Course - Small Wind Turbine

The ITCS Unit had successfully conducted the 17 days Special International Training Course on 'Design, Installation and Maintenance of Small Wind Turbine' during 25th October to 10th November 2017, sponsored by the Ministry of External Affairs (MEA), Government of India under ITEC programmes. The course was attended by 20 participants from 10 countries (Afghanistan, Argentina, Egypt, Ethiopia, Jordan, Kenya, Myanmar, Suriname, Uganda and Zimbabwe).

The course provided an invaluable platform for understanding the wind energy technology and its status, overview of wind turbine components, the aerodynamics aspects of wind turbine, wind

Lighting of lamp by a participant in Inaugural of the Course

Glimpse of practical session

turbine generators, small wind turbine and hybrid systems, wind resource assessment and techniques.

As this course was specialised for Design, Installation and Maintenance of Small Wind Turbine, Theory and detailed hands on practical training on Small Wind Turbine Manufacturing such as Build Winding Jigs, Stator, Cast Stator and Rotor, Weld Body/Tail, Prepare Tower Space, Wood for Blades, Plywood for Moulds, Coil winding of Turbine and Start Carving of Blades, Build Stator, Cast Stator and Rotor, Finish, Prepare Tower, Assemble Tower, Prepare, Install turbine and Blade Assembly, Balance Blades, Testing, Installation & Commissioning of Turbine and Installation & Maintenance of Turbine were taught practically in a focused manner and the participants had designed and prepared the models as well.

Also, as a part of the course, the participants were taken for the study visit to southern part of Tamil Nadu to visit Wind Turbine Test Station / Wind Turbine Research Station at Kayathar, where they visited small and large wind turbine testing process and different wind farms in and around Kanyakumari.

Director General, NIWE chaired the Valedictory function, interacted with participants and distributed the course certificates to all the participants.

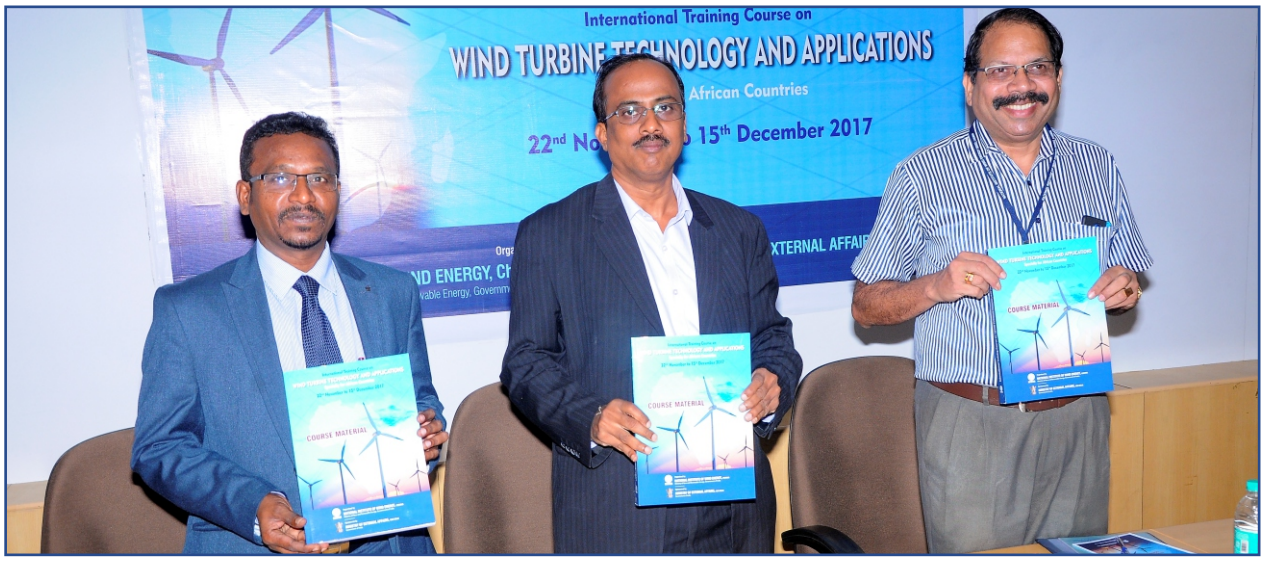
Dr. K. Balaraman distributing the Certificate to the participant during Valedictory function

The participants informed in the feedback that they were very much satisfied by the quality of lectures, practical sessions and hospitality of NIWE and India and they highly appreciated the course structure and procedural conduction of the training.

Special International Training Course for African Countries

The 24 days International Training Course on 'Wind Turbine Technology and Applications' specially for African Countries had been successfully conducted the ITCS Unit during 22nd November to 15th December 2017, sponsored by the Ministry of External Affairs (MEA), Government of India under AIFS-III.

The course was attended by 28 participants from 8 countries (Camearoon, Egypt, Ethiopia, Ghanna, Kenya, Tansania, Uganda and Zambia).



Release of Course Material during Inauguration

Participants infront of NIWE Campus

During the 24 days training, 40 classroom lectures were delivered and handled by NIWE scientists and Wind Turbine Manufacturers, Wind Farm Developers, Consultants, Academicians and Utility to provide complete knowledge transfer, arranged practical training at NIWE Laboratories, study visit to i) M/s. Regen Power Tech at Tada, Nellore District for exposure on large wind turbine manufacturing process (ii) WTTS / WTRS, Kayathar for small and large wind turbine testing facility (iii) M/s. Suzlon,Tiruvelveli for knowledge on various working wind turbines (iv) M/s. RS Wind Tech Engineers (P) Ltd. to know the operation and maintenance process and (v) Apollo Transformers and Filters to know the Controllers and Transformers and to witness the physical material and operation activities near Kanyakumari.

Shri K. S. Popli, Chairman and Managing Director, Indian Renewable Energy Development Agency (IREDA), New Delhi was the Chief Guest for the valedictory function and distributed the course certificates to all the participants.

Dr. K.S. Popli distributing the Course Certificate

21st International Training Course

Dr. K. Balaraman delivering the Inaugural Address

The 24 days 21st International Training Course on 'Wind Turbine Technology and Applications' during 31st January to 23rd February 2018 was organized by the ITCS Unit of NIWE sponsored by DPA-II [Development Partner Administration] Division of Ministry of External Affairs, Government of India under ITEC program. The content of this course was carefully updated for the current industrial requirements and handled by Scientists of NIWE. This course was attended by 28 participants from 15 different countries (Afghanistan, Azerbaijan, Egypt, Ethiopia, Jordan, Kenya, Malawi, Morocco, Nepal, Nigeria, Palestine, Peru, Russia, Syria and Zimbabwe).

The 39 classroom lectures were delivered by NIWE scientists, Wind Turbine Manufacturers, Wind

Dr. K. Balaraman distributing the Course Certificate infront of Group Heads of NIWE

Farm Developers, Consultants, Academicians and Utility to provide complete knowledge transfer and arranged practical training at NIWE Laboratories, study visits to (i) Large Wind Turbine manufacturing factory to M/s. RRB Energy Limited, Chennai (ii) Centralized Monitoring Station (CMS) of M/s. Suzlon Wind Farm at Radhapuram, Tamil Nadu, India for knowledge on various working wind turbines (iii) M/s. Sridi Saai Engineering Agency, Tirunelveli (iv) M/s. Wind World, Vagai Kulam. During the study visit, the participants had listened to the industry experts who are actually in the process of making and monitoring the wind turbines and also visited the manufacturing facilities.

As part of the study tour, all the participants had travelled to southern part of Tamil Nadu to visit Wind Turbine Test Station and Wind Turbine Research Station located at Kayathar, a Unit of NIWE. They have learnt about small and large wind turbine testing process and also visited wind farms in and around Kayathar and Kanyakumari, where wind turbines are installed in large numbers like coconut trees. The participants also enjoyed cultural visits as it revealed spiritual heritage of India.

Director General, NIWE has distributed the course certificates to all the participants. The course was appreciated by the participants on the grade of excellent in terms of lectures, factory and study visits, food and everything.

Participants giving their appreciation Momento to the Director General, NIWE

Visits Abroad

Dr. K. Balaraman, Director General

- Joint Work Group Meeting in Denmark and MoU between NIWE and Technical University Denmark (DTU) and other events during 24th February to 2nd March 2018.
- USAID project on Sulawesi Grid code for variable wind & solar PV generation of PLN at Indonesia during 25th to 31st March 2018.

Dr. Rajesh Katyal, Deputy Director General & Head, WRA&O

- Meeting with M/s Innoven GmBH, Bremenhaven, Germany and other vendors placed in connection with project on 'Assessment of Preparedness of Assembly, Installation and Commissioning of the 3MW prototype wind turbine generator' with Innoven GmBH officials & Vayu energy officials along with IREDA officials during 18th to 21st November 2017.
- Windeurope conference and presented the latest development in the India to the European Union Stakeholders held at Amsterdam, Netherland on 29th & 30th November 2017.
- Master class offshore wind schedule at Amsterdam, Netherlands during 27th to 29th November 2017.

Shri. A. Senthil Kumar, Director & Group Head, S&C

- Visited Germany, along with Dr. Rajesh Katyal, for the technical due - diligence project, awarded by IREDA during 17th to 23rd November 2017 .

Shri. S.A. Mathew, Director & Group Head, Testing & Forecasting

- Attend the India – Spain Joint S&T Steering Committee Meeting held at Madrid, Spain during 31st August to 2nd September 2017.

GENERAL INFORMATION

GOVERNING COUNCIL		
Members of the Governing Council 39th Governing Council Members List (9.4.2017)		
1	Shri. Rajeev Kapoor I.A.S., Secretary, MNRE, New Delhi & Chairman, GC, NIWE	Chairman
2	Shri. Vikram Kapur, I.A.S, Principal Secretary to Govt., Energy Department, Government of TamilNadu	Member
3	Shri. J.B. Mohapatra, I.R.S., Joint Secretary & Financial Adviser, MNRE , New Delhi 110 003	Member
4	Shri. Bhanu Pratap Yadav, I.A.&A.S., Joint Secretary (Wind Energy), MNRE New Delhi 110 003.	Member
5	Shri. Sujit Gulati I.A.S., Additional Chief Secretary, Energy & Petrochemicals Dept Gujarat – 382 010	Member
6	Shri. Kuljit Singh Popli Chairman and Managing Director, IREDA New Delhi -110 066	Member
7	Dr. Rajkumar Deputy Director (EPSA), Space Application Centre Ahmedabad – 380015	Member
8	Dr. Rajesh Katyal Director General (Additional Charge), NIWE Chennai – 600 100	Secretary

Members of the 40th Governing Council Members List (25.09.2017)		
1	Shri. Anand Kumar I.A.S., Secretary, MNRE, New Delhi & Chairman, GC, NIWE	Chairman
2	Shri. Vikram Kapur, I.A.S, Principal Secretary to Govt., Energy Deptment, Government of TamilNadu, Chennai 600 009	Member
3	Shri J.B. Mohapatra, I.R.S., Joint Secretary & Financial Adviser, MNRE, New Delhi 110 003	Member
4	Shri. Bhanu Pratap Yadav, I.A.&A.S., Joint Secretary (Wind Energy), MNRE, New Delhi 110 003	Member
5	Sri. Sujit Gulati I.A.S. Additional Chief Secretary, Energy & Petrochemicals Dept Gujarat – 382 010	Member
6	Shri Kuljit Singh Popli Chairman and Managing Director, IREDA, New Delhi -110 066	Member
7	Dr. Rajkumar Deputy Director (EPSA), Space Application Centre Ahmedabad – 380015	Member
8	Dr. Rajesh Katyal Director General (Additional Charge), NIWE, Chennai – 600 100	Secretary

Members of the 41st Governing Council Members List (17.03.2018)		
1.	Shri Anand Kumar, IAS, Secretary, MNRE, New Delhi & Chairman, GC, NIWE	Chairman
2.	Shri Vikram Kapur, IAS, Principal Secretary to Govt. (FAC), Energy Department, GoTN, Chennai.	Member
3.	Ms.Gargi Kaul, I.A.&A.S., Additional Secretary and Financial Adviser, MNRE, New Delhi.	Member
4.	Shri Bhanu Pratap Yadav, I.A.&A.S., Joint Secretary (Wind Energy), MNRE, New Delhi	Member
5.	Shri Sujit Gulati, IAS Additional Chief Secretary, Energy & Petrochemicals Department Government of Gujarat	Member
6.	Shri Kuljit Singh Popli Chairman & Managing Director, IREDA, New Delhi.	Member
7.	Dr. Raj Kumar Dy. Director EPSA, Space Application Centre ISRO	Member
8.	Dr. K. Balaraman Director General, NIWE, Chennai.	Secretary

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

HINDI PROMOTION COMMITTEE

Members of the Hindi Promotion Committee
(Constituted for the purpose of promotion of Hindi Official Language in NIWE)

1.	Dr. K. Balaraman. Director General, NIWE (from 08.11.2017)	Chairman
2.	Dr. Rajesh Katyal Director General & Head, OS&IB, NIWE (till 07.11.2017)	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

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 Advisor & Former CEO Power System Operation Corporation Limited , New Delhi -110016	Chairman
2.	Shri Bhanu Pratap Yadav Joint Secretary Ministry of New and Renewable Energy, New Delhi – 110 003	Member
3.	Dr. P.C. Pant Scientist-F, Ministry of New and Renewable Energy, New Delhi – 110 003	Member
4.	Dr. Sanjay Bajpai Advisor / Scientist 'G', Associate Head Technology Mission Division, New Delhi-110 016.	Member
5.	Shri. Rajendra V Kharul Chief Executive Officer (CEO) Synergy Infrasys Management Pvt Ltd., Pune - 411 030	Member
6.	Dr. S. Selvi Rajan Chief Scientist & Head, Wind Engineering Laboratory Structural Engineering Research Centre (SERC), Chennai – 600 113	Member
7.	Prof. Dr. Rangan Banerjee Head of the Department Department of Energy Science and Engineering, Mumbai - 400 076	Member
8.	Dr. M.A. Atmanand Director National Institute of Ocean Technology, Chennai - 600100	Member
9.	Prof. Dr. Bhim Singh CEA Chair Professor & Head, Department of Electrical Engineering Indian Institute of Technology (Delhi), New Delhi – 110016	Member
10	Shri. S. Jothibasu Joint Director, Energy Efficiency & Renewable Energy Division Central Power Research Institute (CPRI) Central Research & Testing Laboratory, Bangalore - 560 080	Member
11.	Dr. K. Balaraman Director General (from 08.11.2017) National Institute of Wind Energy (NIWE), Chennai - 600 100	Member
12.	Dr. Rajesh Katyal Deputy Director General &Head –- WRA&O (till 07.11.2017) National Institute of Wind Energy (NIWE), Chennai - 600 100	Member
13.	Shri. J.C. David Solomon Director, R&D, ITCS & IT National Institute of Wind Energy (NIWE), Chennai - 600 100	Member Secretary

PROTOTYPE WIND TURBINE MODELS COMMITTEE		
Members of the Prototype Wind Turbine Models Committee		
1.	Dr. K. Balaraman, Director General, NIWE (from 08.11.2017)	Chairman
2.	Dr. Rajesh Katyal, Director General, NIWE (till 07.11.2017)	Chairman
3.	Shri. Mohamed Hussain, DDG, MNRE & Head, WTRS, NIWE	Member
4.	Shri. N. Rajkumar, Joint Director, CPRI, Bangalore (From 01.02.2018)	Member
5.	Shri. D.V. Giri, Secretary General, IWTMA, Chennai	Member
6.	Shri. A. Senthil Kumar, Director & Group Head, S&C, NIWE	Member - Secretary

COMPLAINTS COMMITTEE FOR WOMEN		
1	Dr. Yasodha Shanmugasundaram Educationist & Ex. Vice Chancellor, Mother Teresa Women's University	Chairman
2	Dr. Aruna Dhathathreyan, Retd. Chief Scientist, CLRI	Member
3	Dr. Vijaya Ravichandran, Scientist 'E', NIOT	Member
4	Smt. M.C. Lavanya, Assistant Director (Tech), NIWE	Member
5	Smt. Anuradha Babu, Executive Staff Officer, NIWE	Member
6	Smt. G. Arivukkodi, Asst. Executive Engineer, NIWE	Member
7	Smt. B. Muthulakshmi, Executive Secretary, NIWE	Member Secretary
8	Deputy Director General (F&A), NIWE	Invitee
9	Assistant Director (F&A), NIWE	Invitee

FINANCE & ADMINISTRATION

Serving as the artery connecting scientific units of Wind Technology & Solar Resources with Management. (i) Budget & Revised Estimates for grants-in-aid, Allocation & re-appropriation of funds, Expenditure management & budget control, Project financial management. (ii) 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. (iii) Framing of Rules, Schemes and Grievance Redressal, Contract Management, Legal issues, Court Cases & RTI, Recruitment , Promotion and upgradations. (iv) 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. (v) 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 two days Training Programme on 'Reservation Policy of Government of India for SC/ST/OBC and PWD Employees' by Dr. H. S. Rana, Principal Director, Institute of Public Administration, Bangalore on 19th & 20th July 2017.
- Organized one day workshop on 'Ethics & Values in Public Governance' by Shri K.S. Samarendra Nath, Director(Retd.), Ministry of Steel , New Delhi on 10th August 2017
- Organized one day Training Programme on 'Prevention of Sexual Harassment of Women at Workplace' by Dr. H. S. Rana, Principal Director, Institute of Public Administration, Bangalore on 13th September 2017.
- Organized one day workshop on 'Constitution Day' by Dr. H. S. Rana, Principal Director, Institute of Public Administration, Bangalore on 29th November 2017.
- Organized one day workshop on 'Tax' by Prof. S. Sampath, Corporate Consultant, New Delhi on 11th January 2018.

Vigilance Awareness Week

Vigilance Awareness Week for the year 2017 was observed in NIWE during 30th October 2017 to 4th November 2017 and all the employees have taken a pledge as instructed by the Central Vigilance Commission.

Swachhta Hi Sewa Week

Swachhta Hi Sewa Week for the year 2017 was observed in NIWE Swachhta related activities has been carried out by NIWE staff members during 15th September 2017 to 2nd October 2017.

Glimpse of Swachhta Hi Sewa Week

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 the following days i) 1st meeting held on 30th November 2017 & ii) 2nd meeting held on 8th March 2018. No complaints received during the year 2017-18.

Women's Day

Women's day was celebrated in NIWE on 8th March 2018. On the eve of Women's Day, competitions were conducted in NIWE, Prizes were distributed to the winners. Dr. Yashodha Shanmugasundaram, Educationist & Ex. Vice, Chancellor Mother Teressa Women's University was the Chief Guest and gave a speech on 'Empowerment of Women'. Dr. Kumudha Lingaraj M.D., D.A, Guest of Honour, gave a Key Note Address on the topic 'Health Care for Women'.

Glimpse of Women's Day

Promotions during the year 2017-18

Sl. No.	Name	Present Designation Level in Pay Matrix	Designation of upgraded post, Level in Pay Matrix	Date of effect of Financial upgradation
1.	Smt.K. Tamilselvi	Admin. & Accts. Officer Level 8 [Rs.9300-34800 + GP Rs.4800/- as per 6th CPC]	Administrative Officer (Stores & Purchase) Level 10 [Rs.15600-39100 + GP Rs.5400/- as per 6th CPC]	12.11.2017
2.	Shri J.C. David Solomon	Additional Director Level 12 (Rs.7600/- as per 6th CPC)	Director Level 13 (Rs. 8700/- GP as per 6th CPC)	01.01.2018
3.	Smt. G. Arivukkodi	Assistant Engineer Level 8 [Rs.9300-34800 + GP Rs.4800/- as per 6th CPC]	Assistant Executive Engineer Level 10 [Rs.15600-39100 + GP Rs.5400/- as per 6th CPC]	01.01.2018
4.	Shri S. Arulselvan	Assistant Engineer Level 8 [Rs.9300-34800 + GP Rs.4800/- as per 6th CPC]	Assistant Executive Engineer Level 10 [Rs.15600-39100 + GP Rs.5400/- as per 6th CPC]	01.01.2018
5.	Shri Y. Packiyaraj	Assistant Engineer Level 8 [Rs.9300-34800 + GP Rs.4800/- as per 6th CPC]	Assistant Executive Engineer Level 10 [Rs.15600-39100 + GP Rs.5400/- as per 6th CPC]	01.01.2018
6.	Shri M.Karuppuchamy	Assistant Engineer Level 8 [Rs.9300-34800 + GP Rs.4800/- as per 6th CPC]	Assistant Executive Engineer Level 10 [Rs.15600-39100 + GP Rs.5400/- as per 6th CPC]	01.01.2018
7.	Shri A.R. Hasan Ali	Assistant Engineer Level 8 [Rs.9300-34800 + GP Rs.4800/- as per 6th CPC]	Assistant Executive Engineer Level 10 [Rs.15600-39100 + GP Rs.5400/- as per 6th CPC]	01.01.2018

Official Language Act

NIWE has been an active member in the Town Official Language Implementation Committee, 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 from 30.08.2017 to 14.09.2017. Various competitions were conducted and prizes distributed.

During the year 2017-18, 04 regular staff members passed Prabodh examination, Conducted by Hindi Teaching Scheme.

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

International Yoga Day

In consonance with the GoI instructions, International Yoga Day was celebrated in NIWE on 21.06.2017. As part of Celebration, Yoga Session was conducted at NIWE. Yoga classes are conducted in the campus of NIWE twice a week for all the regular members of NIWE.

Glimpse of International Yoga Day

Right to Information Act

During the year 2017-18, 17 applications were received seeking information under RTI Act, 2005 and requisite details have been given. One appeal has been preferred against the decision of CPIO.

Implementation of Persons with Disabilities Act 1995

The following facilities are being available to Persons with Disabilities

- 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.
- A separate ramp has been provided to enable use of crutches / wheel chairs.
- Low level steps laid by the side of the lift for easy access.
- Post reservation for physically handicapped as per GOI rules.

Details of Employees (Repatriated to Parent Department)

S.No.	Name	Designation	Date
1.	Shri Joel Franklin Asaria	Additional Director	24.11.2017
2.	Shri A. Hari Bhaskaran	Dy. Director (Technical)	26.05.2017

New Appointees

Sl.No.	Name	Designation	Unit	Date of Joining
1.	Shri Manjunath M. Hosamani	Executive Assistant	F&A	03.04.2017
2.	Shri V.K. Sreeram	Executive Assistant	F&A	15.05.2017
3.	Shri R. Sunderesan	Executive Assistant	F&A	19.06.2017
4.	Dr. K. Balaraman	Director General	DG's Office	08.11.2017
5.	Ms. K. Saranya	JEA	F&A	08.03.2018
6.	Shri P. Chidambaram	JEA	DG's Office	12.03.2018

Details of Employees (Retired / Resigned)

Sl.No.	Name	Unit	Date of Retired/Resigned
1.	Shri M. Anvar Ali	ESD	Retired - 30.09.2017
2.	Shri Manjunath M. Hosamani	F&A	Resigned -29.06.2017

HUMAN RESOURCE

Details of Employees as on 31.03.2018

Sl. No.	Name	Designation
Scientific & Technical Research (S&T)		
1.	Dr. K. Balaraman	Director General
2.	Smt. Anuradha Babu	Executive Staff Officer
3.	Shri P. Chidambaram	Junior Executive Assistant
Finance & Administration (F&A) & (ESD)		
1.	Shri D. Lakshmanan	Dy. Director General (F&A)
2.	Shri R. Girirajan	Assistant Director (F&A)
3.	Smt. K. Tamilselvi	Administrative Officer (S&P)
4.	Smt. B. Muthulakshmi	Executive Secretary II
5.	Shri V.K. Sreeram	Executive Assistant
6.	Shri R. Sunderesan	Executive Assistant
7.	Shri M. Malaravan	Transport Co-ordinator
8.	Shri M. Nandakumar	Technician
9.	Ms. K. Saranya	Junior Executive Assistant
10.	Shri M. Selvakumar	Record Keeper
11.	Shri A. Mani	Driver
Wind Resource Assessment & Offshore (WRA & O)		
1.	Dr. Rajesh Katyal	Deputy Director General
2.	Shri K. Boopathi	Additional Director
3.	Smt. Deepa Kurup	Additional Director
4.	Shri J. Bastin	Assistant Director (Technical)
5.	Shri B. Krishnan	Assistant Director (Technical)
6.	Smt. G. Arivukkodi	Assistant Executive Engineer
7.	Shri T. Suresh Kumar	Assistant Engineer
8.	Shri R. Vinod Kumar	Junior Engineer
9.	Shri Naveen Muthu	Junior Engineer

Sl. No.	Name	Designation
10.	Shri T. Sankara Rao	Junior Engineer
11.	Shri B. Senthilkumar	Technician
Research & Development & IT & ITCS		
1.	Shri J.C. David Solomon	Director
2.	Dr. P. Kanagavel	Additional Director
3.	Shri M.R. Gunasekaran	Executive Secretary II
4.	M.C. Lavanya	Assistant Director (Technical)
5.	Shri Yelchuri Srinath	Assistant Director
6.	Shri C. Stephen Jeremias	Assistant Engineer
Testing & Forecasting		
1.	Shri S.A. Mathew	Director
2.	Shri A.G. Rangaraj	Deputy Director (Technical)
3.	Shri M. Saravanan	Deputy Director (Technical)
4.	Shri Bhukya Ramdas	Deputy Director (Technical)
5.	Shri M. Karuppuchamy	Assistant Executive Engineer
6.	Shri A.R. Hasan Ali	Assistant Executive Engineer
7.	Shri Y. Packiyaraj	Assistant Executive Engineer
8.	Shri S. Paramasivan	Assistant Engineer
9.	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 S. Arulselvan	Assistant Executive Engineer
Contract Staff in SRRA		
1.	Shri Prasun Kumar Das	Assistant Director (Technical)
2.	Shri R. Karthik	Assistant Director (Technical)
Employees on Deputation from MNRE		
1.	Shri A Mohamed Hussain	Deputy Director General
2.	Dr. G. Giridhar	Deputy Director General

NIWE OFFICIALS ON EXTERNAL COMMITTEES, BODIES AND MEMBERSHIP OF ASSOCIATIONS

Dr. K. Balaraman

- Senior Member-IEEE
- Vice Chair, IEEE PES Bengaluru chapter
- Chairman, Wind Turbine Sectional Committee ETD 42 of BIS

D. Lakshmanan

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

Dr. Rajesh Katyal

- Fellow, Institution of Engineers (India).

A. Senthil Kumar

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

Dr. P. Kanagavel

- Member, 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.
- Advisor, Arivukkan - a Monthly Science Magazine.

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 31.03.2018, 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.

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, 2018;

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.

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: 28-08-2018

BALANCE SHEET
2017-18

NATIONAL INSTITUTE OF WIND ENERGY

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

Chennai - 600 100

BALANCE SHEET AS AT 31st MARCH 2018

(Amount in Rs.)

FUND AND LIABILITIES	Schedule	31st March 2018	31st March 2017
CAPITAL ASSET FUND	1	35,04,24,350	39,92,33,180
RESERVES AND SURPLUS	2	41,30,23,641	33,40,64,685
CURRENT LIABILITIES AND PROVISIONS	3	54,22,37,854	39,68,24,702
TOTAL		**1,30,56,85,846**	**1,13,01,22,567**
ASSETS			
FIXED ASSETS			
(a) Created out of Central Governments Grants	4	24,43,84,510	24,16,12,037
(b) Out of Internal Generation Grants		10,60,39,840	15,76,21,143
CURRENT ASSETS, LOANS AND ADVANCES	5	95,52,61,496	73,08,89,387
TOTAL		**1,30,56,85,846**	**1,13,01,22,567**
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. K. Balaraman	Shravan Gattupalli
Asst. Director (F&A)	Dy. Director General (F&A)	Director General	Partner
			Membership No.226441

NATIONAL INSTITUTE

(An Autonomous R & D Institution under Ministry of
Chennai

RECEIPTS AND PAYMENTS ACCOUNT

RECEIPTS			FY 2017-18	FY 2016-17
I.	**Opening Balances**			
	(a)	Cheques in hand	-	-
	(b)	Bank balances		
		i) In Current Account	20,53,693	58,89,815
		ii) In Savings Bank Account	8,70,48,830	17,06,30,459
		iii) In Deposit Accounts	56,95,00,000	43,20,00,000
		iv) In Deposit Accounts (SRRA)	50,00,000	-
	(c)	Stamps in hand	14,009	3,708
			66,36,16,532	**60,85,23,982**
II.	**Grants Received *I* Unutilised Grants**			
	(a)	From Government of India for Grant	23,00,00,000	25,00,00,000
	(b)	From Government of India (Met-Ocean Measurement)	10,00,00.000	-
	(c)	From Government of India (Integrated Wind & Solar Research Assessment)	3,56,00,000	-
	(d)	From Government of India /25KW Grid /lTC Proqramme	-	33,50,000
	(e)	Sale of Fixed Assets	2,40,096	(10,326)
	(f)	From Government of India - North East Project	-	-
	(g)	From Government of India for SRRA Project	4,17,17.000	1,19,00,000
Ill.	**Income on Investments**			
IV.	**Interest Received**			
	(a)	On Bank deposits	3,27,02,211	4,31,84,253
	(b)	On Bank deposits (SRRA)	5,45,239	13,59,488
V.	**Other Income**			
	(a)	Fees for services Including Advances	11,13,43,488	11,88,06,426
	(b)	Fees for services Including Advances (SRRA)	1,23,62,028	1,13,13,746
	(c)	Income from publications	11,917	39,90,931
	(d)	Energyreceipts	3,56,01,480	2,00,40,766
	(e)	Misc. Income	2,54,49,724	2,71,76,463
	(f)	Award Fund - IREDA	4,58,262	1,00,00,000
VI.	**Amount borrowed**			
VII.	**Any other receipts**			
	(a)	Security deposit *I* Eearnest money deposits received	45,09,476	53,44,178
	(b)	Changes in Working Capital	5,50,256	39,51,478
			63,10,91,177	**51,04,07,403**
		TOTAL	**1,29,47,07,709**	**1,11,89,31,385**

OF WIND ENERGY

New and Renewable Energy, Government of India)
600 100

FOR THE YEAR ENDED 31st MARCH 2018

(Amount in Rs.)

PAYMENTS			FY 2017-18	FY 2016-17
I.	**Expenses**			
	(a)	Employee related Expenses	5,48,39,181	4,67,48,633
	(b)	Administrative Expenses	4,86,17,511	5,33,56,495
II.	**Payments made against funds for various projects**			
	Out of CFA			
	(a)	In house R&D project expenses	2,23,21,350	2,78,46,176
	(b)	Seminar & Information dissemination	21,33,650	19,01,816
	Out of Grants for projects			
	(a)	From Government of India for Grant	5,80,31,632	3,53,53,754
	(b)	From Government of India 25KW Grid /ITC Programme	5,391	6,53,434
	(c)	IREDA Award Fund	3,48,609	-
	(d)	From Government of India- North East Project	1,40,56,586	23,66,066
	(e)	From Government of India for SRRA Project	2,42,07,692	2,18,47,137
III.	**Investment and Deposits made**			
IV.	**Expenditure on Fixed assets & Capital Work-in-Progress**			
	(a)	Purchase of Fixed assets (Grants)	8,96,05,943	2,27,17,616
	(b)	Purchase of Fixed assets (Internal Generation)	91,61,481	14,59,93,957
	(c)	Purchase of Fixed assets (SRRA)	17,56,287	8,27,195
V.	**Refund of Surplus Money**			
	(a)	Balance of Grants-in-aid to Government of India	1,60,30,508	-
VI.	**Other Payments**			
	(a)	Refund of Security deposits / Performance Guarantee / Earnest money deposit	34,84,082	54,85,061
	(b)	Expenditure on Consultancy Projects	6,08,87,397	6,83,13,835
	(c)	Expenditure on Consultancy Projects SRRA	41,20,152	2,19,03,679
VII.	**Closing Balances**			
	(a)	Cheques in hand	-	-
	(b)	Bank Balances		
		i) In Current Account	13,57,22,855	20,53,693
		ii) In Savings Bank Account	3,26,49,730	8,70,48,830
		iii) In Deposit Accounts	59,62,50,000	56,95,00,000
		iv) In Deposit Accounts (SRRA)	2,00,00,000	50,00,000
	(c)	Cash in hand (NIWE Canteen)	4,77,672	-
	(d)	Stamps in hand	-	14,009
		TOTAL	**1,29,47,07,709**	**1,11,89,31,385**

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. K. Balaraman	Shravan Gattupalli
Asst. Director (F&A)	Dy. Director General (F&A)	Director General	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 2018

(Amount in Rs.)

INCOME	Schedule	IE	CFA	31st March 2018	31st March 2017
Income from Scientific & Technical Consultancy Services	6	14,69,76,885	-	14,69,76,885	8,04,67,766
Income from publication	7	11,917	-	11,917	39,90,931
Interest Earned	8	2,06,60,718	55,16,327	2,61,77,045	3,71,32,587
Other Income	9	2,57,56,830	7,90,053	2,65,46,884	3,21,74,111
Grants from Government of India allocated for Revenue expenditure during the year		-	7,00,00,000	7,00,00,000	173,350,000
Closing stock		23,08,945	-	23,08,945	5,003,584
TOTAL (A)		**19,57,15,295**	**7,63,06,380**	**27,20,21,676**	**332,118,979**
EXPENDITURE					
Opening stock		50,03,584	-	50,03,584	58,78,291
Establishment Expenses	10	5,34,66,426	-	5,34,66,426	5,29,33,449
Other Administrative Expenses	11 (A)	-	58,380,241	5,83,80,241	5,33,56,495
Consultancy Project Expenses	11 (B)	4,91,99,874	-	4,91,99,874	6,83,13,835
On Advances/Deposits/Prepaid/EMD,SD,PG's etc.,		-	59,365,787	5,93,65,787	4,97,51,982
Interest Refunded to Ministry		-	16,030,508	-	-
In house project expenditure		-	40,132,507	4,01,32,507	6,81,21,246
TOTAL (B)		**10,76,69,884**	**173,909,043**	**26,55,48,419**	**29,83,55,298**
Balance being excess of Income over Expenditure (A-B)		8,80,45,411	-	-	-
Add: Opening Balance b/f		-	23,31,32,206	-	-
Prior period adjustment	12	-	-	-	-
Transfer to Capital Asset Fund	4	91,39,323	-	-	-
Transfer to Welfare Fund		52,866	-	-	-
BALANCE BEING DEFICIT / SURPLUS TRANSFERRED TO GENERAL RESERVE FUND		7,89,06,088	-	-	-
UN-UTILIZED GRANTS OUT OF GOVT. GRANTS FOR REVENUE EXPENDITURE		-	13,55,29,544	-	-
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. K. Balaraman
Director General

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,
Ministry of New and Renewable Energy, Government of India
वेलचेरी - ताम्बरम मुख्य मार्ग, पल्लिकरनै,
चेन्नई - 600 100, तमिलनाडु, भारत
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