REPOWERING WIND ENERGY
IN TAMIL NADU

Date: FRIDAY, FEBRUARY 24, 2023  |  Time: 3.00-4.00 PM (IST)  |  Platform: ZOOM
Wind Energy is being increasingly used to generate electricity and its application is likely to increase in the future.

India has added only a small wind power capacity—about 1.50 GW annually—over the past five years.
Installed capacity and wind potential in seven windy states
The need for repowering

Approximately 3,000 turbines, each of less than 1 MW capacity, and with a cumulative installed capacity of 800 MW, have completed their design life.

Wind turbines in Tamil Nadu have an average capacity of 750 kW. As of March 2021, over 13,000 odd wind turbine generators (45 per cent) were of 500 kW or less in capacity, and another 26 per cent were between 500 kW–1 MW capacities. Together, these smaller turbines account for slightly over half of the total installed capacity.
Why is repowering not taking off?

1. Fragmented ownership structure of wind farms
2. Loss of captive status if captive generators opt for repowering
3. Evacuation infrastructure upgradation
4. Challenges in micro-siting
5. Valuation of existing assets
6. Lack of financial interest by owners
7. Loss of generation during construction
8. Transport challenges of longer blades and taller towers
Recommendations for repowering

- **Mandatory to conduct a safety and performance assessment of all turbines**

- **Replacement of older turbines with newer ones of the same capacity**

- **In Maharashtra and Karnataka it is possible to take up repowering early in the life cycle of the projects without impacting the contracts and adding complexities**

- **Creating a group of corporates can be a viable option. This will help to replace their older turbines with newer ones and establish confidence in the sector**

- **Direct Drive Wind Turbine (Gearless) of at least 1 MW would be a better replacement since not only are their sizes smaller and weight lesser, but the efficiency is also higher**

- **Corporate way**

- **Government can identify a few Wind Parks/Wind-Solar Hybrid Park for repowering and should develop/enhance transmission infrastructure**

- **Business Model**

- **States must facilitate easy termination of PPAs without penalties**

- **Easy termination of PPA**

- **Wind Parks**

- **Early repowering**

- **Better turbine**
Case of Micro-siting at Vankusawade Wind Park

<table>
<thead>
<tr>
<th>Site Existing Details</th>
<th>Repowering with 2.7MW (130 m) Turbine</th>
<th>Repowering with 3.6 MW (140 m) Turbines</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Capacity of &lt;1 MW WTG’s (MW)</td>
<td>Area of Site (Sq km)</td>
</tr>
<tr>
<td>3D x 5D</td>
<td>243</td>
<td>26.27</td>
</tr>
<tr>
<td>4D x 5D</td>
<td>243</td>
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<tr>
<td>6D x 5D</td>
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<td>7D x 5D</td>
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Capacity of repowered layout keeps on increasing compact arrangement
With less spacing in between, the CUF decreases
With sparsely placed turbines, there is a decrease in wake loss
A slight decrease in CUF of approximately 2 per cent at 3DX5D, the energy yield ratio increased by two times.

Source: Wind Repowering in India: Potential, Opportunities, and Challenges; USAID 2022
Case of Micro-siting at Vankusawade Wind Park

Energy yield and capacities with different layouts

Capacity utilization factor and energy yield with different layouts

Source: Wind Repowering in India: Potential, Opportunities, and Challenges; USAID 2022
Key challenges addressed by the repowering policy (2022) draft

• Well defined objective of repowering policy – maximum energy generation from given area (Max MWh/Sq.km)

• Overall project development framework – project based or site-based repowering

• Guidance on regulatory flexibility – PPA related provisions

• Guidance to states on their role in repowering – states to devise policies and decide incentive mechanism

• Business model /project development model – addresses challenges regarding fragmented land and asset ownership
Thank you

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