INDIA Entrepreneur

Decoding India's Energy Future For the Next Decade

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India's road to net-zero by 2070 is a colossal undertaking that will fundamentally alter the country's energy architecture. A recent report by The Energy and Resources Institute (TERI) highlights the scale of the challenge and the pace at which the transformation must unfold. The report estimates that electricity demand could exceed 5,000 terawatt-hours by 2050, potentially peaking at 9,362 TWh—levels comparable to today's European Union. Solar energy, the report says, will form the backbone of this shift.

Mohammad Rihan, director general of the National Institute of Solar Energy, underscored the primacy of solar in this shift: "By 2060 we need around 5000 GW, and our climate is suitable for solar. There is no doubt that solar, being the leading source, will also be the dominating source in the grid." Rihan emphasized the importance of thorough potential assessments to address sectoral challenges early and effectively.

The transformation is being driven by a convergence of climate goals, rising energy demand, and evolving technologies. India's updated nationally determined contributions (NDCs), submitted in August 2022, commit to reducing the emission intensity of its GDP by 45 per cent from 2005 levels by 2030 and achieving 50 per cent cumulative installed capacity from non-fossil sources by the same year. Meeting these commitments will require not only rapid expansion of renewable energy capacity, but also a complete rethinking of energy systems.

"The energy demand is expected to outpace our GDP growth rate in the coming years," said Rahul Raizada, partner - Climate and Energy at PwC India. "To fuel this growth we will need all kinds of energy sources." Raizada noted that renewable energy installations are evolving rapidly, moving beyond standalone solar to more complex configurations like solar-plus-energy storage systems (ESS), round-the-clock (RTC) renewables, and peak power solutions. Despite this progress, Raizada acknowledged a renewed interest in coal-based assets due to the lack of immediate base-load alternatives, with more than 20 GW in tenders already on the table.

Green hydrogen is emerging as a critical piece of the puzzle, particularly for decarbonizing heavy industry and long-haul transport. Raizada pointed out that the combined value chains of solar, battery storage, and green hydrogen could attract more than $350 billion in capital investment by 2030. Battery energy storage systems (BESS), projected to reach 236 GWh by 2032, will play a vital role, bolstered by mandates like 4 per cent storage integration by 2030 and capex support schemes.

Mukesh Gupta, co-founder of Maxvolt Energy, painted a broad picture of the transformation. He identified several driving trends: an expanding renewable footprint, escalating energy demand, strong policy support, plummeting costs, and the growing importance of storage and decarbonization. "India's energy sector is expected to experience significant growth in the next decade, with a focus on renewable energy and a shift away from fossil fuels," Gupta said. He emphasized that this shift is not just about supply; it's also about systemic evolution from infrastructure upgrades to international cooperation and the scaling of electric mobility.

While India's ambitions are clear, the path forward is filled with variables from storage economics and grid integration to policy consistency and private sector execution. The report stresses that the next two decades are not just a transition, but are a complete rebuild.

According to **Dr. Faruk G. Patel, chairman and MD of KP Group,** India's energy transition is not merely promising, it is pivotal. **"We are standing at the threshold of an energy revolution that will reshape our economy, environment, and global position,"** he said. Dr. Patel highlighted decentralization, digitization, and hybridization as defining characteristics of the next decade. From rooftop solar and blockchain-based trading to floating solar and green hydrogen, the coming era will demand innovative integration and inclusive infrastructure development.