



Partnership to Advance Clean Energy - Deployment (PACE-D) TA Program

A Programmatic Approach to Incentivizing Large-scale Rooftop Solar In India

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The PACE-D TA Program aims to facilitate development of a conducive ecosystem which addresses key structural issues in clean energy deployment

- 5-Year, USD 19.5 million PACE-D Technical Assistance Program
- Main US-India Clean Energy program (2012-2017)
- Being implemented by Nexant and a consortium of Indian and U.S. partners.
- Three components of the program:
 - Energy Efficiency
 - Renewable Energy and
 - Cleaner Fossil







Haryana notifies **DSM Regulations** in State Gazette

Karnataka prepares **RE** and **EE policy**

Forum of Regulators is expected to approve the Smart Grid Regulations shortly

Rajasthan ERC invites

public comments on Net

Metering Regulations

BEE in process of **technically updating** ECBC 2015

Clean fossil activities result in **68,000 MTCO2e emissions reductions** through Heat Rate Improvement



MNRE allots 5 MW to Indian Oil for **solar rooftop projects**

Indian RE Federation (IREF) establishes partnership with ACORE

BESCOM initiates solar roof-top program

NISE provides in-principle approval to establish **Solar Energy Training Network**

IH2PA established

Chandrapur budgets USD 9.6 million for **Heat Rate Improvement** activities

More than **13,000 person-hours of training** provided across the clean energy spectrum





Renewable Energy is Green, Clean & Sustainable

India has very ambitious plans for Solar Rooftop Scale Up Plan – 40 percent of solar or almost 3 percent of power to come from rooftops







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At this rate India will be one of the largest solar rooftop markets across the globe

Country	Solar PV Installed Capacity (GW)	Share of Rooftop PV (%)	Mechanism
Germany	~38	~60%	Gross Metering
U.S.	~20	~40%	Predominantly Net Metering (few states with gross metering)
Japan	~24	~35%	Started with Net metering but shifted to Gross (2012)
Australia	~4	~80%	Net metering + commercial adjustment of excess energy generation





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The Indian solar rooftop space has just started moving towards market transformation phase from a pilot phase

- Several off-grid rooftop PV projects across the country for captive consumption
- RESCO model is an emerging segment
- Grid connected rooftop PV has started to gain traction over last few years (commissioned capacity ~ 50 MW)
- Around 20 states have issued Net-Metering regulations for rooftop PV



Present day key challenge for the solar rooftop sector – addressing structural gaps in the eco-system (appropriate regulations, interconnection procedures, capacity building, financing guidelines, lease agreements, new and customized business models) for scale up.





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The Gandhinagar Solar Rooftop Program leveraged public funding address critical eco-system issues like rooftop area, financing, standards etc.





While also creating a transaction structure which allows net inflow of funds to the government while promoting more expensive solar rooftop projects



Assumptions : PLF 18%, Auxiliary Consumption : 0.25%, Degradation : 1%; Present Value assuming discount rate of 10.74%





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However a number of large projects developed after Gandhinagar are facing delays or capacity downsizing due gaps in the market

S No.	Project/ State	Mechanism/ Business Model	Benefits to Rooftop Owner	Benefits to Off taker/ Utility	Status
1	PPP Gandhinagar – 5 MW	Gross Metering (80% Govt. Roof)	Rs. 3/Kwh of solar energy	Solar Purchase Obligation (SPO)	Successfully Commissioned
2	PPP Gujarat 5 cities – 25 MW	Gross Metering	Nil	Nil (SPO already met)	Only 1 bid out of 5
3	PPP Madhya Pradesh – 5 MW	Gross Metering (Govt. Roof)	Nil	Nil (SPO already met)	Size reduced to 2 MW – Govt. departments un willing to provide roof space
4	PPP Odisha – 10 MW	Net Metering (Govt. Roof)	Bill Saving	SPO	Under implementation





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These gaps are manifesting themselves as barriers for rooftop development – leading to either limited investments or delays in execution







Short term solar rooftop development requires two interventions

- Bringing in greater standardized processes and structures for simple and efficient interconnection of rooftop projects
- Leveraging public incentive schemes for the:
 - Creating of large scale projects which are economically more palatable for the market while
 - Identifying and leveraging rooftop deployment opportunities across sectors with high energy costs and high replication potential
 - Creating learning opportunities amongst stakeholders
 - Using these scaled up opportunities to address structural barriers in the market



A comprehensive standardized approach for policy, regulation and operational guidelines for deployment of Solar Rooftop







A programmatic approach to developing large scale projects which creates Interest amongst consumers, lowers costs, improves processes and standardises procurement processes

Scale \rightarrow Lower costs, access to finance, better quality lowered risks \rightarrow participation interest from high quality players



Overall Program Design, Feasibility, Business Model

Thank You

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