

Wind pattern and power generation in Tamil Nadu – June 2024

Rainfall

As per historical data, the average Tamil Nadu sub-division rainfall expected in June was 50.8 mm. however, with 109.2 mm recorded, the state experienced a very large excess of 115%, marking a higher spell compared to the last twenty-seven years.

Rainfall recorded in western ghats' wind pass-wise districts were:

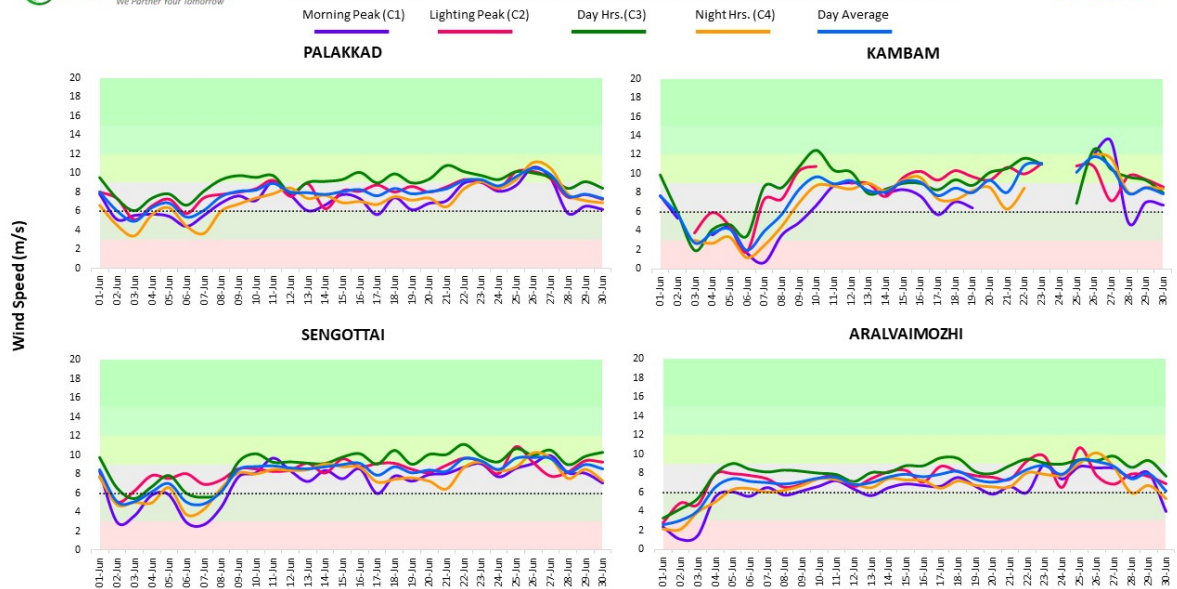
- Palakkad-Coimbatore 242.0 mm (41%)
- Kambam-Theni 105.5 mm (238%)
- Sengottai-Tenkasi 71.6 mm (51%)
- Aralvaimozhi-Tirunelveli 118.4 mm (417%)
- Palk Strait-Thoothukudi 6.2 mm (1%)

Year	2023	2022	2021	2020	2019	2018	2017
Rainfall in mm	53.5	79.1	62.3	59.6	33.6	50.8	47.9

Historic rainfall

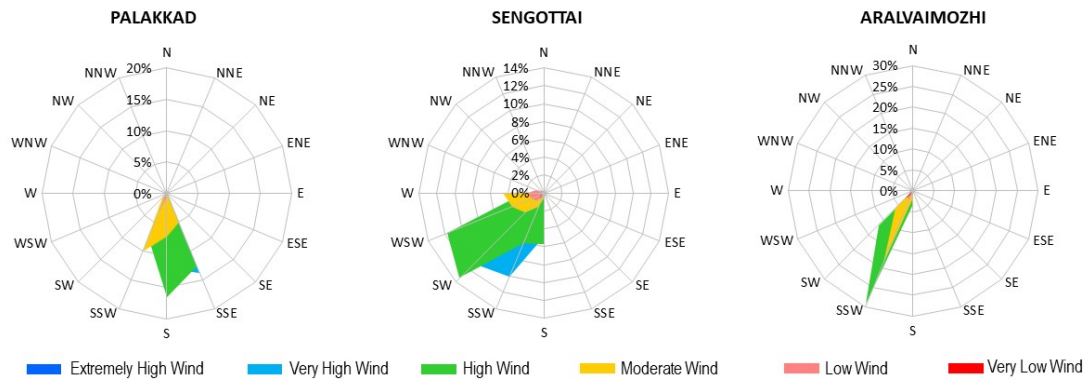
Wind Activity

- ❖ **Cyclonic circulations:** None of the cyclone formed over the North Indian Ocean.
- ❖ **El-Niño Southern Oscillation (ENSO):** ENSO-neutral conditions are present. Equatorial sea surface temperatures (SSTs) are above average in the western and west-central Pacific, near average in the east-central Pacific, and below average in the eastern Pacific Ocean. ENSO-neutral is expected to continue for the next several months, with La Niña favoured to develop during August-October (70% chance) and persist into the Northern Hemisphere winter 2024-25 (79% chance during November-January). The most recent ONI value (April – June 2024) is 0.4°C and for the month of June, the value was 0.16°C anomaly.
- ❖ **Indian Ocean Dipole (IOD):** At present, Neutral Indian Ocean Dipole (IOD) conditions are observed over the Indian Ocean, with the latest anomaly value for June recorded as -0.16°C.
- ❖ **Madden Julian Oscillation (MJO):** The Madden Julian Oscillation (MJO) Index was between the phase 2 and 3 during 20 Jun to 21 Jun with average amplitude of 0.30 and 26 Jun to 30 Jun with average amplitude of 0.72.
- ❖ **Pass-wise average wind speed:** Wind passes such as Palakkad, Kambam, Sengottai, and Aralvaimozhi had average wind speeds of 7.9 m/s, 7.9 m/s, 8.1 m/s, and 7.2 m/s, respectively. Notably, during the lighting peak hours and day hours, the average wind speed at Palakkad and Sengottai pass increased to 9.0 m/s, with the maximum day hours' peak wind speed reaching 12.5 m/s on Jun 26, 2024.



Average peak wind speed

Wind Direction



Average wind direction

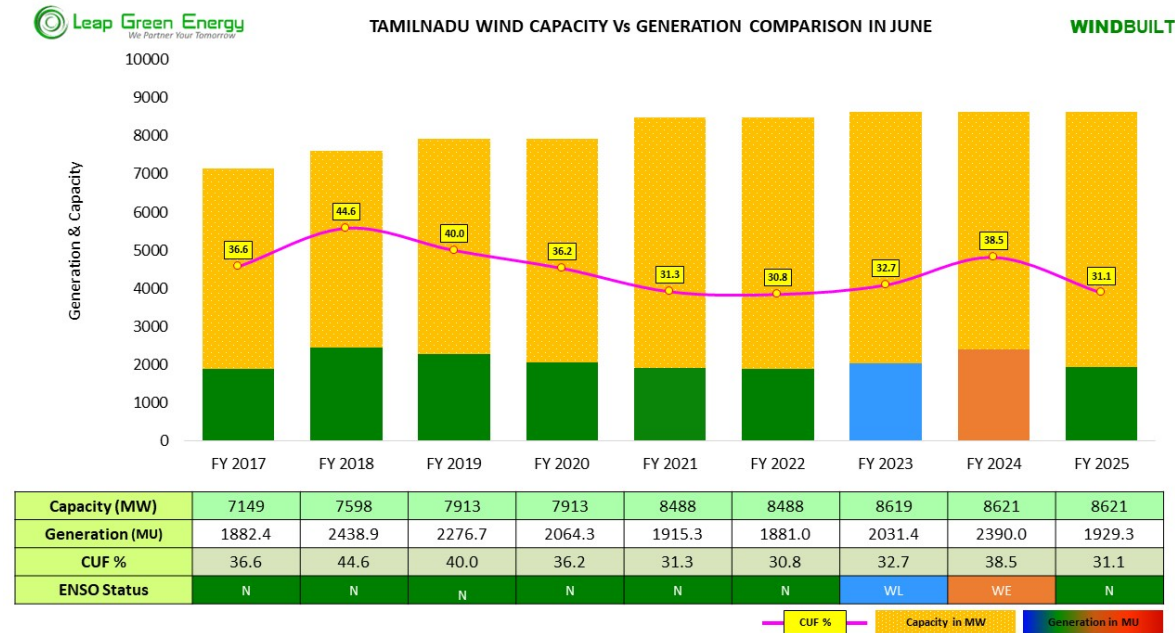
Palakkad pass wind directions distributed were 36.0% in South, 31.6% in SSE and 26.3% in SSW. In Sengottai Pass, the wind directions were 30.1% in SW, 24.3% in WSW and 19.2% in SSW. In Aralvaimozhi Pass, wind directions were 59.7% in SSW, 28.2% in SW and 6.0% in South.

Wind Power Generation

In June 2024, wind power evacuation contributed to 17.9% of Tamil Nadu's total energy demand met.

- Maximum generation:** On Jun 26, the maximum evacuation reached 105.14 MU, constituting 29.1 % of the total demand met.
- Minimum generation:** On Jun 03, the minimum evacuation was 17.58 MU, representing 4.9% of the total demand met.

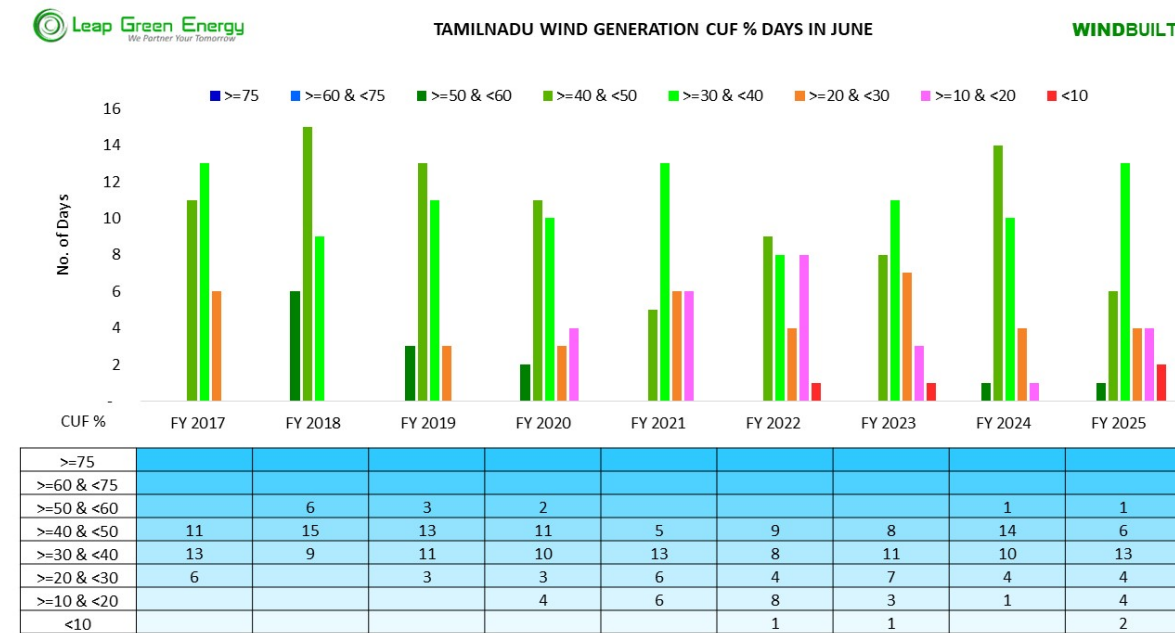
On two days it was greater than 100 MU, six days it was between 75 to 100 MU, fifteen days it was between 50 to 75 MU, one day it was between 40 to 50 MU, one day it was between 30 to 40 MU, three days it was between 20 to 30 MU for the remaining two days it was between 10 to 20 MU.



Monthly generation comparison

During Jun 2024, 1929.3 MU of wind energy was evacuated from Tamil Nadu, which is 31.1% of CUF, which is 19.28% lower than the CUF of Jun 2023.

Capacity Utilisation Factor (CUF)

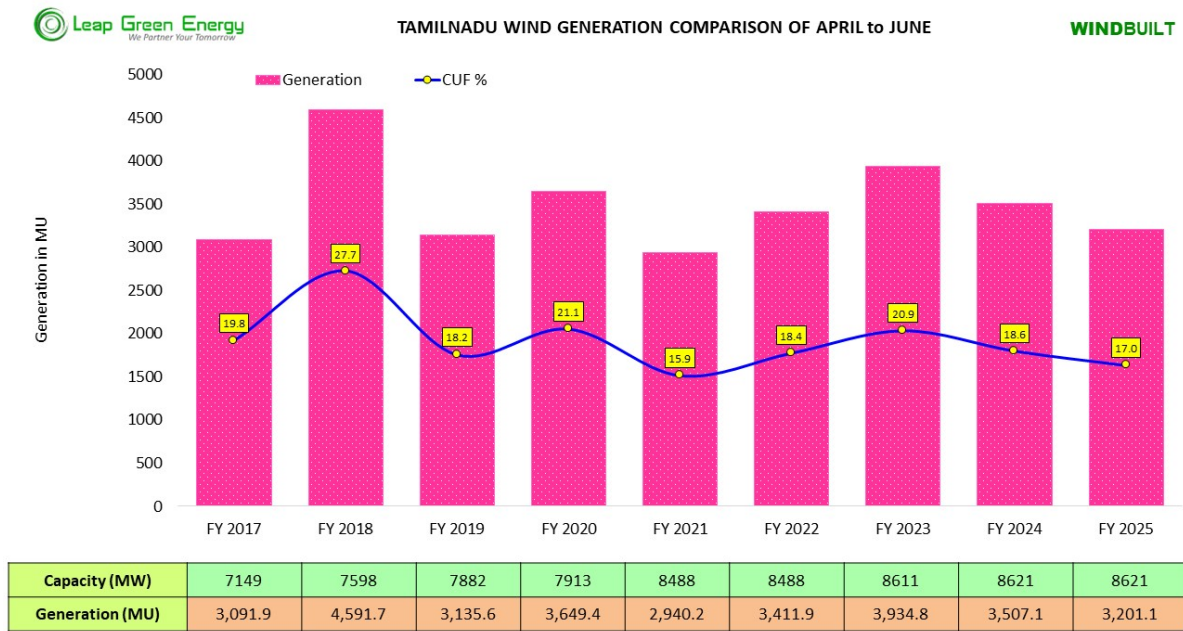


CUF frequency

As regards capacity utilisation factor for one day it was 50 to 60%, for six days it was 40 to 50%, for thirteen days it was 30 to 40%, for four days it was 20 to 30%, for four days it was 10 to 20% and for the remaining two days it was less than 10%.

FY Cumulative Generation as on Jun 2024

During FY 2025, 3201.1 MU of wind energy has been evacuated, which amounts to about 17.0% CUF of the total installed capacity of 8,621 MW.



Year-Month Generation Comparison

Energy Consumption Comparison

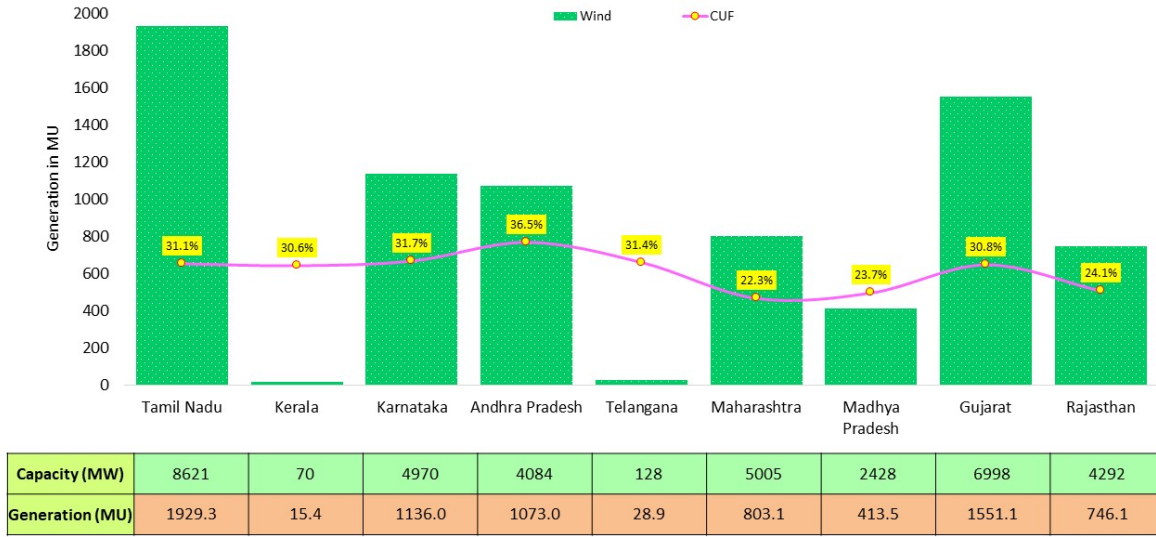
As regards the energy utilisation of Tamil Nadu, 45.5% of energy was taken from the national grid, followed by thermal at 21.3%, wind at 17.9%, solar at 8.9%, other resources like bio-mass and co-generation at 3.3%, hydro at 1.7% and gas at 1.3%.

In June, the energy consumption was 10,784.18 MU and 2.9% lower than that last year.

- **Maximum consumption:** The maximum consumption was 397.47 MU on 01 Jun 2024.
- **Minimum consumption:** The minimum consumption was 305.19 MU on 09 Jun 2024.

State-wise wind power evacuation

In Jun 2024, Andhra Pradesh had the maximum wind power capacity utilisation of 36.5%, Karnataka at 31.7%, Telangana at 31.4%, Tamil Nadu at 31.1%, Gujarat at 30.8%, Kerala at 30.6%, Rajasthan at 24.1%, Madhya Pradesh at 23.7% and Maharashtra at 22.3%. An aggregate quantum of 7,696.5 MU was evacuated, which was 29.2% CUF of the total state grid-connected capacity of 36,596 MW of wind power in the country.



State-wise generation comparison

Reduction in carbon emission and water consumption

Wind power generation in Tamil Nadu during June 2024 has resulted in reduction of carbon emission and water consumption of about 17,99,555 tonnes and 1,295 million litres, respectively. Cumulative reduction of carbon emission and water consumption were 29,85,835 tonnes and 1,689 million litres respectively during FY 2025.

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