



Wind Projects in India

For Prelims: Wind Energy, Renewable Sources of Energy, Government Initiatives

For Mains: Significance of Wind Energy, Challenges in Wind Energy Projects, Related Government Initiatives

Why in News?

The **Global Wind Energy Council (GWEC)** and **MEC Intelligence (MEC+)**, a consulting firm that specialises in renewable energy has reported that **annual installation of new [wind power](#) projects** in India will peak by 2024 and likely decline thereafter.

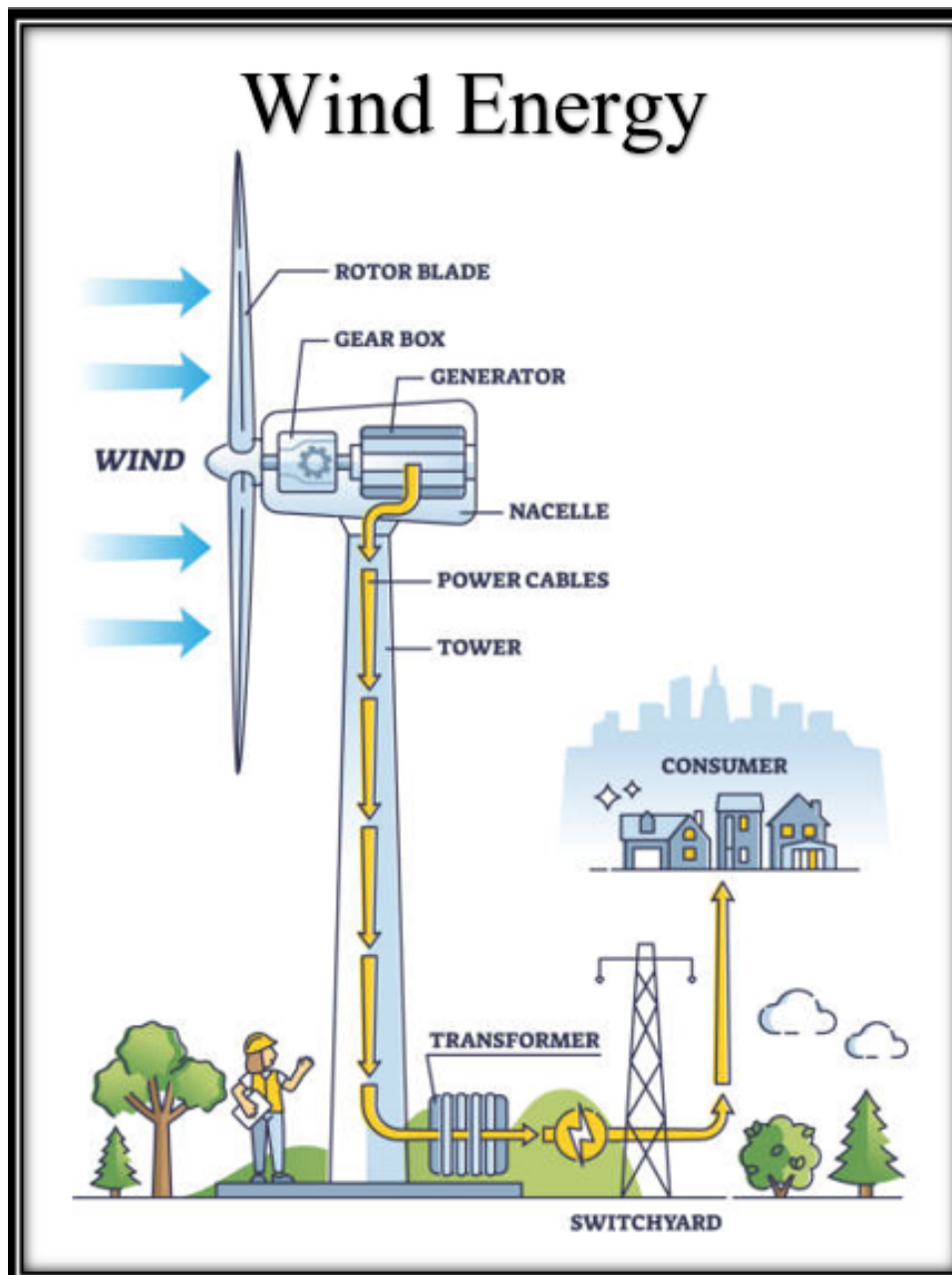
- After 2024, fresh projects are likely to be **wind-solar hybrids**.

What do we need to know about Wind Projects in India?

- **About:**
 - **Wind energy** today typically comes in two different types:
 - **Onshore wind farms** which are large installations of wind turbines located on land.
 - **[Offshore wind farms](#)** which are installations located in bodies of water.
- **Status:**
 - India currently has **13.4 GW of prospective projects in wind energy**, which are expected to **drive installations until 2024 in the market**.
 - India is **expected to add 3.2 GW in 2022, 4.1 GW in 2023 peaking to 4.6 GW in 2024, thereafter declining to 4 GW and 3.5 GW in the next two years**.
 - Wind industry installations have been **slowing down in India since 2017**.
 - Only 1.45 GW of wind projects were installed in 2021 with many delayed due to the **[second wave of Covid-19](#)** and **supply chain-related disruptions**.
- **Challenges:**
 - The market has **concentrated wind projects around a few substations of Gujarat and Tamil Nadu**, which were home to the strongest resource potential and lowest cost of land.
 - This created **bottlenecks and slowed down project activity** and made it **costlier than solar power**.
 - India's track record has indicated that the **wind installation market is a lumpy market**.
 - Considerable momentum has been built in the pipeline since 2017-2018, **but inordinate delays in project execution** have challenged the assumptions of developers.
 - Due to the COVID-19 pandemic and supply chain constraints, **the overall dues of electricity [distribution companies \(DISCOM\)](#) have ballooned**.
 - The outstanding payments to RE generators increased by 73% to ₹19,400 crores in December 2021, as compared to ₹11,200 crores in December 2020.
- **Energy Potential of India:**

- India has potential of about 60 GW of wind.
 - It is quite likely that **it would go up substantially** because over time some of the **old wind power stations** that have very low capacity **could be replaced with wind turbines** which have higher capacity.
- There is another unexplored area, which is in the oceans.
 - Across the world, **exploration from this area is at a nascent stage.**
 - India has a bit of a problem because **on eastern side it has a lot of cyclones** which hit the coast.
 - Probably, **it can explore wind energy on the western side.**
- India is a country having around **7,516.6 km long coastline** and in all of its **exclusive economic zones**, it has enough opportunity to harness wind energy.
- It is found by the **National Institute for Wind Energy (based in Chennai)** that **western states** have larger potential in terms of a stable, steady and a speedy windflow starting from **Gujarat, Maharashtra, Karnataka to Tamil Nadu and Andhra Pradesh.**
 - Tamil Nadu is the largest producer of wind energy producing 9,075MW in 2019.

What do we know about Wind Energy?



- About:

- **Wind is used** to produce electricity using the **kinetic energy created by air** in motion. This is transformed into electrical energy **using wind turbines or wind energy conversion systems.**
 - Wind first **hits a turbine's blades**, causing them to **rotate** and turn the **turbine** connected to them.
 - That changes the **kinetic energy to rotational energy**, by moving a shaft which is **connected to a generator**, and thereby **producing electrical energy through electromagnetism.**
 - The electricity is **sent through transmission and distribution lines** to homes, businesses, schools, and so on.
- The amount of power that **can be harvested from wind depends on the size of the turbine and the length of its blades.**
 - The output is proportional to the dimensions of the rotor and to the cube of the wind speed.
 - Theoretically, **when wind speed doubles, wind power potential increases by a factor of eight.**
- **History:**
 - Wind turbines **first emerged more than a century ago.**
 - Following the **invention of the electric generator in the 1830s**, engineers started attempting to harness wind energy to produce electricity.
 - **Wind power generation** took place in the United Kingdom and the United States in 1887 and 1888, but modern wind power is considered to have been **first developed in Denmark.**

What are the Related Initiatives?

- **National Wind-Solar Hybrid Policy:**
 - The main objective of the [National Wind-Solar Hybrid Policy](#), 2018 is to provide a **framework for promotion of large grid connected wind-solar PV hybrid systems** for optimal and efficient utilization of wind and solar resources, transmission infrastructure and land.
- **National Offshore Wind Energy Policy:**
 - [The National Offshore wind energy policy](#) was notified in October 2015 with an objective to develop the offshore wind energy in the Indian [Exclusive Economic Zone \(EEZ\)](#) along the Indian coastline of 7,516.6 km.

Way Forward

- Governments need to tackle issues such as **planning barriers and grid connection challenges.**
- To sustain and increase growth in wind-based generation capacity, **policymakers need to streamline the procedures to grant permits**, including land allocation and grid connection projects.
- **Workforce planning for large-scale renewables deployment** should be an early policy priority and investment in grids must treble from current levels through 2030.
- There is also a need for **greater public-private co-operation** to confront “the new geopolitics of the wind supply chain”.
- A stronger international regulatory framework is needed to address the increased competition for commodities and critical minerals.

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Q. Give an account of the current status and the targets to be achieved pertaining to renewable energy sources in the country. Discuss in brief the importance of National Programme on Light Emitting Diodes (LEDs). **(2016)**

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