Power 4 Min Read

Why India needs a dedicated scheme on distributed-renewables-powered EV charging

Meeting this demand through grid-based power—more than 75 per cent of which is currently generated through coal and gas—will produce additional emissions of 11–22 MtCO2 per annum, thereby undermining the environmental benefits of EVs and straining India's power grid.

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India's clean energy transition is at a pivotal stage, with several initiatives underway to take the nation closer to its goals of installing 500 GW of renewable energy (RE) capacity by 2030 and attaining net-zero emissions by 2070. The Ministry of New and Renewable Energy (MNRE) has introduced schemes such as the *PM-Surya Ghar Muft Bijli Yojana* and the *Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM)* scheme to decarbonise the residential and agricultural sectors, respectively, by incentivising large-scale adoption of renewables.

However, decarbonising road transport, which accounts for almost 12 per cent of India's energy-related emissions and is a major source of urban air pollution, remains a critical challenge. Rapid adoption of electric vehicles (EVs) offers a promising solution, but the true potential of EVs cannot be realised unless they are powered by clean energy.

Under the EV30@30 campaign, India aims to reach a 30 per cent sales share for EVs by 2030. It is estimated that achieving this target will result in an additional electricity demand of 15–30 TWh annually, with a substantial rise in peak demand. Meeting this demand through grid-based power—more than 75 per cent of which is currently generated through coal and gas—will produce

Charging EVs through RE, especially distributed renewable energy (DRE), can be instrumental in reducing emissions by minimising the reliance on grid-based electricity. In this context, our analysis indicates that by 2030, around 10 to 20 GW of RE capacity dedicated to EV-charging infrastructure will be needed to meet the additional electricity demand accompanying the achievement of the EV30@30 target. This can be sourced primarily through DRE.

In addition to the benefits that come with any RE source, DRE, by generating power closer to consumption points, reduces transmission and distribution (T&D) losses and alleviates grid congestion. As EV adoption increases, DRE can play a key role in meeting the anticipated rise in daytime peak demand caused by charging activities. Further, integrating DRE sources with smart charging and demand response systems can enable dynamic management of charging patterns, optimising grid stability and maximising green energy utilisation.

For the large-scale adoption of DRE-powered EV charging, looking into its financial viability is crucial. While high upfront costs of DRE installations

To illustrate, a recent report by Deloitte India and GIZ says that the levelised cost of electricity (LCOE) for public EV charging through grid power is currently INR 13.97/unit in Bengaluru. This is expected to increase as the public EV-charging tariff of Bangalore Electricity Supply Company Limited (BESCOM)—a prominent component of LCOE and considerably subsidised at present at INR 4.5/unit—is likely to increase over time. According to the report, the LCOE for solar-PV-powered EV charging under the self-financing model with net metering is INR 13.53/unit, which makes it cost competitive.

To harness the potential of DRE for EV charging, MNRE can bring in a targeted scheme that pushes for DRE-based EV-charging infrastructure. The first key component of the scheme could relate to incentivising DRE-powered public charging stations through capital subsidies or viability gap funding to offset DRE installation costs, tax benefits for charging-infrastructure providers, and low-interest loans to facilitate affordable financing. Such government support can address the issue of high initial installation cost of DRE systems, ensuring their financial viability and encouraging widespread adoption.

Additional subsidies could be considered for rural areas, where the grid infrastructure is often unreliable, and this can be leveraged to expand the EV-charging infrastructure along the highways. By providing additional subsidies for installations in these regions, the government can boost EV adoption, encourage entrepreneurial spirit, and foster inclusive growth. DRE-powered public charging would also shield consumers from the rising grid electricity tariffs, creating a win-win scenario for all stakeholders.

The scheme's second component can look at incentivising residential and

systems with the EV-charging points at carports or commercial parking facilities. Further, tax benefits similar to those currently available to individuals for buying EVs can be considered for installing personal DRE systems for EV charging.

Net-metering benefits can also be provided to enhance the scheme's financial viability, and emerging market mechanisms like vehicle-to-grid (V2G) and blockchain-based peer-to-peer (P2P) trading can also be included.

Finally, for ensuring active participation of distribution companies or DISCOMs, the scheme could include a renewable purchase obligation (RPO) component on DRE for EV charging. The RPO targets would require increasing DRE installations, which would spur further investments.

Transitioning to electric mobility is crucial for realising India's net-zero goals by 2070, but this transition needs to be fully green and sustainable. The proposed scheme for DRE-powered EV charging, when accompanied by diligent research and efficient implementation, can serve as a catalyst for this transition.

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