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India has set ambitious medium- and long-term renewable energy targets to counteract the adverse effects of climate change, one of them being the commitment to increase the share of its renewable power capacity to 50% by 2030. After going through multiple hype cycles, hydrogen has now finally found its moment under the sun. Governments and private stakeholders are keen on framing policies and funding projects utilizing its favorable properties, namely high specific energy density and clean emissions.

According to the BP Statistical Review of World Energy, India imported around 45% of its energy requirement of 35.4 EJ in 2021–22. India imported 212 Mt of crude oil and 31 billion cubic meters of natural gas, amounting to nearly USD 114 billion as per the statistics released by the Ministry of Petroleum and Natural Gas. Further, the Government in response to a question in the parliament has stated that India imported 209 Mt of coal to meet its fuel and feedstock demand, of which coking coal is 28% (used in the steel industry). In addition to causing significant strain on the exchequer, the imports are subject to geopolitical dynamics. This necessitates the need to develop a significant degree of energy independence.

India released its green hydrogen policy (production of H2 using renewable sources) with a vision to use hydrogen in the industry as fuel and feedstock to meet its climate targets and insulate itself from the shocks of dynamic geopolitical situations. Presently, India consumes around 6 Mt of hydrogen (produced using fossil fuels), the major demand centers being refineries and fertilizers (ammonia). The demand is expected to rise to 19 Mt by 2050 according to a report by the Center for Study of Science, Technology, and Policy (CSTEP), with newer applications of green hydrogen in steel production, long-haul transport, and the city gas distribution network. Considering that India is endowed with vast solar potential, it is envisaged that the electricity required for electrolysis can be produced through decentralized solar plants. The waiver of interstate transmission charges is expected to make the production of green hydrogen economical. The concept of green hydrogen hubs, or hydrogen valleys, in designated locations around the country, is expected to develop the entire value chain of hydrogen—production, consumption, and intermediate storage and transportation—under a single umbrella.

The challenges that need to be addressed are the rapid and economic scaling up of renewable energy infrastructure in the country. Assuming that all hydrogen is green in 2050, India will need a total of roughly 1000 BU of electricity, which is nearly equivalent to its present electricity consumption. India's total renewable generation for 2021–22 was 171 BU, as per CEA, which is enough to produce 3.4 MT of green hydrogen. To summarise, it will take more than a shiny day and a multitude of arrayed solar panels for India to be energy-independent without compromising on the quality of life.

How Solar Rooftop Phase II Extension Can Accelerate India's Lagging Rooftop Market?

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The necessity for the extension of the MNRE's Rooftop Solar Phase II Program need not be overemphasized. Reasons are aplenty viz., recently launched National Portal for Rooftop Solar, a significant amount of unutilized subsidy and incentives, country gearing up for scaling implementation of rooftop solar, banks stepping up funding for rooftop solar, emerging viable storage solutions, progressive DISCOMs promoting rooftop solar, increasing quality supply and service providers, etc.

A quick glance at the current status of MNRE's Rooftop Solar Phase II Program shows that under Component A, MNRE has sanctioned 3 GW against the target of 4 GW, and under Component B, MNRE has released INR 300 Crs as incentives for DISCOMs for annual incremental rooftop solar installed capacities.

Recently, our Hon'ble Prime Minister, Shri Narendra Modi launched Mission LiFE – Lifestyle for Environment which is expected to be an India-led global mass movement that will nudge individual and collective action to protect and preserve the environment. Rooftop solar for the residential sector is undoubtedly one such individual and collective action. Citizen-centric actions such as rooftop solar for meeting individual power needs will go a long way in meeting India's updated Nationally Determined Contribution (NDC) submitted to UNFCCC in August this year.

The State of Gujarat has led the example of empowering its residents and has democratized the use of solar energy through its SURYA – Surya Urja Rooftop Yojana. Gujarat has enabled the installation of over 1.2 GW in the residential sector by matching MNRE subsidy with state subsidy which led to an accelerated implementation. Gujarat has empanelled over 700 rooftop solar vendors to meet the demand aggregated through exemplary outreach activities and awareness creation besides a unified digital platform and a dedicated DISCOM workforce. Other determined States can replicate Gujarat's success by incorporating the best practices. Gujarat's and India's first solar village, Modhera also showcases how the entire residential consumers could be powered through rooftop solar. Kerala, Rajasthan, Haryana, and Uttar Pradesh are other top four states which have emerged successful in enabling the creation of an ecosystem for rooftop solar growth in the residential sector.