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EDITORIAL

The global transformation of the energy system towards renewable energy is on its way, and wind power is a major force in this development, having become a major pillar of power supply throughout the world. Some countries are making very good progress in accelerating wind power deployment rates. Such acceleration is imperative not only to achieve the objectives of the Paris Climate Change agreement and the Sustainable Development Goals, but also for every country to participate in the full socio-economic advantages of renewable energy.

TANGEDCO has mooted Repowering of Old Low-Capacity Wind energy generators with higher capacity and modern equipment. As Tamil Nadu had taken major strides in wind energy generation quite earlier than other states, some of the turbines are as old as 33 years and many are sub 1 MW capacity. The discom has asked wind power companies to come forward with proposals to rejig the mills on or before April 30. Along with upgradation of wind turbines, TANGEDCO will also go for capacity addition of sub-stations. Most of the machines installed around 1986 are having the capacity of 200 Kw, 225 Kw and 250 Kw. New machines are available in capacities like 750 Kw, 850 Kw, 1500 Kw, 2000 Kw and 2100 Kw.

With the recommendations of RDSPAC, MNRE had sanctioned a project entitled "Integrated Wind & Solar Resource Assessment through Mapping and Measurements" to NIWE. The project envisages the deployment of dedicated 100m integrated wind-solar monitoring stations at carefully chosen sites in different parts of the country. Under this project, 50 numbers of 100m tall integrated wind-solar monitoring stations (in two phases) with 5 levels of instrumentation are to be installed in the country over a period of three years.

NIWE during this quarter has made significant progress in Indigenous Wind Power forecast model for Gujarat and Tamil Nadu.

As regards to testing, three Large Wind Turbine and two Small Wind Turbine are ongoing.

Quality Management System documents are prepared for Recertification Audit-Quality Management System Certificate of NIWE as per ISO 9001:2015.

NIWE during this period had successfully conducted the drawing and elocution competitions for school students and capacity building workshop for teachers as part of the Global Wind Day 2019 celebration with the support of National Green Corps (NGC), Chennai. 140 students and 73 teachers took participation in the events.

Dr. K. Balaraman, Director General

Contents

Editorial Board

Wind Solar Resource Measurements / Offshore

WIND RESOURCE ASSESSMENT (UNCOVERED / NEW AREAS)

Installed and commissioned 1 no. of 100 m wind monitoring station in West Bengal. Currently, 95 wind monitoring stations & Telecom towers are operational in 13 states under various wind monitoring projects funded by the Ministry of New and Renewable energy (MNRE) as well as various entrepreneurs.

100 m Wind monitoring station installed at West Bengal

OFFSHORE WIND ACTIVITIES

Offshore Gujarat

One year LiDAR data report (November 2017 to 2018) has been uploaded in NIWE website along with the time series data as per the approval of MNRE. (https://niwe.res.in/assets/ Docu/LiDAR_data/Report-Lidar%20 data%20analysis(Nov17-Nov18).pdf)

Geophysical study at Gulf of Khambhat, Off Gujarat coast

Geophysical investiga-tion using single beam bathymetry survey, side scan sonar, sub-bottom profiling, magneto-meter survey and sediment samples has been completed for the entire area 369 Sq.Km for proposed 1 GW offshore wind farm project at Gulf of Khambhat off Gujarat coast.

In addition to above, the WSOM division plans to carryout Geotechnical studies for 5 borehole locations in the said area for which the tender process is underway.

R&D PROJECTS FUNDED BY MNRE

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

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 Nos. of LiDARs (2 Nos. for Gujarat and 2 Nos. 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 better understand the sea-state conditions, which are envisaged as essential and necessary to design the foundation of the Offshore wind turbines.

NIWE in consultation with the field experts, M/s. DNV-GL and M/s. NIOT has finalized the proposed locations for LiDAR installation off Gujarat coast.

Integrated Wind and Solar Resource Assessment through Mapping and Measurements

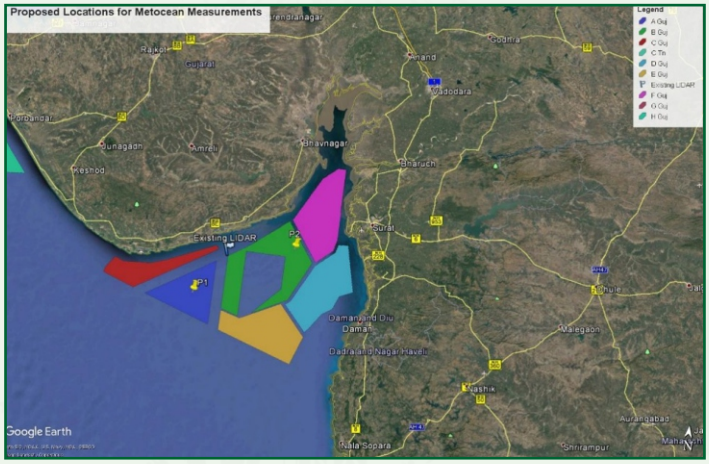
MNRE with the recommendations of RDSPAC had sanctioned a project entitled “Integrated wind & solar resource assessment through mapping and measurements” to NIWE. The project envisages the deployment of dedicated 100 m integrated wind-solar monitoring stations at carefully chosen sites in different parts of the country. Under this project, 50 numbers of 100m tall integrated wind-solar monitoring stations (in two phases) with 5 levels of instrumentation are to be installed in the country over a period of three years. The measurements carried out using integrated wind-solar measurements and the SODAR will be used to estimate the wind solar power potential of the country and for the preparation of wind-solar hybrid Map, which is expected to be very much useful for fostering the growth of wind-solar hybrid projects in

the country.

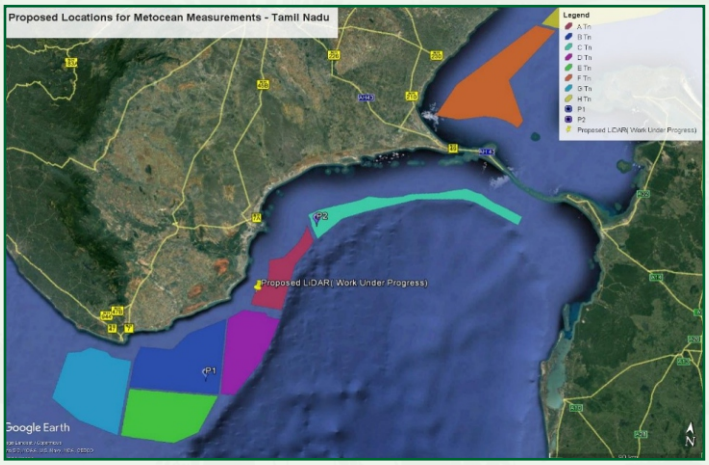
Under the project, the team has carried out multi criteria suitability analysis based on the available data sets and identified 25 Nos. of suitable locations for the installation of integrated measurement stations in the first phase of the project.

As a part of the first year milestone of the project, NIWE is in the process of preparing the 120 m wind potential map of the country. The 120 m high potential assessment will be carried out in similar lines with the 100 m wind potential map, at a spatial resolution of 500 m, using the advanced meso-micro coupled numerical wind flow model with the corroboration of actual measurements spread all over India. Under this study, the indicative wind potential at 120 m agl will be estimated technically by excluding the unsuitable area / land features. Under the work, the base 120 m map has been prepared and the validation and technical potential estimation are underway.

CONSULTANCY PROJECTS:



Proposed met-ocean locations in Gulf of Khambhat, Gujarat



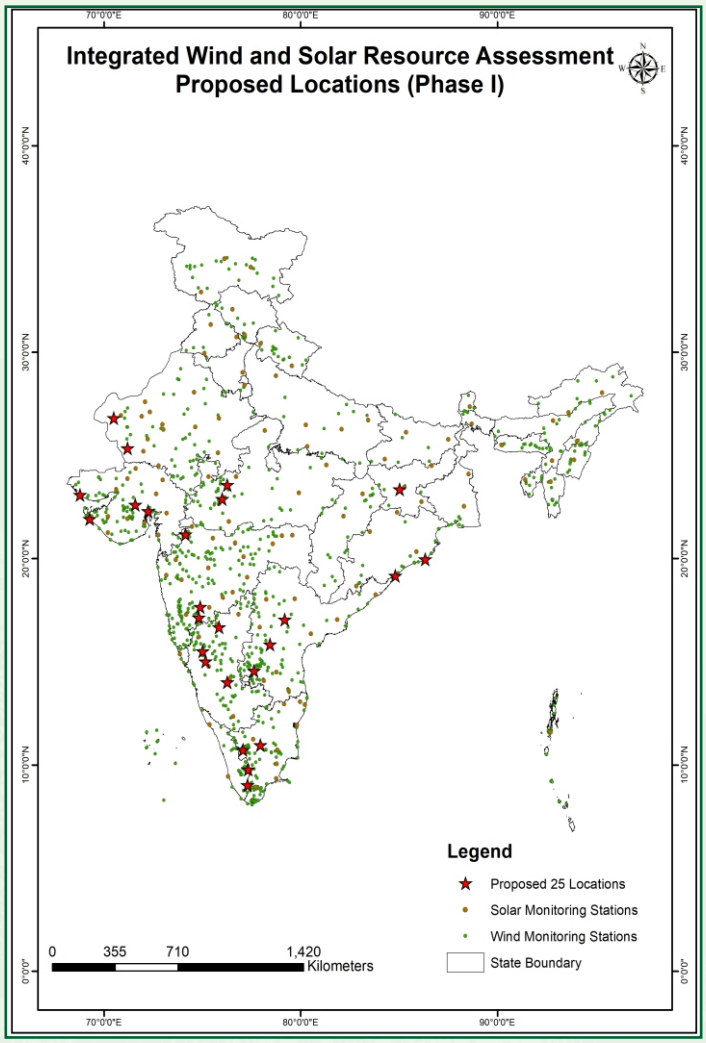
Proposed met-ocean locations in Gulf of Mannar, Tamil Nadu

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

- Verification of Procedure of wind monitoring for 3 sites.
- 12 nos. of private wind monitoring stations registered as per MNRE guidelines.
- Micrositing and Energy Estimation for 1 site.
- Energy Yield Assessment for 15 sites.
- Energy Production Demonstration Test – 1 nos.
- Validation of Energy Yield Assessment – 3 nos.

Geo-Tagging of Wind Turbines Installed Across the Country

NIWE is creating a centralised database of existing and proposed installations in the country. NIWE has initiated data collection from SNAs and other Stakeholders. As on date out of about 35 GW installed capacity in the country,



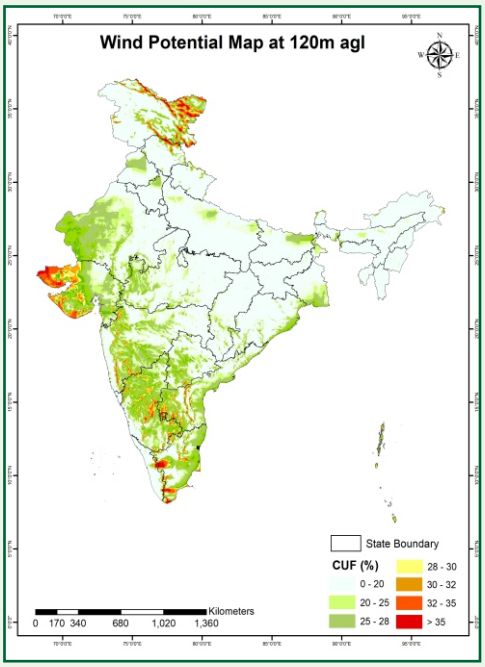
Proposed Wind Solar Monitoring stations

the data from various stakeholders / SNA / Manufacturers of about 29 GW have been collected and the verification process is underway.

The details are as follows:

- Maharashtra : 3911 MW
- Tamil Nadu : 7899 MW
- Rajasthan : 4176 MW
- Andhra Pradesh : 3252 MW
- Gujarat : 4065 MW
- Karnataka : 3224 MW
- Madhya Pradesh : 2168 MW
- Telangana : 100.8 MW
- Kerala : 27 MW
- Total : 28,822.8 MW

The process of development of web portal has been developed.



120 m Wind potential Map

Testing & Research Station

LARGE WIND TURBINE TESTING

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

Power Curve Measurements of 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 with 57 rotor diameter at SF No. 886, Cheliyanallur Village, Manur Taluk, Tirunelveli District, Kayathar. The continuous measurements are on-going.

SMALL WIND TURBINE TESTING

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. The continuous measurements are on-going.

An agreement has been signed between NIWE and Vaata Smart Ltd. dated 22.05.2019 for Type Testing of Vaata 5.5 kW Wind Turbine at Wind Turbine Research Station (WTRS), Kayathar. The continuous measurements are on-going.

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

PROJECT MONITORING COMMITTEE

Carried out PMC on-site demo for the project "Control of Multi-input Converter for Hybrid Wind Solar Battery Based System at NIT, Durgapur on 9th & 10th April2019.

Convened Internal Review Committee meeting for the proposals received through RFP mode at NIWE on 23rd April 2019.

Carried out PMC onsite visit for the RFP proposal titled "Hybrid Energy management using Cyber-Physical Controller for real-time EMS of Micro Grid Application" at Hindustan college on 23rd April 2019.

Other brief actitivies include :

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

- Power consumption data are continuously monitored and recorded for analysis purposes.
- The load details of NIWE has been updated.
- Improving the overall energy efficiency of NIWE campus by adopting suitable Energy conservation methods with automated control.
- Space assessment has been done, and measurements have been taken.
- Design calculations on BESS, Solar are in process.
- Analyzing the detailed planning report submitted by Exide and specifying the missing details in the statement and informing the same to Exide.
- A committee has been constituted to execute the project.

Design and Development of Indigenous Grid Emulator Facility

- Comprehension of standards with respect to the Grid Code Compliance requirements and Grid Connectivity requirements issued by CEA has been completed.
- A comprehensive literature survey and design study of passive filters have been in progress.
- Meeting was conducted on 25.06.2019 with M/s.Nayak power system related to RTDS simulation.
- Formation of R&D consortium is in progress.
- Discussion with Experienced professionals in the relevant area is in progress.

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

- Study on the advantages of the Internet of Things (IoT) over SCADA for realtime monitoring and control of wind farm is under progress.
- Identification of suitable processors for real-time data transfers and monitoring has been completed.
- The purchase of critical sensors and processors are in advance.
- The Study and Implementation of Discrete Fourier Transform for phasor calculation in Matlab has been completed.
- The conversion of Matlab Script into Verilog coding for dumping the application into Field Programmable Gate Array (FPGA) Evaluation Kit is under progress .
- The hardware implementation of Signal Conditioning Circuit is in progress.
- Interfacing of Orbital TMC controller of MICON machine with local PC for data extraction is in progress.

Development of Long-term Wind Speed Forecasting Using Hybrid Model

- Collection of Literature Survey models regarding wind speed forecasting with different time horizons has been carried out.
- Collection of Literature Survey models regarding wind speed post-processing techniques (correction of NWP wind speed data with respect to Metmast wind speed data) has been carried out.
- Completed Data collection of 120 m Metmast data of 5 years and 5 years MERRA data for analysis is under progress.
- Developing codes for Data Quality check and trend analysis for the collected data is under progress.

FORECASTING

- Initiated the pilot wind power forecasting services for the state of Maharashtra from 01-05-2019.
- Reinstated Pilot operational wind power forecasting for KPTCL .
- Testing the Intraday Model of Satellite Image processing of historical data is under progress.
- Completed Conversion of existing Day ahead solar power forecasting model to Python program and prepared validation & comparison report for the same.
- Completed Conversion of existing Intraday forecasting model to Python program.
- Initiated Intraday Forecasting for NP-Kunta Solar plant on a test run basis.
- Documentation of NWP is under progress.
- Derated Analysis for one Substation is under progress.
- Fine-tuning of wind power forecasting model for individual substation wise is under progress.
- To initiate Wind power forecasting services to the APSLDC simulation model is running.
- Prepared a Template for Daily Post Event Analysis.

- Substation penalty calculation Prepared.
- Prepared roughness and contour map for the Periyapatti site.
- Corrected the NWP Wind Speed based on the Met mast data for one substation.
- Error analysis report has been prepared from April to June 2018 for the state of Tamilnadu, Gujarat, Karnataka, Maharashtra, and SRLDC specific solar parks and windfarm.

Resource Data Analytics Lab

- Created an automated system to download the met mast data from Kintech and Ammonit loggers are under progress.
- Created a script to prepare automated data availability reports for running wind monitoring station data.
- Prepared data availability report for telecom towers.
- Data sale format Wind Met mast and Solar stations have been initiated.

SRRA

Calibration of Solar Instruments

Carried out calibration of 2 pyranometers and 1 Pyrheliometer for SRRA project and 15 pyranometers for commercial project.

Inspection of SRRA stations

- Carried out inspection of SRRA station at Nainital from 31.03.2019 to 06.04.2019.
- Carried out a site feasibility study in connection with the relocation of SRRA stations at Rajasthan from 21.04.2019 to 28.04.2019.
- A site visit carried out at NISE, Murthal SRRA stations to study the available test facilities at NISE and to inspect SRRA stations at Murthal and NISE from 27.05.2019 to 29.05.2019.

OVERVIEW OF INDIGENOUS WIND POWER FORECAST MODEL PERFORMANCE

NIWE established an operational forecasting system for the whole state of Tamil Nadu in September 2015, Gujarat in April 2018, Karnataka in October 2018, and for SRLDC in December 2019 and Maharashtra during May 2019. 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 analyses for the 2 states are explained below:

Tamil Nadu

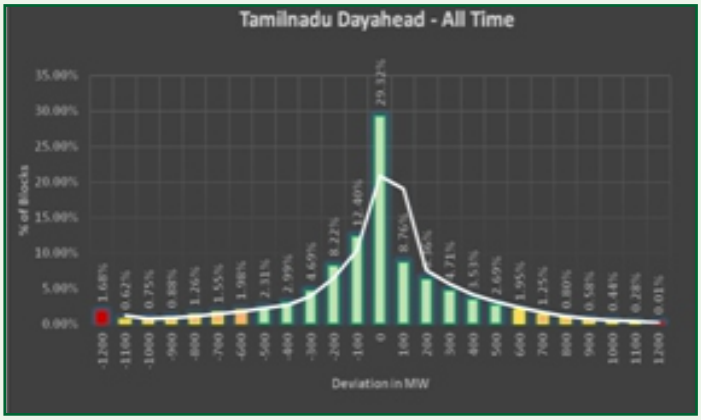


Figure : 1

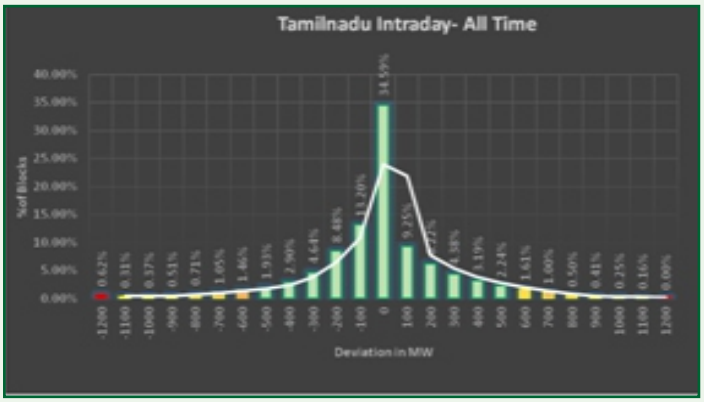


Figure : 2

The Figure 1 & 2 represents the overall frequency error distribution for the whole state of Tamil Nadu since September 2015. From Figure 1 it may be noted that about 86 % of the blocks have day ahead deviation of 600 MW, and with intraday corrections, 86% got improved to 91 %, 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 Figure 3 it may be noted that about 83 % of the blocks have the day ahead deviation of 600 MW, and with intraday corrections, 83 % got improved to 92 % i.e., 8 % improvement (Figure 2).

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

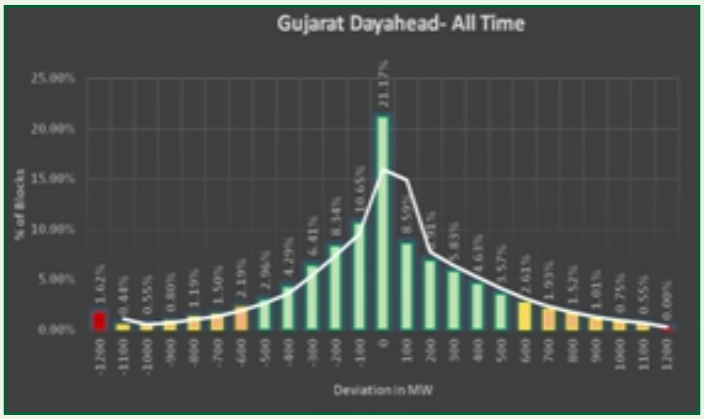


Figure :

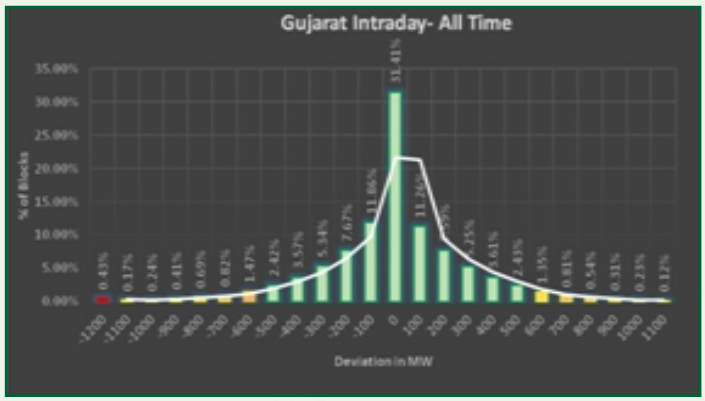


Figure : 4

WEB PORTAL

- UI improvement carried out in the Internship Portal.
- Improved the UI of Staff Monitoring Portal.
- Coordinated with admin staff regarding the staff monitoring portal and new user accounts created in the database for staff monitoring portal.

INTERNSHIP & PROJECT WORK

During the period April to June 2019, 50 UG/PG students & 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 Excellent paper award for the paper "Studying the renewable energy resource characteristics and shear factors for plain, complex and coastal sites in India" during ARSSS International Conference held at Pune on 5th May 2019.

OTHER ACTIVITIES

- Prepared wind and solar zone classification report for the state of Tamil Nadu.
- Convened a Brainstorming meeting to discuss R&D and Design & Development of Wind Turbine on 24.06.2019 at NIWE, Chennai.
- Preparatory work for conducting 2nd PAN INDIA Network meet is in progress.

Finalized brochure for conducting International Wind and Solar Resource Assessment conference and submitted for approval.

Standards and Regulation

Brief activities of S&R division are :

- Completed review / verification of documentation of one prototype wind turbine model received from the wind turbine manufacturer in connection with installation of prototype wind turbines in India as per MNRE guidelines.
- Organized Prototype committee meeting Chaired by DG, NIWE on 14.05.2019 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.

Prototype Committee Meeting

- Organized the meeting between certification bodies and IWTMA on Volume IV of IWTCS held on 21.06.2019 at NIWE, Chennai, as decided by MNRE.

Meeting with IWTMA & CBs on IWTCS

- Director & Division Head, S&R and DG, NIWE participated in IWTCS stakeholders meetings held at MNRE, New Delhi and explained the response for the stakeholders comments received on IWTCS.
- 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 11 wind turbine models for RLMM.
- 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.
- Director & Division Head, S&R participated in the Working group meetings on IEC 61400-12-1 & 2 held on 24.06.2019 & 25.06.2019 at NIWE, Chennai and briefed the working group on objectives of working group and efforts taken by NIWE in formulation of the standards. During the meetings, participated in the detailed discussion on the review of the standards and also discussed various practical issues which are not covered adequately in the standards.
- Quality Management System documents have been prepared for Recertification Audit-Quality Management System Certificate of NIWE as per ISO 9001:2015.
- The continual improvement and maintaining the quality management system are ongoing.

IEC TC 88 & IECRE Meetings Held at Pretoria, South Africa

Certification and Information Technology

Certification division has completed the documentation preparation such as Quality management, Procedures, Formats, CRM in connection with accreditation for the certification services as per IS/IEC 17065 requirements.

- The Division has successfully submitted application along with requisite documentation as per IS/IEC 17065 standard requirement with National Accreditation Board for Certification (NABCB), Quality Council of India in connection with obtaining accreditation for the certification services.
- Agreement has been signed for Pre evaluation of documentation of GWL 225 Wind turbine model of

Awareness cum Internal Auditors training at NIWE, Chennai

M/s Southern Wind Farms Ltd. in connection with type certification as per the requirements of IS/IEC 61400-22:2010. Pre evaluation is under progress.

- As per the requirements of IEC IS/ISO/IEC 17065:2012 for accreditation, certification division has organized a 2 days 'Awareness cum Internal Auditors training programme', for NIWE personnel at NIWE, Chennai.
- 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 maintenance of the quality management system as per the requirements of ISO 9001:2015 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 Department of Science and Technology and Innovation Fund Denmark [DST-IFD] is under progress.

Skill Development and Training Division

TRAINING COURSES

NIWE has scheduled the following National and International Training Courses during the calendar year 201 - and the necessary preparation works are on for the successful conduct of the courses.

International & National training courses

S.No.	Description	From	To	Duration
1.	4th Special International Training Course on Wind Resource Assessment and Wind Farm Planning	28.08.2019	20.09.2019	24 days
2.	3rd Special International Training Course on "Design, Installation and Maintenance of Small Wind Turbine"	28.08.2019	24.09.2019	28 days
3.	7th Special International Training Course on "Wind Turbine Technology and Applications" Specially for African Countries	24.10.2019	21.11.2019	29 days
4.	24th International Training Course on Wind Turbine Technology & Applications	23.10.2019	19.11.2019	28 days
5.	Special International Training Course on Solar Resource Assessment and Development of Solar Power Plant	27.11.2019	20.12.2019	24 days
6.	25th International Training Course on Wind Turbine Technology & Applications	29.01.2020	25.02.2020	28 days
7.	24th National training course on "Wind Energy Technology"	10.02.2020	14.02.2020	5 days

GLOBAL WIND DAY CELEBRATIONS

Global Wind Day is a worldwide event that is supported by Global Wind Energy Council (GWEC) jointly with the European Wind Energy Association (EWEA) on June 15 of every year. It is a day for discovering wind, its power and the possibilities it holds to change our world. In more than 100 countries around the world, wind farms are in operation, generating energy from a clean and renewable source. Thousands of individuals are involved in the production of energy from wind, but for many people, wind energy is a mystery. The day started as a European one in 2007 and went Global in 2009. On 15th June,

hundreds of public events are organized all over the world, to create awareness on Wind Power.

As National Institute of Wind Energy is the only institute of its kind in India perhaps in developing counties, it is NIWE responsibility to create awareness about the Wind Energy. It is therefore, since 2009, NIWE is celebrating the Global Wind Day every year with various programmes for School Students and Teachers.

Similarly, the Global Wind Day 2019 was celebrated at NIWE. As part of the Celebration, NIWE has announced competitions for School Students for class VI to VIII and IX to X also a capacity building workshop for School Teachers towards creating awareness among school level.

Accordingly, the following events were conducted on 12th June 2019 at NIWE with support of National Green Corps (NGC), Chennai.

i. Drawing competition on the title "Use of Renewable Energy Sources for Sustainable Environment" for School Students.

ii. Elocution competition on the title: "Wind Energy Development in India" for School Students.

iii. Capacity building Workshop on "Wind Energy Technology" for School Teachers.

Studdents Drawing Competition in progress

The participants for the above events were asked to register in advance and 140 Students have participated in both the competitions and 73 Teachers attended the Workshop. The participants for the above events were from 70 different schools from Chennai, Thiruvallur, Kanchipuram and Vellore districts.

The events started with an inaugural function, where Dr. P. Kanagavel, Director and Head, Skill Development and Training (SDT) Division, NIWE has welcomed all the students and teachers to NIWE and briefed about the activities and services of NIWE, background about the Global Wind Day and scheduled events. Later, Shri. J. C. David Solomon, Director and Head Testing and Research, NIWE and Shri. G. Thangaraj, District Coordinator of NGC, Chennai addressed the environmental issues and the use of wind energy for sustainable life.

The "Capacity building Workshop on "Wind Energy Technology" for School Teachers" were held at the Conference Hall of NIWE with the following two sessions;

- "Challenges in management of Green Environment" by Shri. Joel Franklin Asaria, Deputy Director, National Productive Council and
- "Renewable Energy sources towards mitigation of Climate Change issues" by Shri. J. C. David Solomon Director & Head, T&R, National Institute of Wind Energy. The teachers were very excited about the technical session and parked a lot of queries to the speaker.

Teachers Workshop in progress

Apart from the competitions and workshop, a study tour to the Renewable Energy facilities available in the campus were also arranged for both students and teachers. Students and Teachers were exited and very much enjoyed the visit and they expressed their happiness in seeing the actual equipment's working in the field rather than seeing only on the internet and text books.

Shri. D. V. Giri, Secretary General of Indian Wind Turbine Manufacturers Association (IWTMA) was the Chief Guest for the function and delivered Key Note speech emphasizing the environmental issues and wind energy contribution in

mitigating the issues along with the wind energy developmental process. Shri. G. Thangaraj, District Coordinator, National Green Corps, Chennai and Dr. S. Rekha, Professor, Kumara Rani Meena Muthiah College of Arts & Science, Chennai who acted as Judge for the competition has also addressed the gathering.

WINNERS OF THE COMPETITIONS

PRIZE	DRAWING COMPETITION		ELOCUTION COMPETITION	
	Category I	Category II	Category I	Category II
FIRST	Mr. M. Niranjan Maharishi Vidyamandir Sr. Sec. School, Chetpet Chennai	Mr. S. Madhavan Anjuham Hr. Sec. School West Mambalam, Chennai	Ms. Kushi. K. Patel Maharishi Vidya Mandir Sr. Sec. School, Chetpet Chennai	Ms. K. Subasri Lady Willington Govt. Hr. Sec. School, Triplicane Chennai
SECOND	Ms. R. Sai Darshini Vidyodaya Girls Hr. Sec. School, T. Nagar Chennai	Ms. R. Uma Mageswari K Arumuga Nadar Girls Hr. Sec. School Washermanpet, Chennai	Ms. P. Yuthikshaa Kalaimagal Vidyalaya Mat. Hr. Sec. School Royapuram, Chennai	Ms. V. Jinitha Sri Dr. Salai Govindarajan Mat. School for Girls, Konnur High Road, Chennai
THIRD	Ms. M.L. Nithya Sri Vidyodaya Matriculation Hr. Sec. Academy, T.Nagar, Chennai	Ms. S. Yuvasri Rani Meyyammai Girls Hr. Sec. School, Annamalai Puram Chennai	Ms. J. P. Monika Panchayat Union Middle School, Arakkonam Vellore District	Ms. A. Kaviya Catherine Daniel Thomas Mat. Hr. Sec. School, Koyambedu Chennai
CONSOLATION	Mr. S. Dinesh Kumar Panchayat Union Middle School Kanchipuram District	Ms. B.R Praisy Daniel Thomas Mat. Hr. Sec. School, Koyambedu Chennai	Ms. N. Navya Sri Chennai Girls Hr. Sec. School, Shenoy Nagar Chennai	Ms. P. Rakshnavi Padma Subramaniam Bala Bhavan Mat. Hr. Sec. School Mangadu, Chennai

Special Consolation prize given to Master Y. Senthamizh, Kendriya Vidyalaya, Minambakkam, Chennai.

Winner receiving prize from Director General

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