

(R&D Institution under Ministry of New & Renewable Energy, Government of India)

National Test Centre for Offshore Wind Turbines @ Dhanuskodi

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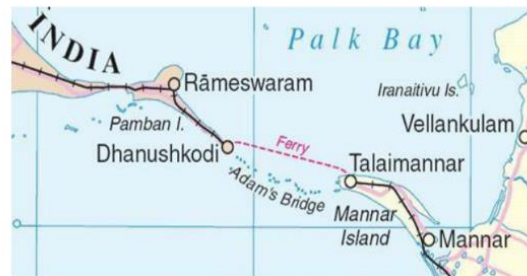
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## About Dhanuskodi

Dhanuskodi ( meaning tip of an *arrow*) is located, around 20 km away from Rameshwaram, Tamil Nadu, India. It's the nearest land point from India to Sri Lanka, approximately 30 Km away. Before 1964, It had a jetty service to transport travellers to Talaimannar in Sri Lanka.

**Short History:**

As per mythology, Dhanuskodi was the spot where Lord Rama and his **army** built Ram Setu, also known as Adam's Bridge (a series of coral reef islands connecting India and Sri Lanka) to reach Sri Lanka.



**Landscape & Land Use:**

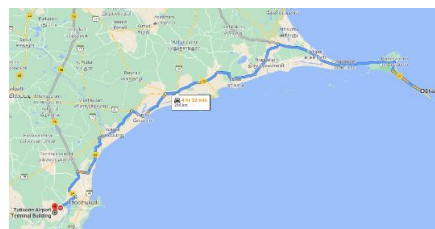
- The land is full of sandy shoreline running up to 15 km and surrounded by Bay of Bengal on one side and Indian Ocean on other side.
- After the cyclone hit during 1964 the place has become uninhabited.
- As the land is under use for hunting fishes, mini fishing harbors and boat jetties located 5km close the beach.

V.O. Chidambaranar Port at Tuticorin during the last financial year, handled 1667 wind blades and 648 wind blade towers, which were transported from Chennai

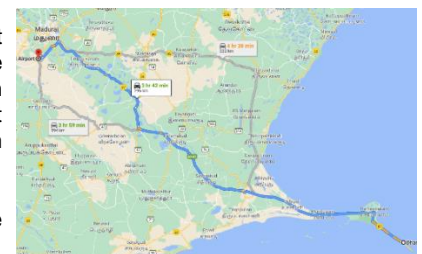


On 21.09.2020, V.O. Chidambaranar Port handled wind blades of length 74.90 metres, the longest of its kind handled through Indian Ports, for transport to Port of New Orleans, USA.

## Access to Dhanuskodi



The nearest Airports are Madurai & Tuticorin which are at approx. 200 Km distance.



Tuticorin port is the nearby port facility.

Pamban Bridge is a railway bridge which connects the town of Mandapam in mainland India with Pamban Island, and Rameswaram. A road bridge was also constructed parallel to the rail bridge, known as Indira Gandhi Road Bridge connects the National Highway (NH 49) with the Rameswaram island. National Highway completed the 9.5-km-long road – 5 km from Mukuntharayar Chathiram to Dhanuskodi and 4.5 km from Dhanuskodi to Arichamunai.



# Wind Resources

As an offshore resource assessment initiative, NIWE in the year 2013 installed a 100 m height Meteorological Mast in the southern tip of Dhanuskodi, Tamil Nadu, India.

Measurement Period: 1 <sup>st</sup> October 2013 to 15 <sup>th</sup> December 2018			
Mean wind speed	Mean air density	Mean turbulence intensity at 15 m/s	Mean wind shear exponent
[m/s]	[kg/m <sup>3</sup> ]	[%]	-
8.36	1.167	6.0	0.03

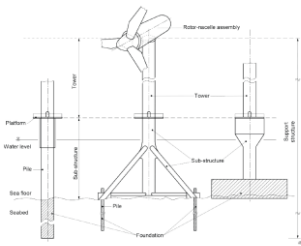
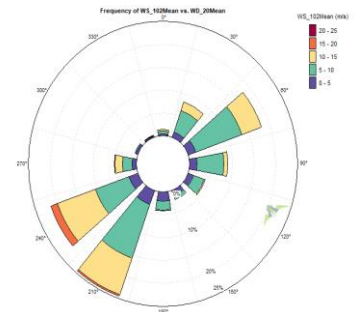
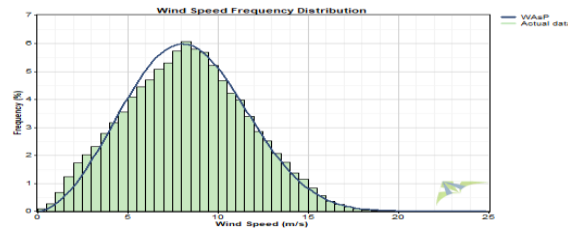
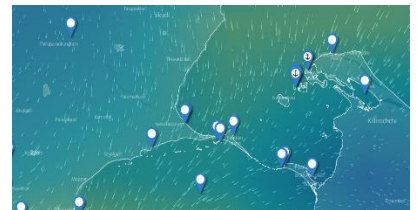
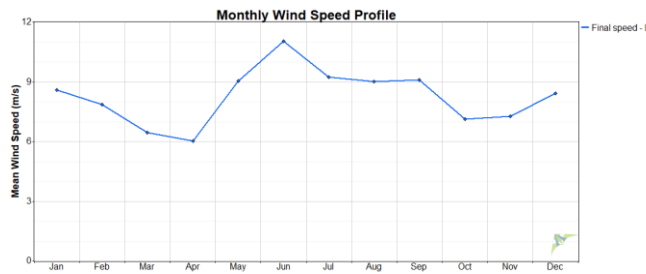


Figure 1 - Parts of a fixed offshore wind turbine



For Offshore Wind Turbines Type Testing,

the global practice is

to Test the Wind Turbines without its sub structure in the land located nearer to Sea, wherein the Wind Conditions at Sea could be experienced.

Moreover, Offshore sites offer zero roughness and are hence not ideal for turbulence test of large scale wind turbines.

Wind blows throughout the year in Dhanuskodi (since Land in India & Srilanka creates a natural wind tunnel here) and monthly average is always higher than 6 m/sec. And Wind is available only in two directions (North East & South West) and hence positioning of Wind Turbine becomes easier.

## Need for National Test Centre

Offshore Wind Turbine models can be tested at the facility as well as those certified based on the Type Test carried out abroad can be up for Indian Moderate wind Performance assessment for building confidence in Indian Project developers, Investors & financial Institutions.

In addition, as per IECRE, Type Certificate for Rotor Nacelle Assembly is acceptable instead of complete wind turbine at a Test site to complete the Type Test and the Tower & foundation are more closely associated with the site specific Project Certification.

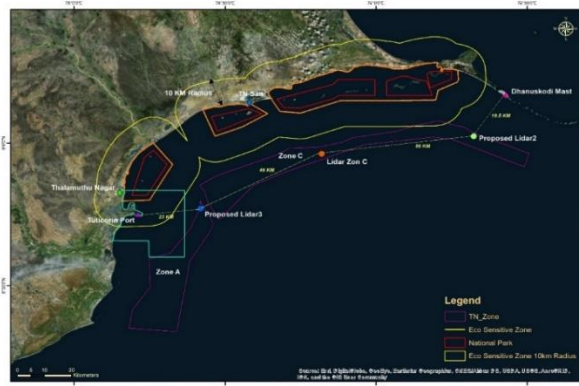
Dhanuskodi site with steady winds throughout the year and having characteristics like flat terrain -without any significant obstacles will expedite successful completion of Type Tests & faster turn around of commercial models for the market. Hence, Wind Turbine Test Station at Dhanuskodi will be beneficial for the following reasons:

- ✓ Representative Site for Moderate & high Wind Conditions
- ✓ To promote new wind turbine variants designed for Moderate Wind Conditions in India,
- ✓ Skill Development for O&M Engineers on Offshore WT erected in Test Site.
- ✓ Testing & Validation of Remote Sensing Device

## Representative Site for Moderate Wind Conditions

The estimated potential for offshore wind in Tamilnadu Coast region is around 25 GW. Considering 5 to 8 MW turbines are planned, approximately 3000 to 5000 wind turbines may be deployed in the region in the first few phases.

If a prototype wind turbine of wind turbine model (without its sub structure) is allowed in the Dhanuskodi Site, it will facilitate the wind turbine manufacturer to optimize the wind turbine design (software & hardware) for the entire region and improve the confidence before deployment.



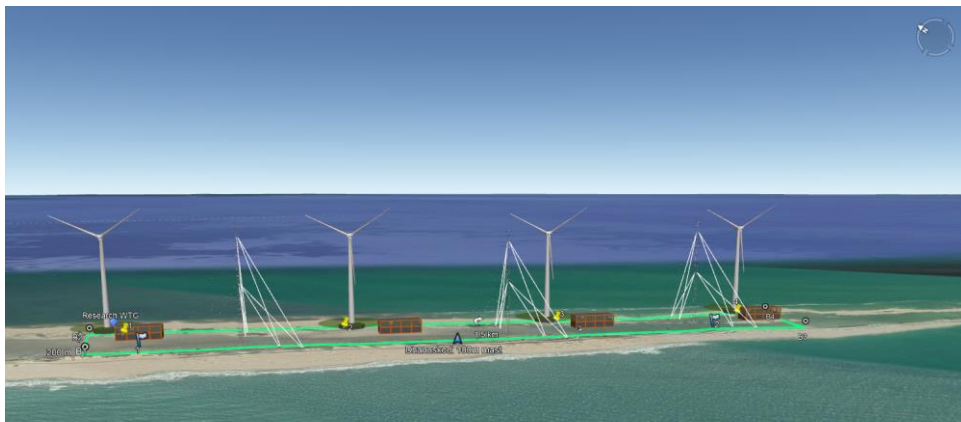
*In general, coastal areas are prone to tsunami. Tsunami shall not affect the site as Ramanathapuram coasts is a convex coast. In the year 2004 tsunami could not approach the site because SriLanka coast has shielded naturally.*



## Wind turbine variants designed for Moderate Wind Conditions

When Wind Turbine variants tuned for Indian site conditions are introduced, it would be easier for Wind Turbine Manufacturers to test in Dhanuskodi site for a faster turnaround in commercializing the models.

Whenever new offshore wind turbine models are tested and certified abroad & are planned for Indian Offshore EEZ, the first wind turbine for the project can be installed in Dhanuskodi Land and used as a demonstration site to build confidence for the investors.



*Dhanuskodi represents climatic conditions of neighboring countries and other countries in Asia & Africa for wind turbine demonstrated here would be good for market confidence.*

### STAKEHOLDER'S PERSPECTIVE:

NIWE being the technical arm of Ministry of New and Renewable Energy would like to know the views of all Stakeholders in the Offshore Wind Energy Development in India with respect to availing services related Testing and Certification of Wind engineering assets by using the facility to be developed at Dhanuskodi – “National Test Centre for Offshore Wind Turbine”.

Kindly provide your inputs for the attached Questionnaire.

Your response to the survey will add more value in realizing the offshore wind potential in India.