

## EDITORIAL



The global wind industry is on track for a record-breaking year, with annual capacity additions expected to reach around 170 GW in 2025. The third quarter (Q3) of 2025 saw high activity, with projections for an even stronger Q4 driven by a

rush to complete projects under existing policy frameworks. The current year proved to be a milestone for the Indian Renewable energy sector as Annual new capacity additions to the grid hit a historic high. India added approximately 1.4 GW of wind capacity in Q3 2025, which represents a significant 105% increase compared to Q3 2024 and during the period Jan-Nov 2025, the wind power sector added about 6 GW of new capacity- the highest ever addition in recent years. The Indian Government introduced a mandate in September 2025 requiring designated consumers to source 3.48% of their total renewable energy consumption from wind power by FY 2030. States like Tamil Nadu and Bihar also set specific, increasing wind RPO targets.

NIWE has initiated the Geotechnical Investigation at three proposed locations in subzone 1 of the Gulf of Mannar, off the Tamil Nadu coast. The project includes drilling boreholes up to 60 meters below the seabed, collecting soil samples, and performing laboratory tests such as grain size analysis, Atterberg limits, and strength and permeability assessments.

NIWE has outlined an ambitious and future-focused research and development pathway designed to meet India's evolving renewable energy needs. The medium-term roadmap (2027-2032) concentrates on strengthening national scientific capabilities through advanced offshore measurements, high-resolution atmospheric modelling, AI-enabled forecasting, indigenous turbine component development, and environmental impact studies.

NIWE successfully completed a wind measurement Proficiency Testing (PT) program in compliance with ISO/IEC 17043 standards, alongside 30 other participating laboratories. By achieving a performance index of 2.25, the institute has provided objective evidence of its high technical competence and data reliability. This success serves as a critical prerequisite for NIWE's upcoming application for NABL accreditation under the ISO/IEC 17025 framework. Consequently, this

milestone reaffirms NIWE's dedication to maintaining internationally recognized quality and technical standards in Wind Resource Assessment.

The testing division had carried out Acoustic Noise Measurement for INOX Wind Turbine in Gujarat. The Test Report on Acoustic Noise Measurement has been issued to M/s. Inox Wind Limited. A Service Agreement was signed to carry out a Site Feasibility Study as per IEC 61400-12-1:2017 for a 2 MW Wind Turbine (RD: 113m, HH: 92m) proposed by M/s. Inox Wind Limited in Gujarat.

The review of documentation was completed for eight ALMM (Wind) applications pertaining to various wind turbine models submitted by wind turbine manufacturers. Further, technical support was provided to MNRE for the implementation of the Approved List of Models and Manufacturers (Wind) process.

The certification division had an Agreement signed with M/s. Inox wind Limited for the Updation of Type certificate. The Evaluation process has been completed and the updated Type Certificate has been issued. An Agreement has also been signed with M/s. Pioneer Wincon Energy Systems Private Limited for the second stage of Certification process.

The Skill Development and Training Division has successfully conducted the special training course for the officials of Envision Energy India Private Limited. NIWE has received the sanction order from MNRE for implementing the VSDP-Phase-II Project. Master trainer course (ToMT) was conducted. 2 batches of Training of Trainers (ToT) course were completed with 55 participants. The process of conducting Training of Participants (ToP) course to train 900 participants through 30 nos of ToP courses is about to commence through the existing Training Partners. During the period from October - December 2025, 188 students had visited NIWE as part of the student visit programme.

As we look ahead to the next quarter, we are energized by the progress and opportunities that lie in advancing wind energy. Your continued engagement is vital to achieving a sustainable future. We look forward to sharing more ground-breaking developments and project milestones in our next edition. Together, we can harness the power of wind to build a more sustainable world.

**Dr. Rajesh Katyal, Director General**

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## Research and Development

### NIWE R&D Vision – Mid-Term and Long-Term Roadmap

NIWE has outlined an ambitious and future-focused research and development pathway designed to meet India's evolving renewable energy needs. The medium-term roadmap (2027–2032) concentrates on strengthening national scientific capabilities through advanced offshore measurements, high-resolution atmospheric modelling, AI-enabled forecasting, indigenous turbine component development, and environmental impact studies. A major emphasis is placed on establishing state-of-the-art infrastructure such as Floating LiDAR validation systems, national wind modelling centres, upgraded testing platforms, and a unified wind data repository. These initiatives will enable India to transition smoothly towards large-scale offshore deployment while improving the accuracy, reliability and performance of onshore systems.

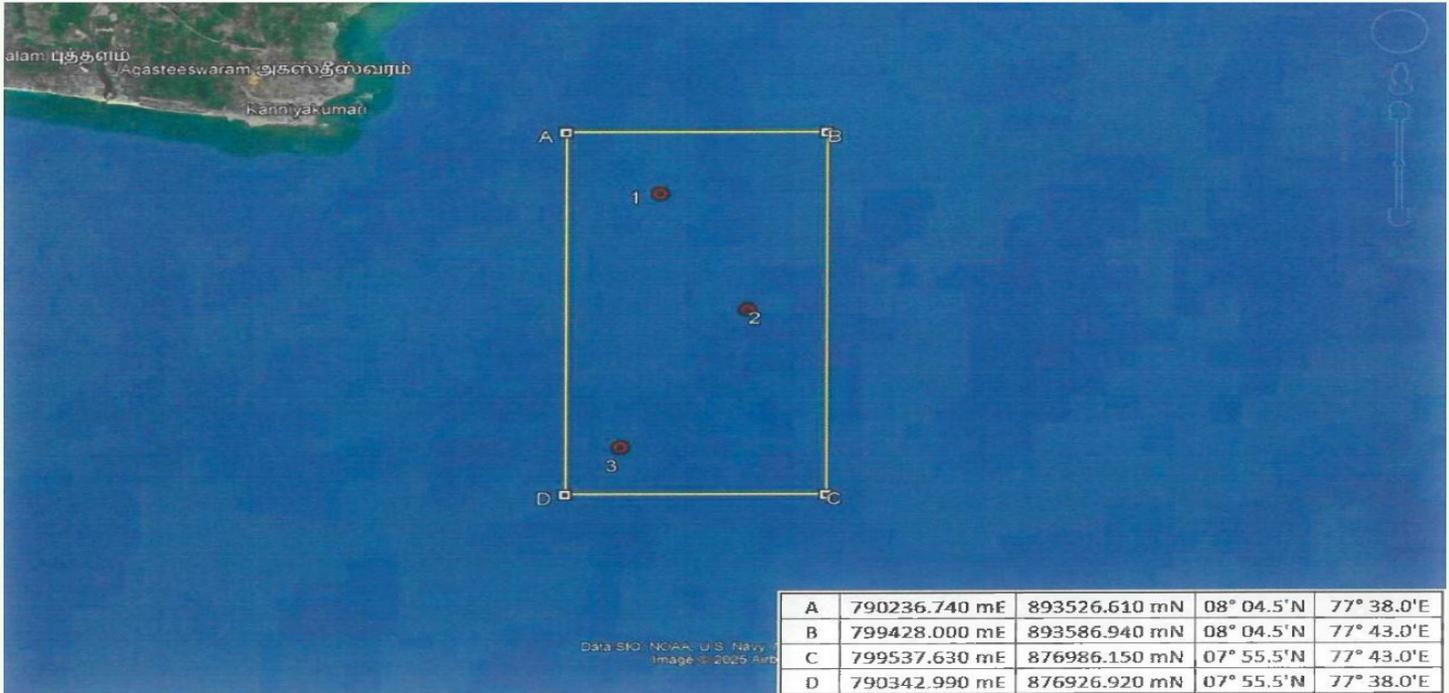
Looking ahead to the long-term horizon (2032–2037), NIWE's vision advances toward deep technology innovation and global leadership in wind energy. This phase prioritises the development of indigenous 10–20 MW turbine technologies, floating offshore engineering platforms, next-generation materials and composite structures, circularity and blade-recycling solutions, and AI-driven digital twins for turbine and wind-farm optimisation. NIWE also plans to create a dynamic National Wind Atlas 2035 supported by AI-based corrections and climate projections. These efforts will elevate India from being largely a technology adopter to a designing and innovation-driven nation in high-capacity onshore and offshore wind technologies.

A central pillar across both phases is NIWE's commitment to strengthening national testing and certification infrastructure, fostering deeper collaboration between research institutions and industry, and enabling faster commercial adoption of emerging technologies. Enhanced data ecosystems, multi-institutional consortia, specialised offshore and materials research laboratories, and demonstration sites will support India's transition to a high-renewable, technology-driven power system. Through these coordinated efforts, NIWE aims to play a pivotal role in shaping India's clean energy future and advancing global wind-energy innovation.



## Offshore Wind Development

NIWE has initiated the Geotechnical Investigation at three proposed locations in subzone 1 of the Gulf of Mannar, off the Tamil Nadu coast. This study is needed to provide essential data on seabed conditions, ensuring safe and effective design and construction of offshore structures. The project includes drilling boreholes up to 60 meters below the seabed, collecting soil samples, and performing laboratory tests such as grain size analysis, Atterberg limits, and strength and permeability assessments.



Geotechnical borehole locations at Gulf of Mannar, Tamil Nadu

## Joint Secretary Visit

Hon. Joint Secretary-Wind, MNRE had visited VOC port, Tuticorin, Tamil Nadu on 27.12.2025 along with DG NIWE and MNRE officials to the site of LiDAR measurement.



Joint Secretary-Wind, MNRE visit to LiDAR measurement at VOC Port

## Wind Resource Assessment

### Successful Completion of Proficiency Testing in Wind Measurement

NIWE has successfully completed the Proficiency Testing (PT) in the area of wind measurement, which was conducted in line with the requirements of ISO/IEC 17043. A total of 30 laboratories participated in this proficiency testing programme.

NIWE demonstrated satisfactory performance with an overall performance index of 2.25, reflecting the technical competence and reliability of its wind measurement activities. The successful participation and performance in this PT programme provide objective evidence of the division's measurement capability.

These proficiency testing results will support the division in submitting its application for accreditation to the National Accreditation Board for Testing and Calibration Laboratories (NABL) in accordance with ISO/IEC 17025, reaffirming NIWE's commitment to maintaining internationally accepted quality and technical standards in Wind Resource Assessment.

### Data Collection and Analysis

#### Andaman & Nicobar Islands

The division had successfully commissioned 3 nos. of Wind Monitoring Stations (WMS) at Manglutan, Bharatpur, and Sigmundera sites in the Andaman & Nicobar Islands. The measurements are under progress.

#### Leh, Ladakh

The division had successfully commissioned 4 nos. of Wind Monitoring Stations (WMS) at Kharnak-1&2 and Pang-1&3 sites in the Leh, Ladakh. The measurements are under progress. The summary of measurement is given in table below.

Station	PANG 1	PANG 3	KARNAK 1	KARNAK 2
Date of commissioning	05.05. 2022	06.05. 2022	13.09.2022	06.07.2023
Month	May 2022 – June 2025	May 2022 – June 2025	Sept. 2022 – June 2025	July 2023 – June 2025
100 (m/s)	4.35	4.67	4.03	3.34
WPD (W/m <sup>2</sup> )	69.75	86.69	90.07	71.99

#### Lakshadweep

- Division has installed Lidar at Kadamat Island.
- Successfully completed data collection for the offshore LiDAR at Kadamat, Lakshadweep Island for the month of November, 2025.
- The measurement summary is as follows.

Kadamat, Lakshadweep Island	Mean wind speed	Mean wind power density
	6.16 m/s @ 183m AGL	312.90 W/m <sup>2</sup> @ 183m AGL
6.12 m/s @ 163m AGL	304.78 W/m <sup>2</sup> @ 163m AGL	
6.06 m/s @ 133m AGL	293.58 W/m <sup>2</sup> @ 133m AGL	
5.99 m/s @ 103m AGL	281.58 W/m <sup>2</sup> @ 103m AGL	
Period of data taken for analysis (Oct. 2024 to Nov. 2025) – 10 minutes interval	5.94 m/s @ 83m AGL	273.47 W/m <sup>2</sup> @ 83m AGL
	5.90 m/s @ 73m AGL	268.48 W/m <sup>2</sup> @ 73m AGL
	5.84 m/s @ 63m AGL	262.00 W/m <sup>2</sup> @ 63m AGL
	5.76 m/s @ 53m AGL	252.86 W/m <sup>2</sup> @ 53m AGL
	5.62 m/s @ 43m AGL	236.07 W/m <sup>2</sup> @ 43m AGL
	5.50 m/s @ 38m AGL	220.88 W/m <sup>2</sup> @ 38m AGL
	5.33 m/s @ 33m AGL	199.20 W/m <sup>2</sup> @ 33m AGL

## Data Analytics

### Consultancy projects

The Division has successfully undertaken and completed multiple Wind Resource Assessment (WRA), Energy Yield Assessment (EYA), data verification, and micro-siting-related projects for various clients across India, as detailed below:

- M/s. Envision – Estimation of Annual Energy Production (AEP) 300 MW Wind Power Project.
- M/s. GPCL – Micro-siting and Energy Yield Assessment for the proposed 10 to 50 MW nearshore wind farm project mahuva region wind power project in Gujarat.
- M/s. SECI - Energy Yield Assessment for the proposed 50 MW wind farm project at Andhra Pradesh.

### Geotagging

Geotagging is a process that involves capturing GPS coordinates of wind turbine locations and assigning a unique ID to each turbine. In the case of a wind farm site with multiple turbines, this process was implemented to accurately map the precise location of each turbine. During the period, 205 geotagging IDs have been created.

Sl.No.	Name of the client	Site	No of WTG
1	Zenataris Renewables Energy Private Ltd	Karnataka	22
2	NTPC Renewables Energy Ltd.,	Gujarat	31
3	SRI4PL	Maharashtra	97
4	Spring Energy	Madhyapradesh	6
5	Spring Energy	Madhyapradesh	16
6	AMPIN Energy Green Ten Pvt Ltd.,	Rajasthan	33

## Issuance of Elevation Certificate for MoD NoC Applications for Wind Power Projects

- The purpose of the project is to validate the elevation certificate and the inputs given by the surveyor and client. To do this, DGPS will be used to conduct joint site visits. High-resolution terrain modeling and desktop GIS tools will be used to validate the coordinates of all proposed wind turbine locations, and a report and certificate will be provided.
- Visited 30 WTGs in Anantapur District, Andhra Pradesh for Issuance of Elevation Certificate.

## Certification & Information Technology

### CERTIFICATION

- An Agreement has been signed between NIWE and M/s. Inox wind Limited for the Updation of Type certificate for the scope of “Document review, Performing the manufacturing evaluation of Hub & Nacelle Assembly (HNA), Generator, and issue a revised Type certificate” for the wind turbine model “INOX DF/3000/145 3.0 MW, Power Booster Mode 3.3 MW Rotor Blade Type SR71 V2 (T-Bolt) / WBSR146-3.0 Hub Height 100m/122.5m/140m IEC WT Class IIIB/S” The Evaluation process has been completed and the updated Type Certificate has been issued.
- An Agreement has been signed between NIWE and M/s. Pioneer Wincon Energy Systems Private Limited for the second stage of Certification process viz., Evaluation of documentation in connection with Type Certification of “Pioneer Wincon 750/57, 750.0kW, PW28.0, HH 90.0m, IEC III A” for the inclusion of 110m Hub Height tower design and the re-evaluation of existing 90m Hub Height tower design. The re-evaluation of existing 90m Hub Height tower design has been completed and inclusion of 110m Hub Height tower design is ongoing.

### Other Activities

Shri A. Senthilkumar, Shri S. Arulselvan and Shri. S. Paramasivan visited M/s. Inox Wind Limited, located at Bavla, Ahmedabad, to carry out the manufacturing

evaluation of the additional Hub and Nacelle Assembly (HNA) facility in connection with the updation of Type certificate issued by NIWE for the wind turbine model “INOX DF/3000/145 3.0 MW, Power Booster Mode 3.3 MW Rotor Blade Type SR71 V2 (T-Bolt) / WBSR146-3.0 Hub Height 100m/122.5m/140m IEC WT Class IIIB/S”.

Shri A. Senthilkumar and Shri S. Arulselvan visited M/s. ELINWG India Pvt. Ltd., located at Mhalunge, Pune, to carry out the manufacturing evaluation of the Generator Manufacturing facility in connection with the updation of Type certificate issued by NIWE for the wind turbine model “INOX DF/3000/145 3.0 MW, Power Booster Mode 3.3 MW Rotor Blade Type SR71 V2 (T-Bolt) / WBSR146-3.0 Hub Height 100m/122.5m/140m IEC WT Class IIIB/S”.

### INFORMATION TECHNOLOGY

- Continued to maintain the IT infrastructure to keep servers, storage, systems, Firewalls, Switches, CCTV, endpoint security and software up and running.
- Continued to provide IT support for users at NIWE and its stakeholders.
- Carrying out procurement of new hardware, software, and AMC services.
- Taking backups of NIWE data in DC and DR IT infrastructure.
- STQC GIGW certification for NIWE website is in progress.

## Testing

### Acoustic Noise Measurement - INOX Wind Turbine

Acoustic Noise Measurement as per IEC 61400-11:2018 (CSV) for the "INOX DF/3000/145 3.0 MW Power Booster Mode 3.3 MW Rotor Blade Type SR71 V2 (T-Bolt) Hub Height 100m IEC WT Class IIIB" wind turbine located in Jasdan, Rajkot District, Gujarat has been completed based on the Service Agreement dated 14.08.2025. Subsequently, the Test Report on Acoustic Noise Measurement has been issued to M/s. Inox Wind Limited.



Visit of NIWE Team during Acoustic Noise Measurements at Jasdan, Rajkot District, Gujarat

### Site Feasibility Study - NTPC Wind Farm

A Service Agreement was signed on 11.11.2025 to carry out a Site Feasibility Study as per IEC 61400-12-1:2017 (as a prerequisite) before conducting Power Performance Measurements for a 2 MW Wind Turbine (RD: 113m, HH: 92m) proposed by M/s. Inox Wind Limited in the NTPC 150 MW Wind Farm located at Dayapar, Kutch District, Gujarat. Subsequently, a site visit was conducted by Dr. K. Boopathi, Director & Division Head, Shri N. Rajkumar, Additional Director (Testing) and Dr. A. Hari Bhaskaran, Deputy Director (Technical) on 02.12.2025. The Site Feasibility Report is under preparation and will be issued shortly.



Visit of NIWE Team for Site Feasibility Study at Dayapar, Kutch District, Gujarat

## Calibration Wind Tunnel Facility (CTF) Project

- An Expression of Interest (EoI) for "Design, Construction, Supply, Installation, and Commissioning of a Calibration Wind Tunnel Facility at Mohasa-Babai Industrial Area, District Narmadapuram, Madhya Pradesh" was floated by M/s. Madhya Pradesh Industrial Development Corporation (MPIDC) on 14.10.2025.
- Subsequently, presentation sessions were organized by MPIDC on 07.11.2025 and 10.11.2025, with 7 prospective bidders participating.
- The Division continues to provide ongoing support to MPIDC in the tendering process.

## Quality Management System

Continual improvement and maintenance of the Quality Management System for Testing services as per ISO 9001:2015 and ISO/IEC 17025:2017 standards are in progress.

## Renewable Energy Projects

The Division manages two grid-connected solar power projects, a 2 MWp ground-mounted plant at IIM Trichy and a 1 MW (AC) ground-mounted plant at Madurai Kamaraj University. Regular monitoring includes daily review of generation data and periodic site inspections of key components such as modules, inverters and transformers. Operation and Maintenance activities, including module cleaning and equipment testing, are carried out as per agreed O&M protocols. This proactive management ensures optimal performance, reliable operation and maximum clean energy generation, supporting the sustainability goals of the institutions.

## Publication

Reliability analysis of solar-powered resilient quadratic boost converter for off grid rural homes: Divya Navamani J, Boopathi K & Lavanya A <https://doi.org/10.1080/21681724.2025.2582136>

## Visitor

A Team of Japanese Delegates and Manipur Delegates visited the Division and had a brief discussion related to Wind Turbine Testing with Dr. K. Boopathi, Director & Division Head, Shri. N. Rajkumar, Additional Director, (Testing) & Dr. A. Hari Bhaskaran, Deputy Director (Technical) on 31.10.2025.

## New Infrastructure

- Equipment Data Base Management System (EDMS) has been established for accreditation purpose.
- The dedicated equipment rooms have been created for NABL audit purpose.



## Standards and Regulation

- The review of documentation was completed for eight ALMM (Wind) applications pertaining to various wind turbine models submitted by wind turbine manufacturers. Further, technical support was provided to MNRE for the implementation of the Approved List of Models and Manufacturers (Wind) process.
- The 16<sup>th</sup> meeting of the ETD 42 Wind Turbine Sectional Committee of BIS was organized on 15.10.2025 through video conference. The meeting was attended by the Director General, NIWE/ Chairman, ETD 42; Shri Ritwik Anand, Scientist E & Member Secretary, BIS; Deputy Director (T) and Division Head (i/c), S&R; Director and Division Head, C&IT; and Director and Division Head, Testing. The status of Indian Standards and various standardization-related works was discussed during the meeting.
- The Prototype Committee meeting, chaired by the Director General, NIWE, was organized on 10.12.2025 through video conference. The review of documentation for two prototype wind turbine models was completed. Subsequently, letters dated 12.12.2025 were issued in connection with grid synchronization for the two prototype wind turbine models, as decided by the Prototype Committee.
- Technical support was provided to the Bureau of Indian Standards (BIS) on matters related to standardization. Pursuant to the decision of the 16th meeting of the ETD 42 Wind Turbine Sectional Committee, the standard “IS/IEC/TS 61400 (Part 28): 2025 [IEC TS 61400-28:2025] — Wind Energy Generation Systems – Part 28: Through-Life Management and Life Extension of Wind Power Assets” was published by BIS. Works related to the preparation of draft Indian Standards, review of IEC standards & IECRE documents are under progress.
- Carried out the Manufacturing Facility inspection of M/s. Venwind Refex Power Limited along with MNRE official and Director & Division Head, C&IT, NIWE for ALMM (Wind) at Silvassa during 19.11.2025 to 21.11.2025.
- Carried out the Manufacturing Facility inspection of M/s. Senvion wind Technology Private Limited along with MNRE official and Assistant Engineer, C&IT, NIWE for ALMM (Wind) at Baramathi, Pune during 18.12.2025 to 20.12.2025.



## Skill Development and Training

### TRAININGS

NIWE conducted the following Training Course during the period. To equip participants with comprehensive knowledge of wind energy systems and their applications, share updates on global and national wind energy scenarios, government policies, legal frame works and capacity enhancement in the sector.

#### Special Training Course for the officials of Envision Energy India Private Limited

The Skill Development and Training Division of NIWE had successfully conducted the special training course on "WIND ENERGY TECHNOLOGY" for the officials of Envision Energy India Private Limited held during 06.10.2025 to 10.10.2025. The course provided a focused study on all aspects of wind power, ranging from the basics of wind and resource assessment to project implementation and operations and maintenance. It also included offshore wind to cover the development of economically viable wind farm projects. A total of 11 numbers of Envision officials have participated in the course.

The programme started with the registration of participants and Dr. P. Kanagavel, Director & Head, SDT Division, NIWE inaugurated the course and started his opening lecture session.



Dr. P. Kanagavel inaugurating the Course

There were 20 presentations scheduled during the course, which was handled by 11 NIWE Engineers & Scientists.

Dr. P. Kanagavel, Director & Division Head, SDT, NIWE distributed the Course Certificates to the participants on the last day of the training course.

The participants were asked to share their views on the training, and all of them provided positive feedback, specifically mentioning about NIWE's organizational skills and the excellent execution of the course.

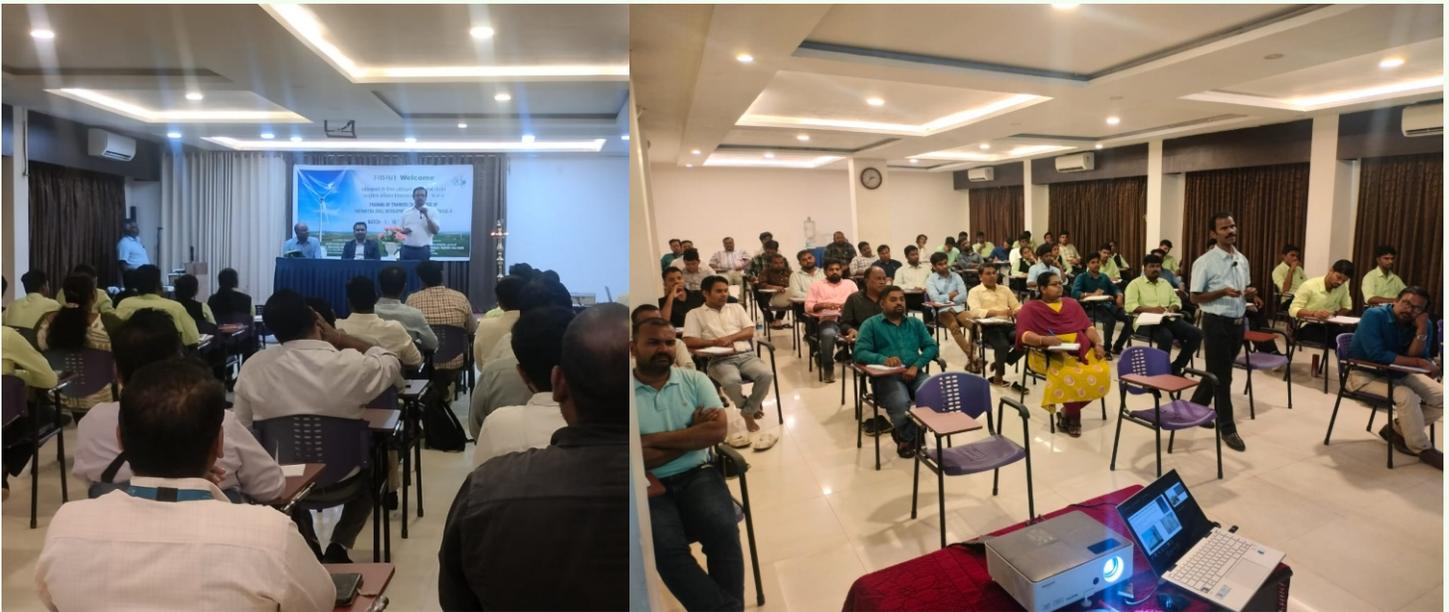


Group photo of Participants

## Vayumitra Skill Development Programme (VSDP) - Phase-II

Based on the sanction order received from MNRE for implementing the VSDP-Phase-II Project during the year 2025-26, the following activities are completed to complete the target by March 2026 set by MNRE.

- Inspection carried out as part of the physical verification process to all the Training Centres / Training Partners across states of Maharashtra, Gujarat, Madhya Pradesh, Tamilnadu, Karnataka, and Andhra Pradesh covering 13 Training Centres / Training Partners.
- Conducted Master trainer course (ToMT) for 15 NIWE Scientists / Industry Experts during October 2025.
- 7 Nos. of Training of Trainers (ToT) batches are proposed to be conducted before March 2026 out of which 2 courses were completed from 10.11.2025 to 21.11.2025 and 08.12.2025 to 19.12.2025 respectively and 55 participants have successfully completed the course.
- The process of conducting Training of Participants (ToP) course to train 900 participants through 30 nos of ToP courses is about to commence through the existing Training Partners (TP).



Glimpse of VSDP Phase II Training of Trainers (ToT) - Batch-1



Glimpse of VSDP Phase II Training of Trainers (ToT) - Batch-2

## Internship Programme

The “NIWE-Academic Associate Programme” (NIWE-AAP) aims to encourage students and provide an opportunity to choose renewable energy as their career option. To create awareness and interest in the field of renewable energy research among the young talented Sciences, Management and Engineering students.

The duration of the Internship is normally in the range of two weeks to six months. NIWE-AAP will provide opportunities for the graduate / post graduate students / Lecturers / Professors to work with scientists / engineers on NIWE's projects.

From October to December 2025, our internship program saw significant activity. Out of 51 applications received, 21 students successfully enrolled. Looking at outcomes, two students have received the Internship Certificate, with another 7 currently in the process of completing their internships.

## Officials / Students Visit

To create awareness and to motivate towards research on wind energy, achieving the indigenization and also to create awareness about the activities and services of NIWE, schools and college students are encouraged to visit the campus.

During the period from October - December 2025, 188 students had visited NIWE. The officials had appreciated the presentation and stated that it was a truly enriching experience and also the talk was highlighting the importance of conserving energy in our daily lives.

S.No.	Name of Institution	No. of Students	No. of Staff	Visited on
1	B S Abdur Rahman Crescent Institute of Science and Technology, Chennai	49	1	16.10.2025
2	Amethyst International School, Chengalpet	58	2	22.12.2025
3	Amethyst International School, Chengalpet	51	2	23.12.2025
4	NITTR, Chennai	30	1	26.12.2025



Classroom lecture



Renewable Energy Facility visit at NIWE

## Monsoon: India's Ancient Ally, Modern Power

Author : J.C. David Solomon, Director & Head, R&D Division, WTRS (Incharge) - Email : david@niwe.res.in

As the echoes of Deepavali celebrations fade across the nation and the warmth of Pongal draws near, India once again finds herself in festive rhythm, a rhythm set centuries ago by the monsoons themselves. From the sparkling lamps that mark the end of the rains to the thanksgiving feasts that greet a fresh harvest, the Indian calendar - social, cultural, and spiritual continues to move to the timeless pulse of the winds and rains. Few natural forces have sculpted the destiny of a nation as profoundly as the monsoon has shaped India. These mighty seasonal winds born of the ocean's breath and the sun's heat have not only watered India's fields but also carried her people, ideas, and wealth across the seas. From the spice-scented ships of ancient merchants to the sleek turbines spinning along her modern coastlines, the story of India is, in many ways, the story of her winds.

### The Science and Soul of the Monsoon

The monsoon is more than a meteorological phenomenon; it is a grand atmospheric symphony.

Each summer, as the Indian subcontinent heats up, vast low-pressure zones draw moist air northward from the Indian Ocean. These moisture-laden winds rise, cool, and release their bounty as life-giving rain across the land. When winter approaches, the pattern reverses cool, dry air flows back toward the seas, completing nature's six-monthly dance of advance and retreat. This unique dual rhythm, six months onward and six months of retreat, is rare in the world and profoundly defines India's seasons, economy, and ecology. The Himalayas block and redirect these winds, while the Indian Ocean acts as both cradle and conductor of this vast cycle one of the most complex and beautiful climatic systems on Earth. From ancient times to today, the certainty of this rhythm has given India her agricultural heartbeat, her trading seasons, and her festive calendar.

### The Monsoon Mind-set: A Civilization in Tune with Nature

This natural clock of wind and rain has not only governed crops but also nurtured culture. Across the



country, harvest festivals celebrate the gratitude of communities bound to the monsoon's rhythm be it Pongal in Tamil Nadu or Makar Sankranti in Karnataka and Andhra Pradesh, Lohri in Punjab, Bihu in Assam, Onam in Kerala, Nuakhai in Odisha and Gudi Padwa in Maharashtra. This continuum of celebrations during the autumn agricultural cycle, becomes Navratri and Dussehra, Durga Puja in the east, Onam in Kerala (marking the earlier retreat of the southwest monsoon), Karthigai Deepam in Tamil Nadu, and finally Deepavali, which lights the nation as the monsoon bids farewell. Thus, the monsoon does not merely irrigate the soil it irrigates the soul. It synchronizes India's agriculture, architecture, and acts as the pulse of nature itself.

### From Sail to Turbine: The New Wind Revolution

More than two millennia ago, the monsoon winds turned India into a seafaring giant. Mariners of the Malabar and Coromandel coasts timed their voyages to the precise change of winds. With the southwest monsoon, ships sailed westward laden with spices, textiles, and crafts; with the northeast monsoon, they returned bearing gold, horses, and wisdom. Today, the same winds power a new revolution one of technology and sustainability. India's wind energy sector, among the largest in the world, draws its strength from the same atmospheric engine that once filled the sails of our ancestors. The differential heating between land and sea the very physics that drives the monsoon is now harnessed through the elegant blades of wind turbines, converting nature's breath into clean, renewable power. The peninsular shape of India, cradled between the Arabian Sea and the Bay of Bengal, makes it a natural wind corridor. States like Tamil Nadu, Maharashtra, Gujarat, Karnataka, and Rajasthan reap the steady gifts of these monsoon currents, turning the age-old rhythm of the winds into modern energy security.

### Wind as the Merchant of Modern Prosperity

In ancient times, the monsoon winds brought merchants, markets, and material wealth at the harbours. Today, the wind bring Gigawatts. The "new trade" is no longer in spices and silks, but in renewable power and innovation. Each wind farm stands as a modern harbour where science, policy, and sustainability converge. And once again, India is looking seaward. Offshore wind farms are being planned along both the western and eastern coasts, in Gujarat and Tamil Nadu, tapping into the same monsoon-driven sea breezes that once guided our trading vessels. The ocean winds that once carried goods are now set to carry electrons green, clean, and infinite across the nation's grid. These projects herald a new age of maritime enterprise one that unites ancient wisdom with cutting-edge technology, linking the compass of history with the current of the future.

### Full Circle

From the sound of sails billowing in the Arabian Sea to the steady hum of turbines across the Deccan plateau, the Indian monsoon has been a timeless companion guiding both our past and our future. The winds that once made India a maritime pioneer are now propelling her toward becoming an energy superpower. And as India stands poised to embark on her offshore wind journey in a transformative way, the story seems destined to repeat itself this time with turbines instead of sails, and with renewable energy instead of cargo. Guided once again by the monsoon, India is set to win as she once did in maritime trade not by conquering the seas, but by mastering the winds. Truly, the monsoon remains India's most faithful ally the invisible hand that turns both wind turbines and fortune.



नीवे NIWE

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