



EDITORIAL



The expansion of the wind industry has resulted in a strong ecosystem, project operation capabilities and a manufacturing base. State-of-the-art technologies are now

available in the country for the manufacture of wind turbines. All the major global players in this field have their presence in the country with over 24 different models of wind turbines are being manufactured by more than 12 different companies. It is noteworthy to state that Wind turbines and components are being exported to the US, Australia, Europe, Brazil and other Asian countries. Around 70-80% indigenization has been achieved with strong domestic manufacturing in the wind sector.

The Government of India has announced a laudable Renewable Energy target of 175GW by 2022 out of which 60 GW will be coming from wind power. The Wind Potential in India was first estimated by National Institute of Wind Energy (NIWE) at 50 m hub-height i.e. 49 GW but according to the survey at 80m hub height, the potential grows as much as 102 GW and 302 GW at 100 Meter hub height. Further a new study by NIWE at 120 m height has estimated a potential 695 GW. One of the major advantages of wind energy is its inherent strength to support rural employment and uplift of rural economy. Further, unlike all other sources of power, wind energy does not consume any water-which in itself will become a scarce commodity. Overall the future of Wind Energy in India is bright as energy security and self-sufficiency is identified as the major driver.

During the period, three wind masts have been installed ranging from 50 m to 100 m

height and 10 Telecom towers in NE region were mounted with sophisticated wind sensors and data loggers for collecting the wind data. Based on the inputs obtained from the Geo-physical investigations carried out during the last quarter, 5 nos. of borehole locations have been finalised for conducting Geo-technical studies at Gulf of Khambhat, off Gujarat coast and installed first of its kind Lidar based offshore wind measurements at Zone B at Gulf of Khambhat, off Gujarat.

The continuous measurements for testing of three large and one small wind turbines are on-going. The final test reports issued to the customer of one small wind turbine and closed the project.

Preparatory work for organizing the 2 PAN INDIA Network meet is in progress. NIWE forecasting project received "NIWE-Best Statewide Forecaster" award by Indian Wind Power Association.

NIWE carried out Calibration of 10 SRRA station under consultancy mode and 27 under SRRA project and inspected 9 SRRA stations during this quarter.

NIWE has been assigned to obtain accreditation for the certification services as the ISO/IEC 17065 standard from National Accreditation Board for Certification Bodies (NABCB), Quality Council of India.

NIWE during this period had successfully conducted two International Training Courses (ITC). 4th ITC on Wind Resource Assessment and Wind Farm Planning with 16 participants from 9 countries and 3rd ITC on Design, Installation and Maintenance of Small Wind Turbine with 26 participants from 9 different countries.

Dr. K. Balaraman, Director General

Contents

◆ NIWE at work - 2

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Wind Solar Resource Measurements / Offshore

The Wind Solar Resource Measurements & Offshore (WSOM) division is involved in the following activities

1. Wind Resource Assessment studies using met. masts and telecom towers
2. Offshore wind related activities
3. R&D projects funded by MNRE
4. Consultancy projects for various wind sector stakeholders

ONSHORE WIND RESOURCE ASSESSMENT

Three wind masts have been installed ranging from 50 m to 100 m height. One 100 m mast has been installed in the state of West Bengal while two 50m masts has been installed in north eastern region. The measurements campaign is underway. The details are shown below:

Sl.No.	State	Height of Wind Monitoring Station	No. of wind monitoring stations installed
1	West Bengal	100 m	1
2	Tripura	50 m	1
3	Manipur	50 m	1
Total			3

Wind resource assessment studies using existing Telecom Towers

A total of 10 Telecom towers in NE region were mounted with sophisticated wind sensors and data loggers for collecting the wind data. The measurement programme is underway. The details are shown below:

Sl.No.	State	No. of Telecom towers installed with wind sensors
1	Tripura	1
2	Manipur	9
Total		10

OFFSHORE

Geotechnical Investigation at Gulf of Khambhat off Gujarat coast

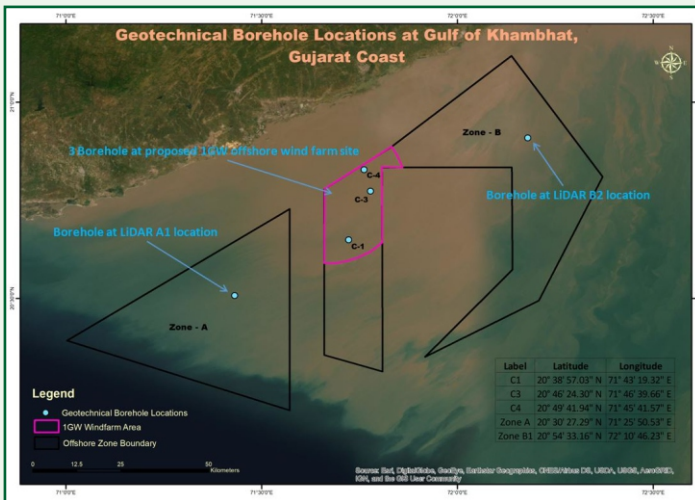
Based on the inputs obtained from the Geo-physical investigations carried out during the last quarter, the division has finalised 5 nos. of borehole locations for conducting Geo-technical studies at Gulf of Khambhat, off Gujarat coast. Out of the 5 boreholes, 3 surveys will be carried out in the area (369 Sq.km) proposed for 1 GW offshore Wind Farm development. While the two borehole investigations will be carried out for installing two new Lidars for carrying out the wind resource measurements in Zone A and Zone B respectively for fostering the development of offshore wind farm in the country.



50 m Wind monitoring station installed at Tripura



Image- Wind resource assessment sensors mounted on telecom tower



Proposed borehole locations at Gulf of Khambhat off Gujarat coast

Offshore wind measurements at Gulf of Khambhat off Gujarat coast

WSOM division has installed first of its kind Lidar based offshore wind measurements at Zone B (B1-Lidar location) at Gulf of Khambhat, off Gujarat coast during the year November 2017 for which the one year Lidar data report (November 2017 to October 2018) has already been



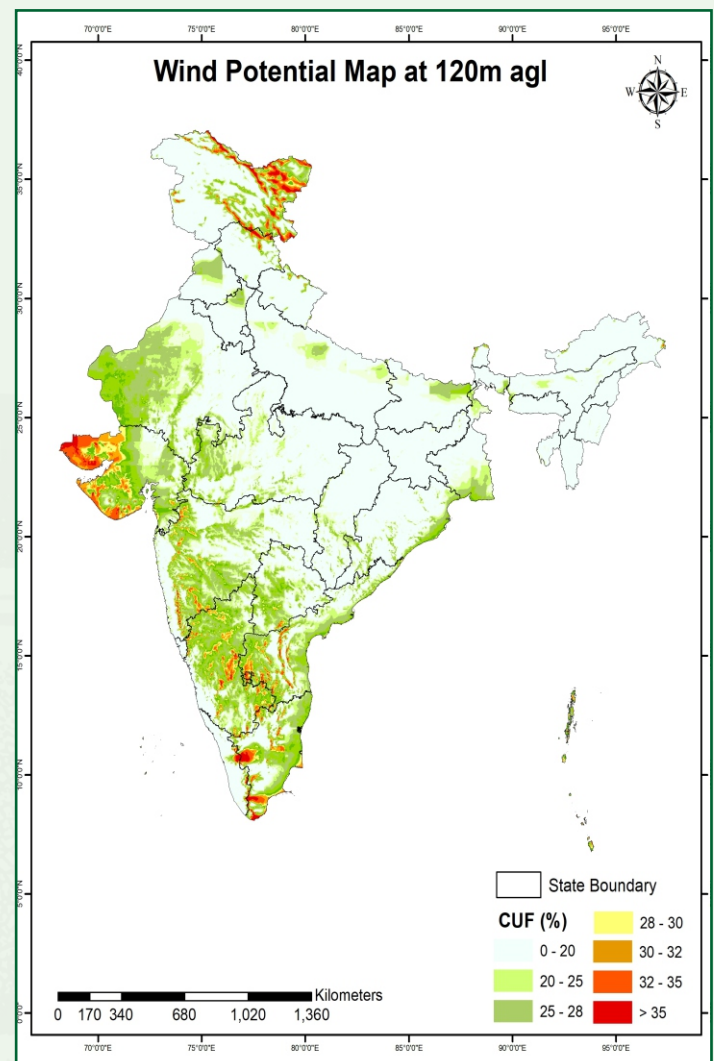
Automated weather station along with Lidar equipment on the platform

uploaded in NIWE website along with the Time series data for the benefit of offshore wind turbine stake holders. The offshore wind measurement has further been continued for one more year and the measurements are underway.

R&D PROJECT APPRAISAL COMMITTEE (RDPAC) APPROVED PROJECTS

Integrated wind & solar resource assessment through mapping and measurements

As an outcome of the said project WSOM division has validated 120 m wind atlas map and the same has been uploaded at NIWE website for the benefit of wind stake holders. Further towards the installation of integrated mast both for wind solar measurements, the procurement and fabrication of materials is under way. The proposed integrated masts will be installed at 25 locations covering about 10 renewable energy rich states.

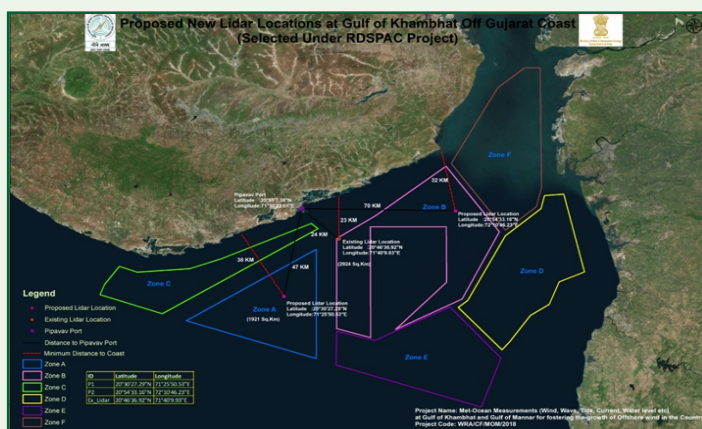


120m Wind Potential Map

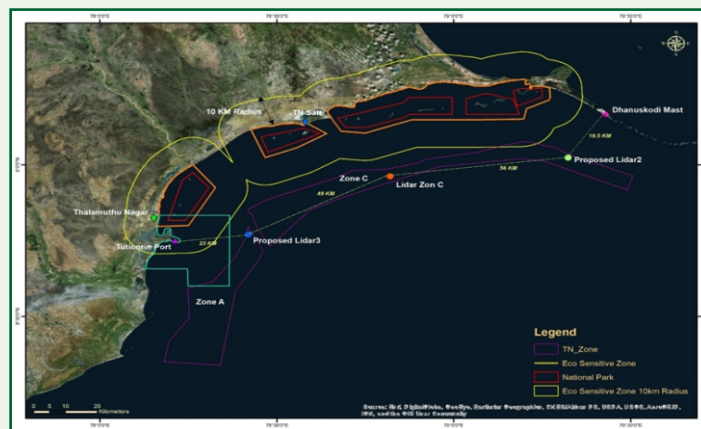
Met-Ocean measurements (Wind, Wave, Tide, Current, Water level, etc) at Gulf of Khambhat and Gulf of Mannar for fostering the growth of offshore wind in the country.

As a part of the milestone activity of the project, the WSOM division has finalised two Lidar locations one in Zone A and another at farther end of Zone B at Gulf of Khambhat, off Gujarat coast. Also two more locations for installing the Lidar at Gulf of Mannar off Tamil Nadu coast has also been identified with the help of field experts. The location detail of four Lidars has been shown below.

Further NIWE has also initiated the requisite clearance protocol both from central ministries and state departments which are envisaged as essential and necessary for installing and commissioning monopile and platform for mounting the Lidar. The stage 1 clearance protocol/NOC work is under way.



Proposed Lidar locations at Gulf of Khambhat, off Gujarat coast



Proposed Lidar locations at Gulf of Mannar, off Tamil Nadu coast

CONSULTANCY PROJECTS:

WSOM division has executed consultancy projects to the tune of about 400 MW towards supporting the stakeholders of the wind industry. The activities include;

- Verification of wind monitoring procedure
- Wind Monitoring Study
- Micrositing
- Energy Yield Estimation
- Energy Production Demonstration Test

Further, NIWE has taken first of its kind international project for preparation of Detailed Project Report for establishment of wind farm project from M/s Energoimport at Rio-Seco Cuba for a capacity of 50 MW to be financed under the line of credit by Government of India. As per the agreement, NIWE would carry out



evaluation of the wind resource assessment together with investigation of the site, preparation of the report on the wind characteristics, Design and Engineering of the wind farm layout and Financial/Economic analysis. During the quarter, as a part of project deliverables, NIWE had carried out the data analysis and prepared the Interim report using six month's real time measurement from the 100m met mast at Rio-Seco, Holguin province, CUBA successfully.

Testing & Research Station

LARGE WIND TURBINE TESTING

Power Curve Measurements of 2000 kW Wind turbine of M/s. Atria Wind Power (Savarkundla) Pvt. Ltd. The continuous measurements are on-going.

Power Curve Measurements of Inox 2000 kW wind turbine of M/s. Inox Wind Ltd. The continuous measurements are on-going.

Type Testing of its Model Pioneer Wincon 750/57, 750 kW, a wind turbine of M/s. Para Enterprises Pvt. Ltd. The continuous measurements are on-going.

SMALL WIND TURBINE TESTING

Type testing of SM2 (1kW) at Wind Turbine Research Station, Kayathar, Tuticorin District, Tamil Nadu of M/s. Windstream Energy Technologies India Pvt. Ltd. The final test reports issued to the customer and project has been closed.

Type Testing of Vaata 5.5 kW Wind Turbine at Wind Turbine of M/s. Vaata Smart Pvt. Ltd. The continuous measurements are on-going.

VISITOR

DEA & NIWE meeting under the INDEP Program. Mr. Martin Hansen, Deputy Director General, Danish Energy Agency visited NIWE discussed on workshops on Marine Spatial Planning (MSP) and LCoE on 16th August, 2019.

Research & Development and Resource Data Analytics & Forecasting and Solar Radiation Resource Assessment

BRIEF R&D ACTIVITIES INCLUDE :

Establishment of Smart RE-Micro Grid with Integrated Resource and Building Management System (IRBM) at National Institute of Wind Energy, Chennai

- The design engineering calculation for the sizing of solar and wind requirements to meet out the demand is completed
- Land requirement and spacing criteria assessment has arrived
- BESS design criteria and Load growth works are ongoing
- The draft specification for Microgrid is under progress
- The expert committee has been formulated to verify the specification
- Simulation of Microgrid using the various tool is under progress

Design and Development of Indigenous Grid Emulator Facility

- Eminent persons/organizations in the field of power systems were identified & requested their nomination for the formation of R&D consortium.
- A literature survey on the functional blocks of the Grid Emulator test facility is in progress.
- Draft specification preparation with the support of industries is in progress.

IoT Based Smart wind farm to enable real-time remote monitoring and control

- The technical specification has been prepared. EOI was made to float tender for the sensors and Intelligent electronic device (IED) instrumentation as per the design and requirement of NIWE.



- Preparation of Design basis document is in progress.
- Development of Signal Conditioning Module Procurement of critical sensors for Real-Time Data acquisition is in progress.
- Development of Intelligent Electronic device (IED) for real-time data acquisition, processing, and transfer is in progress

Development of Long-term Wind Speed Forecasting Using Hybrid Model

- A literature survey was carried out.
- The indigenous model development framework was laid.
- Establishment of Big data framework and Development of Visualisation Tool were carried out

FORECASTING

- Intraday Model of Satellite Image processing of historical data was tested.
- Conversion of existing day ahead forecasting model to Python program is completed. The validation & comparison report was prepared for the same.
- Documentation of NWP is under progress.
- Time series analysis using the ARIMA model is under progress.
- NWP Data extraction for SRRA stations is under progress.
- Identified the issues in the sky camera and tried to resolve it.
- Learning and developing the model for Sky camera Image processing.
- Preprocessing of solar static details for Tamil Nadu was carried out.
- Evaluation of operational aggregation forecasts and single-plant level forecasts were in progress.
- Intraday simulation model for other SRLDC solar parks has been carried out.
- Documentation of bias correction of ECMWF data, a combination of NWP GHI, till conversion modeling, PV module efficiently modeling, Gujarat individual power plant with single NWP is completed.
- Solar power peak generation from 121 stations in India has been estimated.
- Fine-tuning of wind power forecasting model for individual substation wise is under progress.

- Pilot forecasting services for the whole state of Andhra Pradesh has initiated on 26-07-2019.
- Draft of MoU and NDA for the pilot project of wind power forecasting for Madhya Pradesh is prepared, and the same has been sent.
- Model wise Error Analysis has been carried out for Tamil Nadu.
- Preprocessed the static details of 2 wind farms of SRLDC and simulation model is running. 2 wind farms of SRLDC is under testing for pilot basis forecasting services. Web portal development for SRLDC for 2 new plants is under progress.
- Carried out NWP validation for the Kayathar site.
- Prepared bias correction templates for the NWP models.
- Capacity building training for team members on Python has been completed.
- Verification of Real-time generation data validation on feeder level has been carried out.
- Mapping of folder location is carried out for copying the data from the old server to the new server.
- Implementation quartile based bias correction on the NWP dataset.
- Extraction of NWP data for the available WRA stations.
- Error analysis report from July to September 2019 has been prepared for the state of Tamil Nadu, Gujarat, Karnataka, Maharashtra, and SRLDC specific solar parks and wind farm

Resource Data Analytics Lab

- Created an automated system to download the met mast data from Kintech and Ammonit loggers.
- Created an automated system to process the NRG Data loggers.
- A list of Column identification for the met mast data has been completed.
- Northeast state's met masts, 100m, and 50m, met mast data segregation for wind monitoring stations has been completed.
- Historical Data extraction for NGR, Ammonit and Kintech logger data is under process
- Carried out 100m met mast data sale for 1 site (3 years data).

SOLAR RADIATION RESOURCE ASSESSMENT

Calibration of Solar Instruments

- Carried out Calibration of 10 pyranometers under consultancy mode and Calibration of 18 pyranometers & 9 Pyrheliometers under SRRA project.
- Visited SRRA calibration lab at NISE, Haryana on 05.09.2019

Inspection of SRRA stations

Inspection has been done for the following SRRA station during the quarter:

- Erode and Trichy from 19.07.2019 to 24.07.2019.
- Port Blair from 30.07.2019 to 04.08.2019
- Khandwa from 27.07.2019 to 01.08.2019
- Chitradurga and Haveri from 03.09.2019 to 06.09.2019
- Rajamundry and Chilakapalem from 26.09.2019 to 03.10.2019
- Pondicherry from 26.09.2019 to 28.09.2019

OVERVIEW OF INDIGENOUS WIND POWER FORECAST MODEL PERFORMANCE

NIWE has established an operational forecasting system for the whole state of Tamil Nadu during September 2015 and Gujarat during April 2018. NIWE forecasting team is actively carrying out various activities, including daily event analysis, to improve the wind power forecasting model accuracy on a daily / weekly / monthly basis. The brief model analysis for the above said two states are explained below:

Tamil Nadu

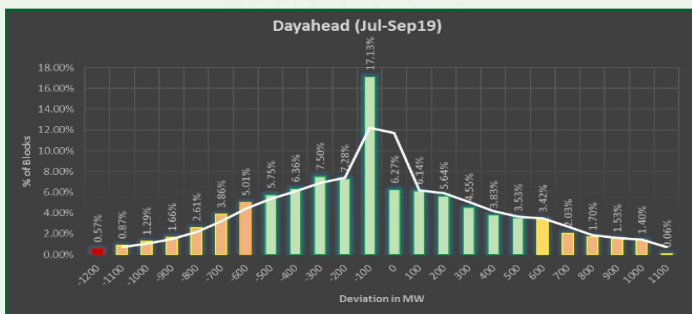


Figure : 1

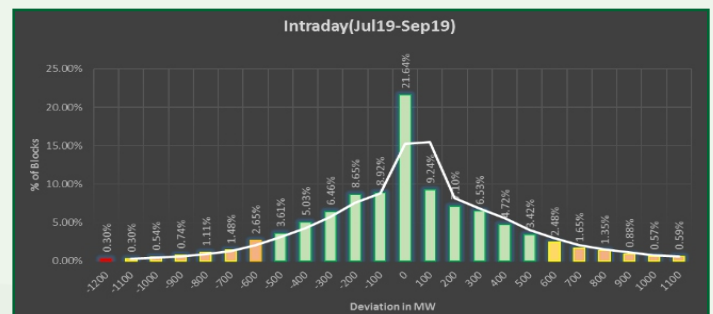


Figure : 2

Figure 1 & 2 represents the frequency error distribution for the whole state of Tamil Nadu from July 2019 – September 2019 (3 months). From Figure 1, it may be noted that about 76% of the blocks have a day ahead deviation of 600 MW, and with intraday corrections, 76% got improved to 86%, i.e., 10% improvement (Figure 2).

Gujarat

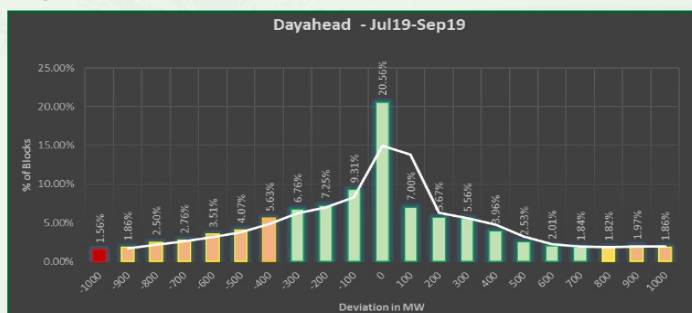


Figure : 3

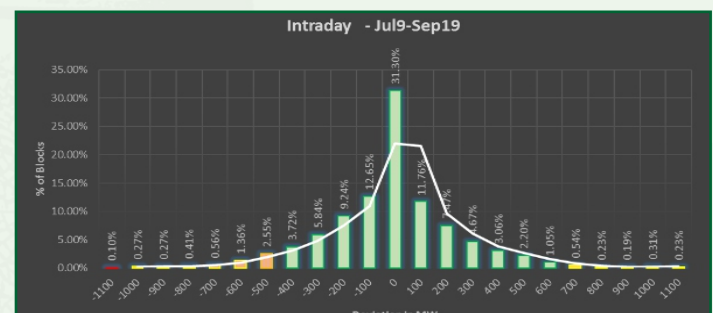


Figure : 4

Figure 3 & 4 represents the frequency error distribution for the whole state of Gujarat from July 2019 – September 2019 (3 months). From Figure 3, it may be noted that about 78% of the blocks have a day ahead deviation of 600 MW, and with intraday corrections, the 78% got improved to 94%, i.e., 16% improvement (Figure 2).

Further fine tuning of the wind power forecasting model for the whole state of Tamil Nadu and Gujarat is under progress.

WEB PORTAL

- UI improvement carried out in the Internship Portal.
- Improved the UI of Staff Monitoring Portal.
- Staff monitoring portal and new user accounts created in the database for staff monitoring portal.
- Implemented RLMM online security audit comments, and the same has been handed over to the IT division.
- A web portal for the 2nd PAN India Research Network meeting has been developed.
- Developing a web portal for online data availability of Solar and wind measurement is under progress.

INTERNSHIP & PROJECTWORK

During the period July to September 2019, 32 UG/PG students and faculties have completed their internship & project work at NIWE in the field of Wind and Solar Energy mentored by various subject experts of NIWE Scientific staff.

AWARDS

Received "NIWE-Best Statewide Forecaster" award for forecasting project by Indian Wind Power Association.

OTHER ACTIVITIES

- Preparatory work for organizing the 2nd PAN INDIA Network meet is in progress.

- Preparatory work for organizing an International conference on "Wind and Solar Resource Assessment" is in progress.
- Carried out a Site visit to Andaman & Nicobar Islands for the feasibility study for setting up of wind farm in Little Andaman, Port Blair and Nicobar Islands (Car Nicobar) from 05.08.2019 to 10.08.2019

VISITORS

- Prof. Amlan Chakrabarti, Dean, Faculty of Technology, Dr. Saptarsi, Faculty, and A.K.Chaudhuri, School of Information Technology, University of Kolkata have attended meeting in connection with Wind Power Forecasting at NIWE on 19th July 2019.
- Dr. Detlev Heinemann, Head, Energy Meteorology Group, Univ of Oldenburg, Germany provided Solar Power Forecasting training in NIWE, Chennai for R&D, RDAF & SRRA staff during 23rd to 26th July 2019.
- Dr. Pierre Pinson, Professor at the Technical University of Denmark (DTU), Department of Electrical Engineering during 19th to 21st August 2019.
- Dr. Bernhard Ernst, Fraunhofer Institute for Energy Economics and Energy System Technology on 1st & 2nd September 2019.

Standards and Regulation

- Completed the review verification of documentation of one prototype wind turbine model viz., "S133 2.6 MW / 2.8 MW" received from M/s. Suzlon Energy Limited (SEL) in connection with installation of prototype wind turbines in India as per MNRE guidelines.
- Organized the Prototype committee meeting chaired by DG, NIWE held on 26.09.2019 at NIWE, Chennai.
- Technical support has been provided to MNRE in connection with Indian Wind Turbine Certification Scheme (IWTCs) including the review of stakeholders' comments.



Meeting with IWTMA & CBs on IWTCs



Prototype Committee Meeting

- Organized the meeting between Certification bodies (CBs) and IWTMA on IWTCS, chaired by DG, NIWE held at NIWE, Chennai on 04.07.2019. During the meeting, discussed the response prepared for each stakeholders' comments on Volume – IV of IWTCS.
- Based on the consultations with stakeholders during the meetings, the modified draft IWTCS document (Version 1) has been sent to MNRE on 02.08.2019.
- The continuous technical support is being provided to MNRE for all the works related to Revised Lists of Models and Manufacturers of wind turbines (RLMM). Review of documentation has been carried out for 07 wind turbine models during this period.
- The security audit for RLMM online portal has been completed on 10.09.2019.
- Technical support to Bureau of Indian Standards (BIS) in connection with standards related works are ongoing.
- Review of draft Indian standards circulated by BIS is under progress.
- Organized the meeting with Certification Bodies (CBs) and Testing Laboratories (TLs) on preparation of

working document for compliance of CEA regulation held at NIWE, Chennai on 27.08.2019

- Quality Management System (QMS) documents have been prepared for Recertification Audit-Quality Management System Certificate of NIWE as per ISO 9001:2015.
- Organized 22nd Management Review meeting of Quality Management System (QMS) as per ISO 9001:2015 on 02.07.2019 at NIWE, Chennai chaired by DG, NIWE.
- DNV-GL has conducted the Recertification Audit of Quality Management System (QMS) as per ISO 9001:2015 for NIWE. Director & Division Head, S&R as Management Representative (MR) provided the support for DNV-GL recertification Audit of QMS as per ISO 9001:2015 for NIWE held at Kayathar on 11.07.2019 and at Chennai on 12.07.2019.
- Based on the successful completion of the recertification audit, DNV-GL has issued the revised ISO certificate for NIWE with the extended validity till 10.08.2022.
- The continual improvement and maintaining the quality management system are ongoing.

Certification and Information Technology

- Agreements were signed with M/s Southern Wind Farms Limited (SWL) for the review / verification of documentation in connection with the projects for renewal of certificates of the following wind turbine models:

Manufacturer's Name	Wind Turbine Model / Capacity
M/s. Southern Wind Farms Limited	GWL 225 / 225 kW

Based on the completion of review / verification, renewed Certificates have been issued to Southern Wind Farms Limited.

- NIWE has been assigned to obtain accreditation for the certification services as the ISO/IEC 17065 standard from National Accreditation Board for Certification Bodies (NABCB), Quality Council of India. The following major activity has been completed:

- NIWE submitted the Application along with the requisite documentation to NABCB. NABCB has accepted the Application and appointed Dealing Officer and assessors.
- A specialized workshop on “Certification of Wind Turbines for India market – Trends, Challenges and Solutions”, was held on 27th September 2019 at the National Institute of Wind Energy (NIWE), Chennai. The workshop was jointly organized by TÜV Rheinland and National Institute of Wind Energy (NIWE).
- During the year, Certification Division has successfully undergone the re-certification Audit on 12th July 2019 and has been recommended for continuation of certification issued by DNV-GL. The Division monitors the Quality Management System on a continuous basis and puts in place improvements as and when needed.
- NIWE has created the RLMM (Revised List of Models

DIVISION TRANSFER

Shri N. Rajkumar has been transferred from Standards & Regulation (S&R) Division to Testing & Research Station Division with effect from 19.08.2019.

and Manufacturers) portal for which the IT Division has carried out an audit by a CERT-In approved Security auditor for evaluating the vulnerabilities and has put in place mitigation strategies.

- New IT infrastructure such as High Computing Servers, Additional Networks, N-Computing Devices, Work Stations, Laptops and Printers have been procured and installed.
- Active directory has been installed in all the Desktops and Laptops available in NIWE and the IT division facilitates all the devices 24*7 to ensure effective reliability and security.

All Engineering software have been centralized and installed in server for speedy computing. Access rights are provided based on requirements and information received by various Divisions, which enables seamless access to scientists & engineers all the software available in NIWE.

Skill Development and Training Division

4th Special International Training Course

The Skill Development and Training (SDT) Division of NIWE had successfully conducted the 4th Special International Training Course on "Wind Resource Assessment and Wind Farm Planning" during 28th August to 20th September 2019. This is a special training course for ITEC partner countries sponsored by the Ministry of External Affairs (MEA), Government of India under ITEC programme. The course was attended by 16 Participants from 9 countries (Ethiopia, Tunisia, Mongolia, Iraq, Syria, Morocco, Nigeria, Sri Lanka, and Bangladesh).

The course was inaugurated by Dr. K. Balaraman, Director General (Head of the Institute), NIWE on 28th August 2019 by lighting the lamp, Kuthuvilakku after his insightful inaugural address mentioning about the importance of the Wind Resource Assessment for establishing the economically viable wind power project in a successful manner.

The course started with briefing about Wind Turbine technology aspects and detailed deliberation on various characteristics of Wind Resource Assessment, 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 Collection, Analytics and Processing, Software Tools used for Wind data Analysis, Design and Layout of Wind Farms, Wind Resource Mapping, Forecasting and Wind Energy Production.



Participant receiving the Course Certificate from Director General, NIWE



Release of Course Material

As part of the training, the practical training was arranged starting from site selection, mast installation and instrumentation of sensors, collection of data and it's validation, processing, analysis and reporting, which were held at different Laboratories and in the fields.

As part of study visit, all the participants were taken to southern part of Tamil Nadu to visit Wind Turbine Test Station (WTTS) / Wind Turbine Research Station (WTRS) located at Kayathar, apart from visiting Met Mast and operating wind turbines of various models, capacities and makes.

Participants stayed at Kanyakumari during the study visit period and the experience at Cape Comorin (southern tip of India) are so exciting to the participants such as seeing the sunrise and sunset and cultural visits showcasing the spiritual heritage of India.

Dr. K. Balaraman, Director General, NIWE distributed the Course Certificates to all the participants during the Valedictory Function after his Valedictory address on 20th September 2019.

3rd Special International Training Course

The 3rd Special International Training Course on "Design, Installation and Maintenance of Small Wind Turbine" for ITEC partner countries was successfully conducted by NIWE, Chennai during 28th August to 24th September 2019, sponsored by Ministry of External Affairs (MEA), Government of India under ITEC programme. The objective of the International Course was designed in such a way that the participants themselves would design the parts / components of the Small Wind Turbines from the low cost and locally available materials, as also construct, Install, commission and erect the turbine to produce power along with Operation Maintenance practices. The course was attended by 26 participants from 9 different countries, Bhutan, Ethiopia, Guyana, Honduras, Morocco, Sri Lanka, Sudan, Tanzania and Zimbabwe.

The training course was inaugurated by Dr. K. Balaraman, Director General, NIWE.



DG, NIWE inaugurating the Training Course with participants



Glimpse of Hands on Training

The course content of the training were handled by Scientists, Engineers of NIWE who have years of experience in the field. During the 28 days course, Sixteen classroom lectures were held apart from practical training, study visits to wind farm and wind Turbine manufacturing factory.

The major part of the course contents of the training were handled by Shri. Jorge Ayarza, Engineers and Founder of MINVAYU, Auroville with the support of NIWE scientist / engineers. During the 28 days course, the participants had themselves designed the parts / components of the Small Wind Turbines apart from study visits to wind farms.

The participants had visited the Centralized Monitoring Station (CMS) of Suzlon at Radhapuram, where they had a chance of listening from the industry experts who are actually in the field.

The participants were taken to southern part of Tamil Nadu to visit (i) M/s. RS Windtech Engineers (P) Ltd., Aralvoimozhy, Tamil Nadu (ii) M/s. Apollo Transformer and Filters, Radhpuram, Tamil Nadu (iii) Wind Turbine Test Station (WTTS), Kayathar, Tamil Nadu (iv) Wind Turbine Research Station (WTRS), Kayathar, Tamil Nadu where they got 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.

Participants stayed at Kanyakumari during the study visit period and the experience at Cape Comorin (southern tip of India) are so exciting to the participants such as seeing the sunrise and sunset and cultural visits showcasing the spiritual heritage of India.

Dr. K. Balaraman, Director General had delivered the valedictory address and distributed the course certificates to all the participants during the Valedictory function.



Dr. K. Balaraman, DG, NIWE distributing the Course Certificate

VISITORS

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 period July to September 2019, the following visits were coordinated and facilities of NIWE showcased and explained.

- 57 students and 3 faculties from Peace On Green Earth Public School Kundrathur, Chennai on 19th July 2019.
- 35 students and 2 faculties from Kings Engineering College, Irrangattakotai, Tamil Nadu on 26th July 2019.
- 67 students and 3 faculties from Murugappa Polytechnic College, Avadi, Chennai on 13th August 2019.
- 1 staff from HMS Global Eided Polytechnic, Tumkur, Karnataka on 28th August 2019.
- 1 staff from Govt Polytechnic College, Bellary Dist, Karnataka on 28th August 2019.
- 1 staff from University College of Engineering, Dindigul on 28th August 2019.
- 1 staff from Govt Polytechnic College, Mysore on 28th August 2019.



नीवे NIWE

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