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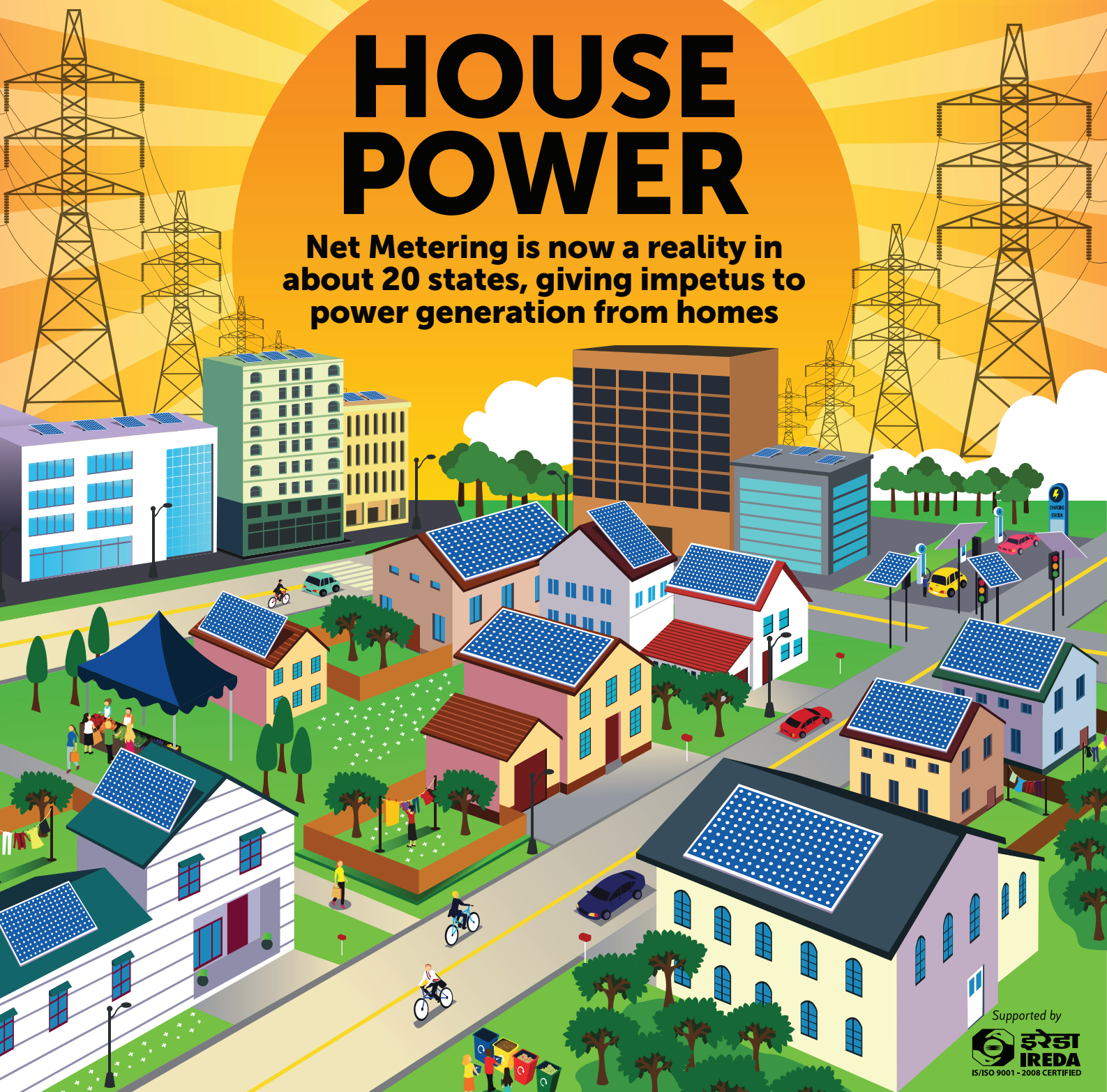
Your guide to Renewable Energy

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HOUSE POWER

Net Metering is now a reality in about 20 states, giving impetus to power generation from homes



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Civilizations across the globe worship the 'Sun God', who provides energy without any technological intervention. The omnipresent Sun gives an equal opportunity to everyone, without discrimination and bias. *Dr Sagarkumar M Agravat* takes a look at the 'Gandhinagar roof-top programme, which was launched on a pilot basis



Solar photovoltaic technology has recently come to our rescue and provided us with an opportunity to generate required electricity at the location of our interest. With an objective of providing an opportunity to citizens of India and allowing them to contribute to the ever-growing demand for power, the Government of Gujarat in the year 2010, took the challenge of tapping solar power and launched the 'Gandhinagar roof-top programme.'

Being the first pilot demonstration, the project had to face many challenges, like the acceptance of solar PV installations on the roof-tops by owners in residential and commercial sectors, ability of the owner to execute the installations in their respective areas, readiness to invest and own the installations, funding arrangements, sale of power and revenue model, permissions and approvals, operation and maintenance along with appropriate system architecture etc.

The stakeholders for this Programme were: (i) government administrative departments, (ii) government departments

lending their roof/ terrace for installation, (iii) home owners, (iv) state electricity regulatory commission, which is Gujarat Electricity Regulatory Commission (GERC) in this case, (v) local distribution utility, which is Torrent Power Limited (TPL) in this case, (vi) /financial institutions, (vii) Project Developers, and (viii) research and development institutions.

PROGRAMME STRUCTURE

The Energy and Petrochemicals Department, Government of Gujarat, was the proponent of this Programme, while the Gujarat Energy Development Agency (GEDA) was the nodal agency. Gujarat Energy Research and Management Institute (GERMI) structured the Programme and coordinated the bid process for selection of project developers. Gujarat Power Corporation Limited (GPCL) was the Project Implementing Agency. The International Finance Corporation (IFC) was hired as the transaction advisor for this programme.

The programme was structured in such a way that two project developers were selected to develop 2.5 MW of cumulative solar photovoltaic rooftop installations through tariff-based competitive bidding. In order to comfort the project developers, the Government of Gujarat assured terrace space for hosting 80 per cent of the net installations (i.e. 4 MW) on government building. It was up to the project developers to secure the terrace space for the other 1

MW, to be installed on private residences.

The local distribution utility, which is Torrent Power Limited (TPL) in the present case, had to buy the solar power generated through the rooftop solar photovoltaic systems at the tariffs bid by the successful project developers. The project developers and TPL were bound into a contract through individual Power Purchase Agreements (PPA). As the tariff bid by the successful project developer is higher than the tariff approved by GERC, the PPA, which is GPCL in this case, had to provide the difference between the successfully bid-tariff and the GERC regulated-tariff or the viability gap, to the project developer throughout the life of the project. The project developers and GPCL were bound into contracts through individual 'Project Implementation Agreements' (PIA).

It was decided that the project developer would pay the terrace owner a 'green incentive' instead of a flat rent. The floor price for the green incentive was kept at `3 per kWh generated from the rooftop solar photovoltaic system. This incentive was generation-based in order to motivate the terrace owner to participate in the programme. The project developers and terrace owners were bound into contracts through individual 'Green Incentive Agreements'.

Two companies, namely Azure Power and Sun Edison were selected as project developer through competitive bidding and

Gandhinagar roof-top program has carved a path which leads to realising the concept of consumer participation in the grid



allocated 2500 kW each.

To simplify and expedite the accounting process, a separate AC meter was installed with each installation and electricity was metered for payment to project developer and in-turn providing roof-rent to building owners. This is different from the presently practiced bi-directional meter, wherein the roof-top owner himself invests and earns from his own electricity.

A number of concerns were expressed by various authorities regarding the issue of potential damage to the water proofing of the roof as well as suitability of the roof-structure to adopt additional load of solar PV installations. In order to resolve this issue, non-penetrating type of foundations were designed. Also, these structures would have a lower tilt than ideal. This compromises electrical generation but helps in minimising impact of wind load over terrace to a greater extent.

These installations could be installed on very small terraces which can host around 1 – 2 kW solar PV plants, as well as clusters on government / commercial complexes, which can host as large as 900 kW worth of solar PV plant. Many institutes like Gujarat Energy Development Agency (GEDA) and Gujarat Power Corporation Limited (GPCL) came forward to install more solar PV plants on their roof-top. Currently, Gandhinagar hosts nearly 7500 kW solar PV plants through roof-tops.


Following the success of Gandhinagar roof-top program, five more cities in Gujarat viz. Vadodara, Surat, Bhavnagar, Rajkot and Mehsana are under phase-wise execution. Currently, Vadodara roof-top solar program is underway. Various state governments across India are now executing similar programs in their respective states on larger capacity.

●● WAY FORWARD

There's a need for new innovative solutions to

effectively tackle legal, financial, technical and administrative challenges in simplest possible manner. There is also a need for devising new incentive mechanism to encourage roof-top solar PV in new buildings. The industry may be encouraged through appropriate mechanism for their captive consumption, which shall reduce the burden of subsidy/ incentives on the Government.

There is a greater need to create skilled man-power to satisfy the need to execute massive roof-top installations that the Government of India is targeting. Service and supply chains need to be strengthened. Development of "DIY" solar kit with standardised package can help rapid expansion of roof-top projects. The role of Akshay Urja shops can be redesigned and broadened to supply DIY kits, enlist trained solar PV installers for installation, service support etc. Existing meter-readers can be educated and trained for installation, service and repairs. The youth can be encouraged to adopt solar as their career and embrace solar entrepreneurship as a career option.

The Gandhinagar roof-top programme has carved a path which lead to realising the concept of consumer participation in the grid. It will be very interesting to witness and contribute in the paradigm shift which the Indian power sector is currently experiencing. 

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(Views expressed by the author are personal)

