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Renewable Energy

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Understanding the granularities, opportunities, and challenges in India's Renewable Energy sector

EXPERT CALL TAKEAWAYS

Industry

Renewable Energy

We hosted an expert session addressing India's renewable energy sector. Expert has over 30 years of experience working on capex projects for solar modules & cells, wind turbines, automobile engines, heavy engineering, steel rolling, and fabrication plants. The session entailed discussions on key sectoral developments and provided insights into the prospects of India's energy landscape.

Key takeaways from our expert session on India's Renewable Energy Sector:

- **Evolution of Renewable Energy (RE) efficiency:** India's RE sector has witnessed notable evolution since the early 1970s. Wind systems that began with ~250-kilowatt nameplate capacity have reached 3MW, 4MW, and 5MW in India. Solar modules have seen a similar evolution from 50 watts to 750-watt panels with efficiency growing from 6-7% to ~25%.
- **India's RE target 2030:** Indian government has set itself a target to reach 500GW of RE installed capacity by 2030. This would comprise 60% solar energy and 40% wind energy, excluding hydroelectricity. RE currently constitutes ~30% of India's energy mix.
- **Pace of wind capacity addition and supply chain constraints:** Wind capacity addition lags that of solar as industry tailwinds rendered a significant number of OEMs financially unviable resulting in business closures in the past. As the sector makes a turnaround with favorable policies and government thrust, India now relies on a limited number of OEMs which explains a slower pace of capacity addition compared to solar projects. Turbine subcomponents like castings, bearings, and gearboxes are majorly imported and assembled in India which attracts import duties. However, key raw materials for rotor blade manufacturing, like glass fiber and resin, are locally manufactured.
- **Import-dependent solar sector:** The solar component supply chain is entirely import-dependent and dominated by countries such as China, Korea, Malaysia, and Vietnam. Indigenous production, which is gradually happening, would represent a significant step towards enhancing supply chain autonomy.
- **PLI scheme and import duties to foster local manufacturing:** Measures like PLI scheme and basic customs duty of 40% on solar modules and 20% on solar cells have somewhat reduced imports and boosted local manufacturing. However, India must add significantly higher solar module and solar cell manufacturing capacities than the current run rate to beat low-cost imports and achieve targeted solar energy capacities. (20GW and 3GW, respectively, added in 2023).
- **Wind repowering:** Wind repowering requires replacing older turbines with newer ones, which includes micro-setting the plant according to new turbines, changing the grid lines, and reinstallation of wind masts. The activity is labor and time-intensive compared to new farm development but can be a feasible option since these are already identified efficient wind sites. There are government policies in place to facilitate repowering and sites could come up in 3-4 years.
- **Impact of re-introduction of reverse bidding:** Reverse bidding back in the day drove price discovery down to unviable levels of Rs 2.40/unit for power

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developers, mostly IPPs equipped with conventional power generation systems. The scenario today is different with a better infrastructure in place and efficient machines that enable viability at reasonable unit costs. Reverse auction is unlikely to repeat the scenario seen in 2016-17 since there is a greater focus on adding incremental capacities. The move can impact IPPs but not OEMs.

- **State Electricity Boards (SEBs) acceptance of RE:** Investments in grid connectivity, transmission lines, and industrial sites have turned SEBs adaptive towards RE. Moreover, SEBs have come around realising that endless dependence on conventional sources of power, like thermal energy, is not feasible. Thermal power plants, which take years to build and commission, do not run beyond 60-70% PLF due to coal availability challenges in India. The availability of merchant power further facilitates grids to source power directly from IPPs.
- **Capex requirement:** Setting up solar cell capacity is highly capital-intensive and requires skilled manpower. It can cost ~Rs 10bn/GW to set up a solar cell manufacturing unit and requires technical expertise equivalent to that of setting up a semiconductor plant. India must integrate silicon ingot and solar wafers manufacturing to beat low-cost imports. Setting up a wind turbine manufacturing capacity could attract a capex outlay of around Rs 80-90mn/MW, including land cost and common infrastructure.
- **Module price outlook due to import ban:** Module prices would remain volatile depending on import policies. The recent import ban is conditional, and a 100% ban implementation would take longer due to high import dependence.
- **View on land requirement:** Setting up a solar plant requires a minimum of 2.5-3 acre/MW land which is completely blocked for the next 20-25 years. A wind farm requires 1.5-2 acre/turbine land but the area surrounding the tower can be utilized for other purposes such as agriculture. Land availability is not a bottleneck, especially in the case of wind power, with only 15-20% potential explored so far, leaving significant headroom for growth.
- **Rooftop solar:** Increasing adoption of rooftop solar mitigates the land block challenge in the case of solar power. Albeit at a nascent stage, planned investments of ~Rs 1,800bn in rooftop solar presents a big opportunity for OEMs and IPPs.
- **Opportunities in the renewable value chain:** Lithium-ion batteries present growth opportunities in the battery storage segment. These batteries cost almost twice as much as conventional lead acid batteries but have a life of almost 3x. Single metering systems, which are now compulsory for solar and wind farms, would drive smart meter demand for not only new installations but also existing turbines and solar sets.
- **Growth beneficiaries:** The RE space in India needs faster deliveries and installations to meet capacity targets. End-to-end solution (turnkey players) providers in both the wind and solar spaces will benefit from the sector growth going forward.

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