

# Bolstering Rooftop Photovoltaic Uptake in Karnataka



Center for Study of Science, Technology and Policy

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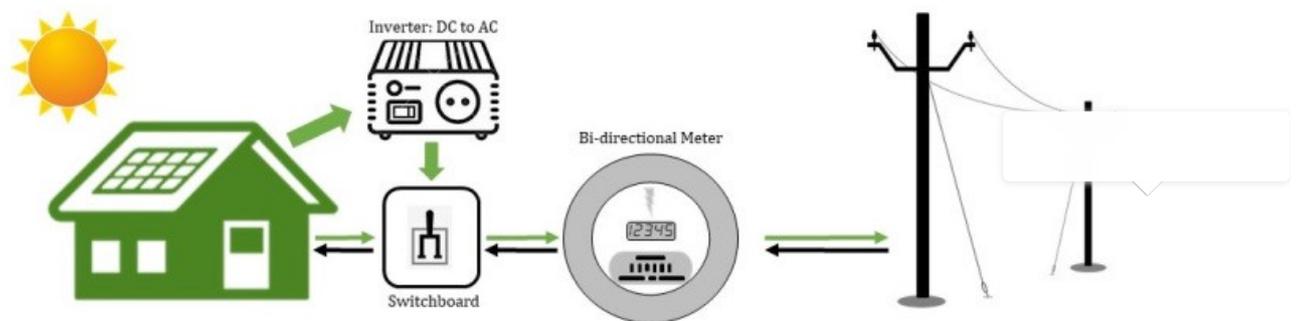


Rooftop Photovoltaic (RTPV) systems are one of the champions of decentralised distributed clean energy generation. They reduce system congestion and distribution losses in urban contexts due to localised generation and consumption. Despite these advantages, India's RTPV sector has struggled to take off; only 2 GW of solar capacity out of the cumulative 22 GW target of have been installed in the country till date, according to CSTEP, the Central Electricity Authority and Industry Market Analysis. Unstable policy regimes in most states, arising out of the weak financial health of most distribution companies (DISCOMs), lack of accurate information for prospective consumers and higher capital costs are the primary deterrents to RTPV uptake.

Karnataka, a state with high solar potential and an ambitious RTPV target of 2.3 GW for 2021–22, has only 125 MW installed so far, according to the Energy Department of the

Government of Karnataka. Although the state offered one of the highest net-metering tariffs for RTPV, uptake has still been sluggish. There needs to be a concerted effort from both central and state governments to enable higher RTPV penetration by reducing costs and making the economics more amenable to both consumers and DISCOMs. There is also a need to accurately assess the RTPV potential in cities and towns considering the shading aspects of obstacles which negatively impact generation. This accurate assessment can allow prospective consumers to make informed investment decisions in RTPV.

The Center for Study of Science, Technology and Policy (CSTEP) entered into a tripartite agreement with Bangalore Electricity Supply Company (BESCOM) and Karnataka Renewable Energy Development Limited (KREDL) to promote RTPV in Bengaluru. CSTEP is using Light Detection and Ranging (LiDAR) technology to obtain aerial images of the city. A helicopter, coupled with a LiDAR system, flew over the city to map the RTPV potential. The flights covered almost 1,100 sq. km and captured high-resolution images, including topography, buildings and trees. These data sets will be used to generate individual digitised rooftops, which will help CSTEP determine the shadow-free area of each rooftop, by taking into account the shadow cast by neighbouring obstacles. This visualisation will be integrated into an app/Web tool, which can be used by building owners to generate accurate RTPV system designs along with the associated business cases by obtaining consumption data from BESCOM.



Connection between Central Grid and RTPV System

The outputs of the tool will also be used to identify the most suitable rooftops in the city, based on a Multi-Criteria Analysis (MCA) ranking technique. The highest-ranked government, commercial, industrial and institutional establishments will be chosen for installation of RTPV systems. These buildings will be aggregated and large-scale tenders (around 200–600 MW) will be issued by BESCOM, in stages. This will lead to a reduction in costs and the net/gross-metering tariffs. An implementable roadmap will be developed based on these analyses for BESCOM to reach the 1 GW target for 2021–22.

Similar scientific and structured approaches, with aerial imagery techniques, can be used across the country. Robust roadmaps can be developed for RTPV implementation

with information being provided beforehand to consumers, developers and DISCOMs — the national target of 40 GW of RTPV by 2021–22 will not seem daunting anymore.

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