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EDITORIAL

The overall installed capacity of wind generated worldwide by the end of 2018 reached 597 Giga watt, according to preliminary statistics published by World Wind Energy Association (WWEA). 50.1 GW were added in the year 2018, slightly less than in 2017 when 52.5 GW were installed. All wind turbines installed by end of 2018 can cover close to 6% of the global electricity demand.

NIWE has installed and commissioned 13 nos. of 50 m wind monitoring station in NE region and 22 nos. of telecom towers in NE region are mounted with wind sensors. A beta version of the Geo-tagging web portal has been developed for uploading the data of wind turbines installed across the Country. Geotechnical studies for about 3 to 5 borehole locations in the Gulf of Khambhat off Gujarat Coast for which the tender process is in progress.

NIWE has completed one Large Wind Turbine Testing and issued the Final Test Report to the customer and also completed one Type Testing of Model and issued the Final test report to the customer.

NIWE during this quarter has made significant progress in developing Indigenous Wind Power forecast model for Gujarat, Karnataka and Tamil Nadu and web portal for sports, recruitment, staff monitoring for various activities of NIWE.

An agreement has been signed withM/s RRB Energy Limited (RRBEL) and M/s Southern Wind Farms Limited (SWL) for the review / verification of documentation in connection with the projects for renewal of certificates.

NIWE during this period had successfully completed 23rd National training course on Wind Energy Technology with 44 participants and 23rd International training course on Wind Turbine Technology and Applications with 28 participants. The second edition of the IREDA-NIWE Annual Awards for Wind Energy 2019 was announced and distributed the award to the winners during the celebration of Foundation Day of NIWE.

Dr. K. Balaraman, Director General

Contents

Editorial Board

Wind Solar Resource Measurements / Offshore

WIND RESOURCE ASSESSMENT (UNCOVERED / NEW AREAS)

Installed and commissioned 13 nos. of 50 m wind monitoring station in NE region and 22 nos. of telecom towers in NE region are mounted with wind sensors. Currently, 108 wind monitoring stations & Telecom towers are operational in 11 States under various wind monitoring projects funded by the Ministry of New and Renewable energy (MNRE) as well as various entrepreneurs.

CONSULTANCY PROJECTS

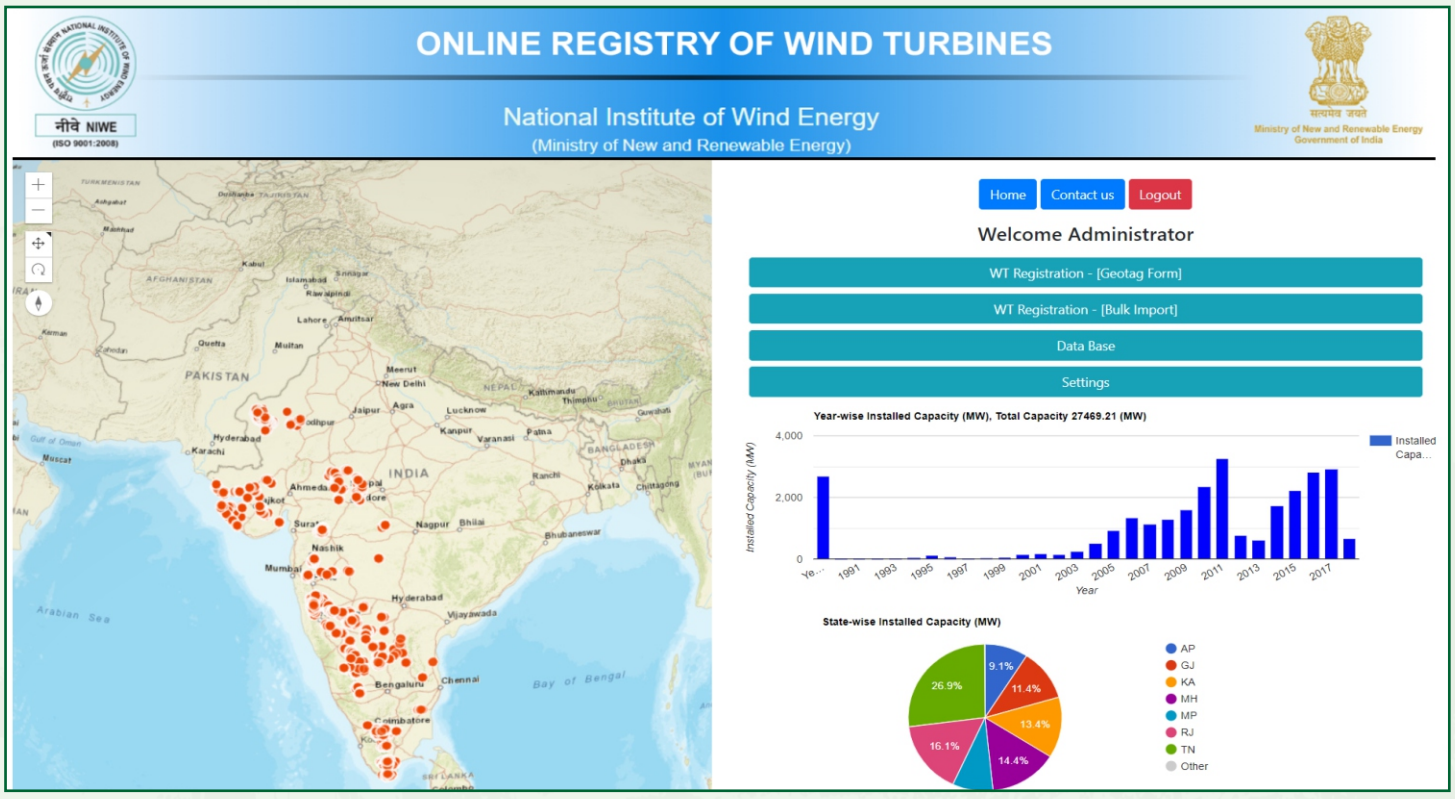
The following consultancy projects have been completed and reports have been submitted for promotion of onshore wind farm development in the country.

- Verification Procedure of Wind Monitoring for 25 sites has been completed.
- 8 nos. of Private Wind Monitoring Stations has been registered as per MNRE guidelines
- Micrositing and Energy Estimation has been done for 1 site.
- Energy Yield Assessment has been done for 15 sites.
- Energy Production Demonstration Test – 1 no.
- Validation of Energy Yield Assessment – 3 nos.

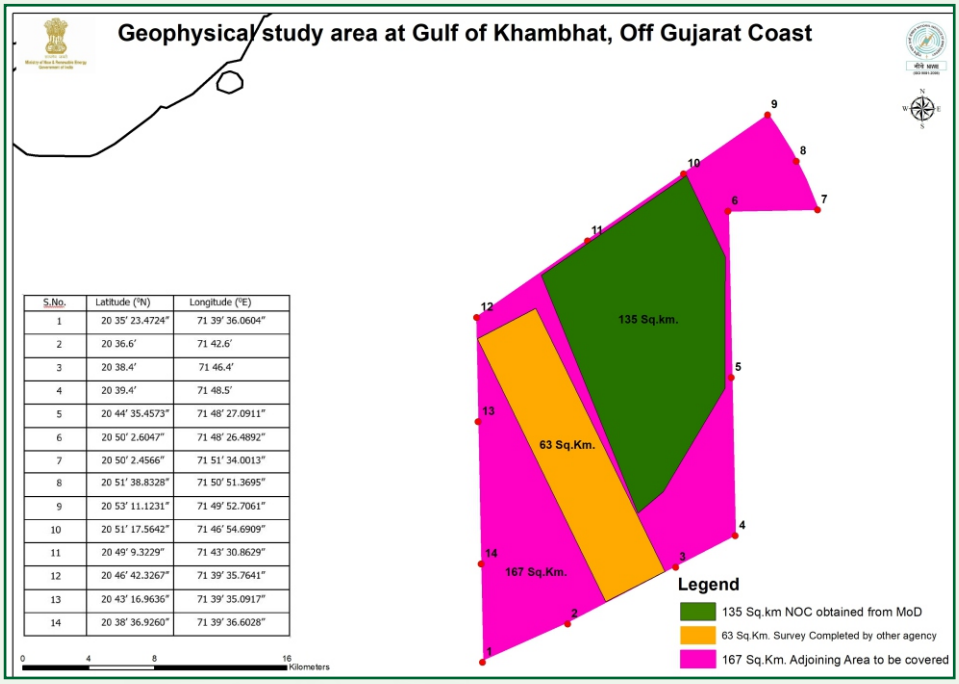
GEO-TAGGING OF WIND TURBINES INSTALLED ACROSS THE COUNTRY

NIWE has created a centralised database of existing and proposed Wind Turbine installations in the country based on the data collected from SNAs and other Stakeholders. As on date out of 35 GW installed capacity in the country, 29 GW of data has been collected from various stakeholders / SNA / Manufacturers and the verification process is underway.

A beta version of the web portal has been developed for uploading the data.



Geo-tagging web portal



S.No.	Latitude (°N)	Longitude (°E)
1	20 35' 23.4724"	71 39' 36.0604"
2	20 36.6'	71 42.6'
3	20 38.4'	71 46.4'
4	20 39.4'	71 48.5'
5	20 44' 35.4573"	71 48' 27.0911"
6	20 50' 2.6047"	71 48' 26.4892"
7	20 50' 2.4566"	71 51' 34.0013"
8	20 51' 38.8328"	71 50' 51.3695"
9	20 53' 11.1231"	71 49' 52.7061"
10	20 51' 17.5642"	71 46' 54.6909"
11	20 49' 9.3229"	71 43' 30.8629"
12	20 46' 42.3267"	71 39' 35.7641"
13	20 43' 16.9636"	71 39' 35.0917"
14	20 38' 36.9260"	71 39' 36.6028"

Proposed met-ocean locations in Gulf of Khambhat, Gujarat

OFFSHORE GUJARAT

Raw data files (time series) of one year of LiDAR measurement carried out at Gulf of Khambhat has been uploaded in NIWE website.

Onsite Geo-physical investigation (single beam bathymetry survey, side scan sonar, sub-bottom profiling, magnetometer survey and sediment samples) covering the entire area (302 Sq.Km by NIOT + 67 Sq.Km by FOWPI) for 1 GW offshore project at Gulf of Khambhat off Gujarat Coast is likely to be completed by end of April 2019. Further, it is planned to carry out geotechnical studies for about 3 to 5 borehole locations in the said area for which the ender process is in progress.

Testing & Research Station

LARGE WIND TURBINE TESTING

Power Curve Measurements & Special Measurements for Loads of Pioneer 750 kW wind turbine of M/s. Para Enterprises Pvt. Ltd. The final test reports issued to the customer and the project has been completed.

SMALL WIND TURBINE TESTING

Type Testing of model Vaata Smart, Vertical Axis WT (5.5 kW) at Wind Turbine Research Station (WTRS), Kayathar of M/s. Vaata Smart Ltd. The final test report issued to the customer and the project has been completed.

Research & Development and Resource Data Analytics & Forcasting

PROJECT MONITORING COMMITTEE

Carried out onsite Project Monitoring Committee for the project "A Novel Hybrid Energy System for Supplying Isolated loads with FPGA based Energy Management Scheme" at National Institute of Technology, Trichy on 10.01.2019.

RESEARCH COUNCIL

The Twenty seventh Research Council (RC) meeting to review the project proposals received under RFP mode was convened on 8th March 2019 at NIWE, Chennai. Four proposals reviewed by the internal Project Monitoring Committee of NIWE has been placed for review.

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

Phase-I work completed and the report has been prepared.

The following major activities in Phase-I:

- Load pattern details for the year 2017 & 2018 have been completed
- The design engineering calculation for sizing of solar and wind requirement to meet out the demand is completed
- Land requirement and spacing criteria assessment has been arrived
- Layout diagram of the project has been arrived
- Improving Energy efficiency of NIWE campus is ongoing
- BESS design criteria and Load growth works are ongoing

Phase-II

- A meeting with experts to have a discussion regarding the Phase-II of the project has been convened on 29.03.2019.

20 kW solar power plant for PLF study on WT & SPV assets has been instrumented at NIWE, Chennai

Order has been placed for purchase of needed equipment for instrumentation of 75 kW solar power plant at Kayathar.

AWARDS

The project on "Wind power forecasting for the whole state of Tamil Nadu" has been awarded (Gold) for National Award on e-governance under the category of Category-IV "Outstanding research on Citizen Centric Services by Academic Research Institutions".

A team of NIWE & MNRE headed by DG & JW had participated and received award in the distribution ceremony of National Awards for e-Governance 2018-19 for "Wind Power Forecasting for the whole state of Tamil Nadu" held on 27.02.2019 at Dr. Ambedkar International Centre, Janpath, New Delhi.

Overview of Indigenous wind power forecast model performance

NIWE has established operational forecasting system for the whole state of Tamil Nadu during September 2015, Gujarat during April 2018 and Karnataka during October 2018. NIWE forecasting team is actively carrying out various activities including daily event analysis to improve the wind power forecasting model accuracy on daily / weekly / monthly basis. The brief model analysis for the above said 3 States are explained below:

Tamil Nadu

The Figure 1 & 2 represents the overall frequency error distribution for the whole state of Tamil Nadu since September 2015. From the Figure 1 it may be noted that

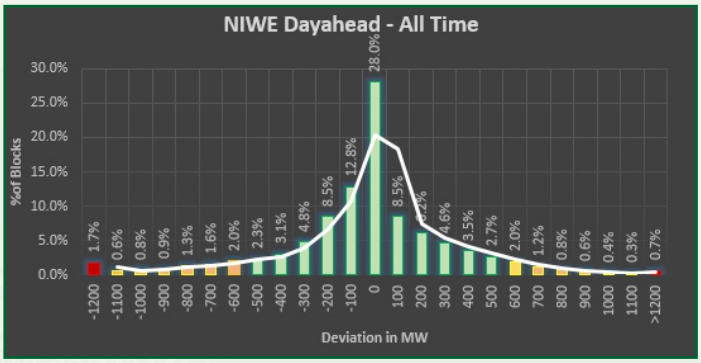


Figure : 1

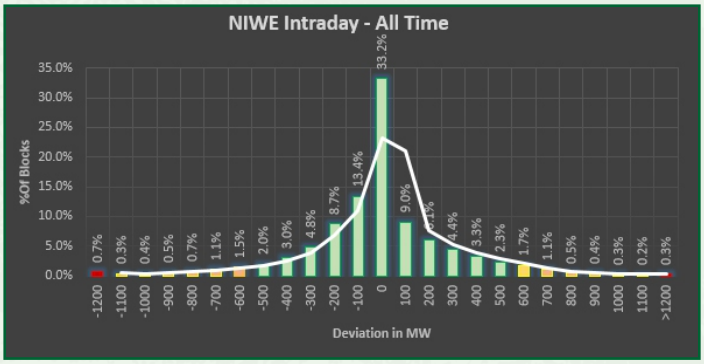


Figure : 2

about 85 % of the blocks are having day ahead deviation of 600 MW and with intraday corrections, the 85 % got improved to 90 %, i.e., 5 % improvement (Figure 2).

Gujarat

The Figure 3 & 4 represents the overall frequency error distribution for the whole state of Gujarat since April 2018. From the Figure 3 it may be noted that about 83 % of the blocks are having day ahead deviation of 600 MW and with intraday corrections, the 83 % got improved to 91 % i.e., 7 % improvement (Figure 2).

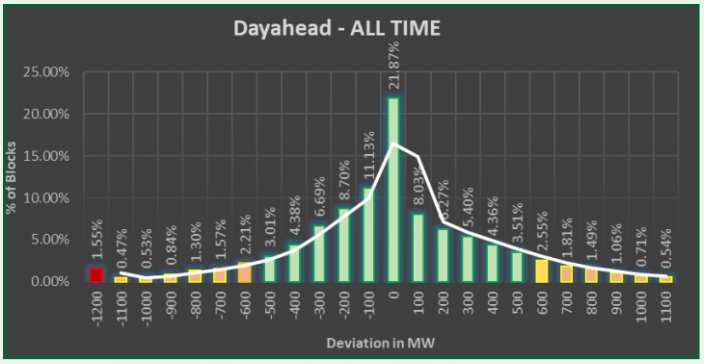


Figure : 3

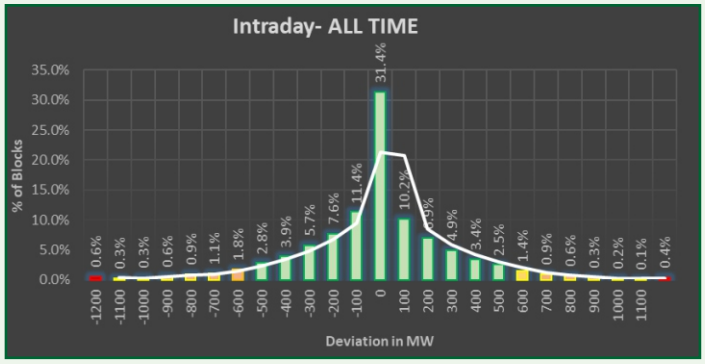


Figure : 4

Karanataka

The Figure 5 & 6 represents the overall frequency distribution of NIWE's forecast error for the whole state of Karnataka since October 2018. From the Figure it may be noted that about 95 % of the blocks are having day ahead deviation of ±600 MW and with intraday corrections, the 95 % got improved to 98 %, i.e., 3 % improvement (Figure).

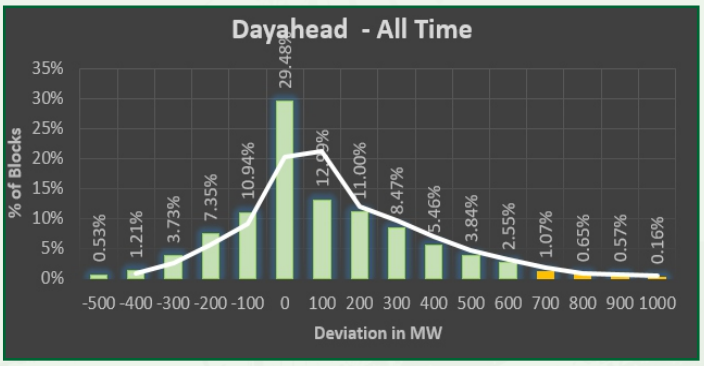


Figure : 5

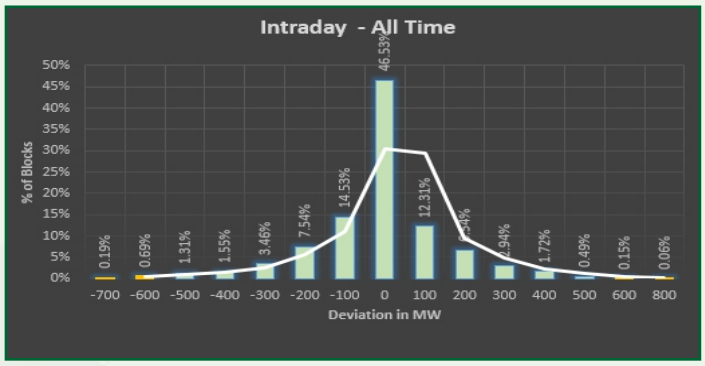


Figure : 6

Further finetuning of the wind power forecasting model for the whole state of Tamil Nadu, Gujarat and Karnataka is under progress.

INTERNSHIP & PROJECTWORK

- Developed script to download and extract the NWP data for 12.5 km resolution
- Modified the sending mail scripts for SRLDC.
- Pre-processed static data information of Maharashtra
- Compared ABT meter data with SCADA for NPKunta.
- Developing Forecasting Database Portal is under progress.
- Processed the Maharashtra generation data and coordinating with MSLDC to obtain missing data.
- Initiated Solar Aggregated forecast for all 7 solar plants. Fine tuning the solar aggregated Forecast.
- Historical Generation Data has been processed and executing the indigenous model for Historical Maharashtra data to fine tune and initiate the forecasting.

- Developed solar model using Cloud Cover, GHI and Temperature.
- Prepared an article for E-magazine in connection with National e-Governance award for "Wind Power Forecasting Services for the whole state of Tamil Nadu".
- Error analysis report from January to March 2019 has been prepared for the state of Tamil Nadu, Gujarat, Karanataka and SRLDC specific solar parks and windfarm

OTHER ACTIVITIES

- Prepared wind and solar zone classification report for the state of Tamil Nadu
- Attended discussion/meeting on Wind and solar zone classification with Principal Secretary to Government, Energy Department, Government of Tamil Nadu.
- Preparatory work for conducting 2nd PAN INDIA Network meet is in progress.
- Preparation of brochure for Wind Resource Assessment conference is in progress.

WEB PORTAL

The following web portal has been created by the staff of division for various activities of NIWE

- Developed a web portal for Sports for NIWE
- Created a dedicated operational web server (RLMM) and carried out various activities to secure server.
- Developed Recruitment Portal for NIWE.
- Developed Staff Monitoring Portal for NIWE.

Standards and Regulation

- Our S&R team was active in Standards & regulation activities which include the review/verification of documentation of four prototype wind turbine models received from the wind turbine manufacturers in connection with installation of prototype wind turbines in India as per MNRE guidelines.
- Organizing Prototype committee meeting chaired by DG, NIWE on 20.02.2019 at NIWE, Chennai and is decided by the Prototype committee letters have been issued to the concerned State Electricity Boards in connection with grid synchronization of prototype Wind Turbines.

PROTOTYPE COMMITTEE MEETING

- Review / verification of documentation of one prototype wind turbine model in connection with installation of prototype wind turbines in India as per MNRE guidelines is under progress.
- Technical support to MNRE in connection with Indian Wind Turbine Certification Scheme (IWTCS) including the review of stakeholders comments.
- The Continuous technical support to MNRE for all the works related to Revised Lists of Models and Manufacturers of wind turbines (RLMM). During the period, the review of documentation has been carried out for more than 20 wind turbine models and submitted the comments to MNRE.
- Review of draft Indian standards circulated by BIS is under progress.
- Organizing the 9th meeting of Wind Turbine sectional Committee (ETD 42) of Bureau of Indian Standards (BIS) held on 26.02.2019 at NIWE, Chennai. S&R division provided the technical support to BIS for the meeting. The meeting was chaired by Dr. K. Balaraman, Director General, NIWE and Chairman, ETD 42. Shri. A. Senthil Kumar, Director & Division Head, S&R and Member, ETD 42 participated in the said Committee meeting and explained the status of various Standards related works carried out by NIWE. Two Indian standards have been finalized during the meeting.
- In addition Director & Division Head, S&R along with MNRE officials carried out the inspection of two wind turbine manufacturing facilities. Further Director & Division Head, S&R along with S&R Engineer carried out the inspection of damaged wind turbine site in Andhra Pradesh along with MNRE and NREDCAP officials.

9TH ETD 42 COMMITTEE MEETING

- The division has been providing the support to working groups on standards for the works related to formulation of standards.
- Technical support to Bureau of Indian Standards (BIS) in connection with standards related works are ongoing.

Certification and Information Technology

Agreements were signed with M/s RRB Energy Limited (RRBEL) and 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:

Issuing renewed certificate to M/s RRB Energy Limited

Issuing renewed certificate to M/s Southern Wind Farms Limited

Based on the completion of review / verification, renewed Certificates have been issued to RRBEL and SWL.

- The documentation preparation for obtaining accreditation for the certification services as per IS/ISO/IEC 17065:2012 standard from National Accreditation Board for Certification (NABCB), Quality Council of India is underway.
- Interactions with M/s. TUV Rheinland Industrie Service GmbH and M/s. TUV Rheinland (India) Private Ltd. in connection with the cooperation agreement has been completed and the activities are under progress.
- Software resource specification has been prepared in connection with the development of RLMM online portal and providing support for software development.
- The continual improvement and maintaining the quality management system are ongoing.
- Establishment of new IT infrastructure such as Servers, Networks, Storage, Disaster Recovery System, Biometric System, upgradation of fire wall and IT policy are under progress.
- The activities for "HYBRIDize", a research project approved by DST-IFD (Department of Science and Technology and Innovation Fund Denmark) is under progress.

Skill Development and Training Division

23RD NATIONAL TRAINING COURSE

The SDT Divsion had successfully conducted the 5 days 23rd National Training Course on "Wind Energy Technology" during 11th to 15th March 2019 to address all aspects of Wind Power starting from introduction to wind and its technology, wind resource assessment, installation, operation and maintenance aspects of wind farms along with financial analysis in a focussed manner. The course was attended by 44 participants from 10 States (Andhra Pradesh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Mizoram, Odisha, Tamil Nadu and Uttar Pradesh) with diverse background. The course was inaugurated by Shri. K.C. Dhimole, Technical Advisor to Chief Minister of Arunachal Pradesh.

During the training, the participants were taken to the Technical & Safety Training Centre of M/s. Vestas Wind Technology India Private Limited at Nellikuppam, Chennai, where they had a chance of listening from the professional trainers and all the facilities were demonstrated.

Dr. K. Balaraman, Director General, NIWE distributed the Course Certificates to the participants during the Valedictory Function held on th March .

Participant receiving the Course Certificate from Dr. K. Balaraman, DG, NIWE

23RD INTERNATIONAL TRAINING COURSE

The SDT Division had successfully conducted the 31 days International Training Course on "Wind Turbine Technology and Applications" held during 30th January to 1st March 2019, sponsored by the Ministry of External Affairs (MEA), Government of India under ITEC programme. The course addressed 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 in a focused manner along with Testing and Certification of Wind Turbines, financial and policy aspects. The course was attended by 28 participants from 16 ITEC countries (Afghanistan, Cote d'Ivoire, Egypt, Ethiopia, Guyana, Malawi, Mauritius, Mongolia, Morocco, Myanmar, Nigeria, Sudan, Syria, Tanzania, Togo and Uganda).

The training course was inaugurated by Shri. P. K. Ashok Babu, Head of Branch Secretariat, Regional Passport Office (RPO), Chennai.

Release of Course Material

The syllabus of the training course had been taken under the following 7 modules to group the syllabus / topics and evaluation test was conducted for all participant after completion of each module.

Module 1: Introduction and Wind Turbine Components

Module 2: Standards, Testing & Certification

Module 3: Resource Assessment

Module 4: Erection, Commissioning and Operation & Maintenance

Module 5: Electrical Systems & Grid Integration

Module 6: Energy Storage and Hybrid

Module 7: Policy and Financial / Economical Analysis

Module 8 : Environmental & Social aspects

The course content of the training were handled by Scientists, Engineers of NIWE, and experts from Wind Industries and Academic Institutions, who have years of experience in the field.

The practical training was arranged with Wind Resource Assessment Laboratories apart from the Large Wind Turbine manufacturing factory visit to M/s. M/s. RRB Energy Limited, Chennai, Tamil Nadu where they had the opportunity of listening from the industry experts who are actually in the process of making wind turbines and also visited the manufacturing facilities with all major components and its process. 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 wind farms in and around Kayathar and Kanyakumari, where wind turbines are installed in large numbers like coconut trees.

Dr. G Giridhar, DDG, NIWE distributing the Course Certificate

Dr. G. Giridhar, Deputy Director General, SRRA, NIWE distributed the course certificates to all the participants during the Valedictory function.

NIWE FOUNDATION DAY 2019

NIWE has celebrated its 22nd Foundation Day on 21st March 2019. As a part of Foundation Day celebration, the day was announced as an 'Open Day' specially for School and College Students to visit the scientific laboratories of NIWE, such as Solar Station, Met-Mast, Bio-gas plant, Wind Turbine Nacelle, Wind Solar Hybrid System etc., between 9.30 AM and 12.30

PM. The visitors were well received by the volunteers of NIWE deputed for the purpose and explained the facilities of NIWE. Later, the Foundation Day Celebration were held.

During the function, Dr. K. Balaraman, Director General, NIWE has distributed mementos to all the staff for appreciation and also for various competitions conducted as part of the Foundation day celebration.


Shri David Solomon receiving the mementoe from the Director General, NIWE

IREDA – NIWE AWARDS FOR WIND ENERGY 2019

The second edition of the IREDA-NIWE Annual Awards for Wind Energy 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 has been announced for the following three broad categories :

(i) IREDA-NIWE Award for the Best Performing State Nodal Agencies for 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

Calls for Nominations in each category were uploaded in NIWE / IREDA Websites and advertised through national daily Newspapers, and also through groups & mass communications inviting for the nominations. The nominations received and selection of the awardees of all the three categories for the awards were done through an eminent Jury Committee consisting of Technocrats from the Wind Energy field and Mass Media. The Awardees were informed of their selection and invited to attend the Award Ceremony held on 21st March 201 , the Foundation Day of NIWE, to receive the Award.

Shri. Vikram Kapur, I.A.S Chairman Cum Managing Director, Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) was the Chief Guest of the Award Ceremony and distributed the Awards to the Winners:

(a) The Award of **Best performing State Nodal Agencies** for the year 2017-18 was conferred on Karnataka Renewable Energy Development Agency Limited (KREDL), Bengaluru and Shri. Basavaraju, Managing Director, KREDL, Bengaluru received the Award of Rs. 1,00,000/- and citation on behalf of KREDL. KREDL has promoted 875 MWs of wind power projects in the Karnataka State and the state has stood first in the country for the year 2017-18.


Shri Basavaraju receiving Award on behalf of M/s. KREDL

Dr. Rohit Bhakar receiving Award on behalf of MNIT, Jaipur

Shri Rakesh Reddy receiving the Award on behalf of Dr. Zakir Hussain Rather

(b) The Award for the **Best Institution of Higher Learning in Wind Energy** was conferred on Malaviya National Institute of Technology, Jaipur, Rajasthan and Dr. Rohit Bhakar, Head, Centre for Energy & Environment received the Award of Rs. 1,00,000/- and citation on behalf of Malaviya National Institute of Technology.

(c) The Award for **Best Research work in Wind Energy** Category was awarded to Dr. Zakir Hussain Rather, Assistant Professor, IIT, Mumbai for the research project on "Intelligent Operation and Control of Modern Power Sytems with large scale Renewable Energy Penetration". Shri. Rakesh Reddy on behalf of Dr. Zakir Hussain Rather received the award of Rs.1,00,000/- and citation.

VISITORS TO NIWE

During the period January to March 2019, SDT Division has organised and coordinated the following visits of School and College students and explanation / demonstration about the facilities of NIWE along with the activities / services of NIWE to create awareness and to motivate towards research on wind energy.

- 15 students & 1 Coordinator from National Productivity Council, Ambathur, Chennai on 4th March 2019.
- 60 students (2nd, 3rd & 4th Year Batch) & 2 faculties from National Prince Shri Venkateshwara Padmavathy Engineering College, Ponmar, Chennai on 2nd February 2019.
- 40 students and 2 faculties from SRM Institute of Science & Technology Kattankulathur on 14th February 2019.

Staff Promotion

S.No.	Photo	Name	Cadre	Promoted to	Division
.		Dr. P. Kanagavel	Additional Director	Director	SDT
.		Mr. K. Boopathi	Additional Director	Director	R&D, RDAF
.		Mr. N. Rajkumar	Deputy Director (Technical)	Additional Director	T&R
.		Mr. K. Bastin	Assistant Director (Technical)	Deputy Director (Technical)	WSOM
.		Ms. M.C. Lavanya	Assistant Director (Technical)	Deputy Director (Technical)	R&D, RDAF

Solar Radiation Resource Assessment

Brief activites carried out by SRRA division on :

- Carriedout calibration of 4 pyranometers, which are under SRRA and commercial mode.
- Visited NHPC Ltd., Bhatlagundu SPV Power Plant in connection with Performance Guarantee Test and Technical audit.
- Review meeting on the specifications for tender documents for 2 MW SPV plant was held on 04.01.2019 at NIWE.
- STC Meeting for finalization of tender document on 2 MW for IIM plant convened on 24.01.2019.
- One year AMS data of Gurugram submitted to BSRN on 23.01.2019 for approval and BSRN uploaded the data in their portal on 28.01.2019.
- Draft report on PG Test and technical audit prepared for the month of December 2018 for NHPC, Bathlagundu SPV plant was sent on 29.01.2019.
- Solar Feasibility studies for 4 locations in Manipur has been prepared & submitted to MANIREDA on 23.02.2019.
- E-Tender Document for 2 MWp plant at Trichy uploaded on 08.02.2019 in the NIWE website and e-procurement portal.
- Draft PG Test report for the month December 2018 and January 2019 for the SPV plant at Bathlagundu submitted to NHPC on 15.02.2019.
- Technical Committee Meeting of SRRA was held on 23.02.2019 at NIWE under the chairmanship of DG, NIWE.
- Data of Tiruvallur for January-July 2018 and Howrah for November 2018 submitted to BSRN on 22.02.2019 and uploaded in BSRN portal 28.02.2019.
- Pre bid meeting of the 2 MW SPV plant at Trichy held on 18.02.2019.
- Inspected roof top of India International Centre (IIC), New Delhi for SPV feasibility study during the period 28.02.2019 - 01.03.2019.
- Reports on pre-feasibility and roof top solar potential was submitted to IIC, New Delhi sent on 08.03.2019.
- Comparitive studies carried out based on the 6 bids received in connection with the 2 MW SPV plant to be established at IIM, Trichy.
- Dr. G. Giridhar, Prasun Kumar Das and two Project Assistants visited on 20.03.2019 Madurai Kamaraj University, Madurai for discussion with the officials on the proposal of 1 MW SPV plant at Madurai Kamaraj University, Madurai.
- STC meeting for bid evaluation of 2 MW SPV plant at Trichy held on 30.03.2019.

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