

# **Solar PV Rooftops in India:** *need to incentivize self consumption with net metering*

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Round-Table Discussion on Promoting Rooftop Solar Electricity Generation and  
Domestic PV Manufacturing

by Pune International Centre and Prayas Energy Group

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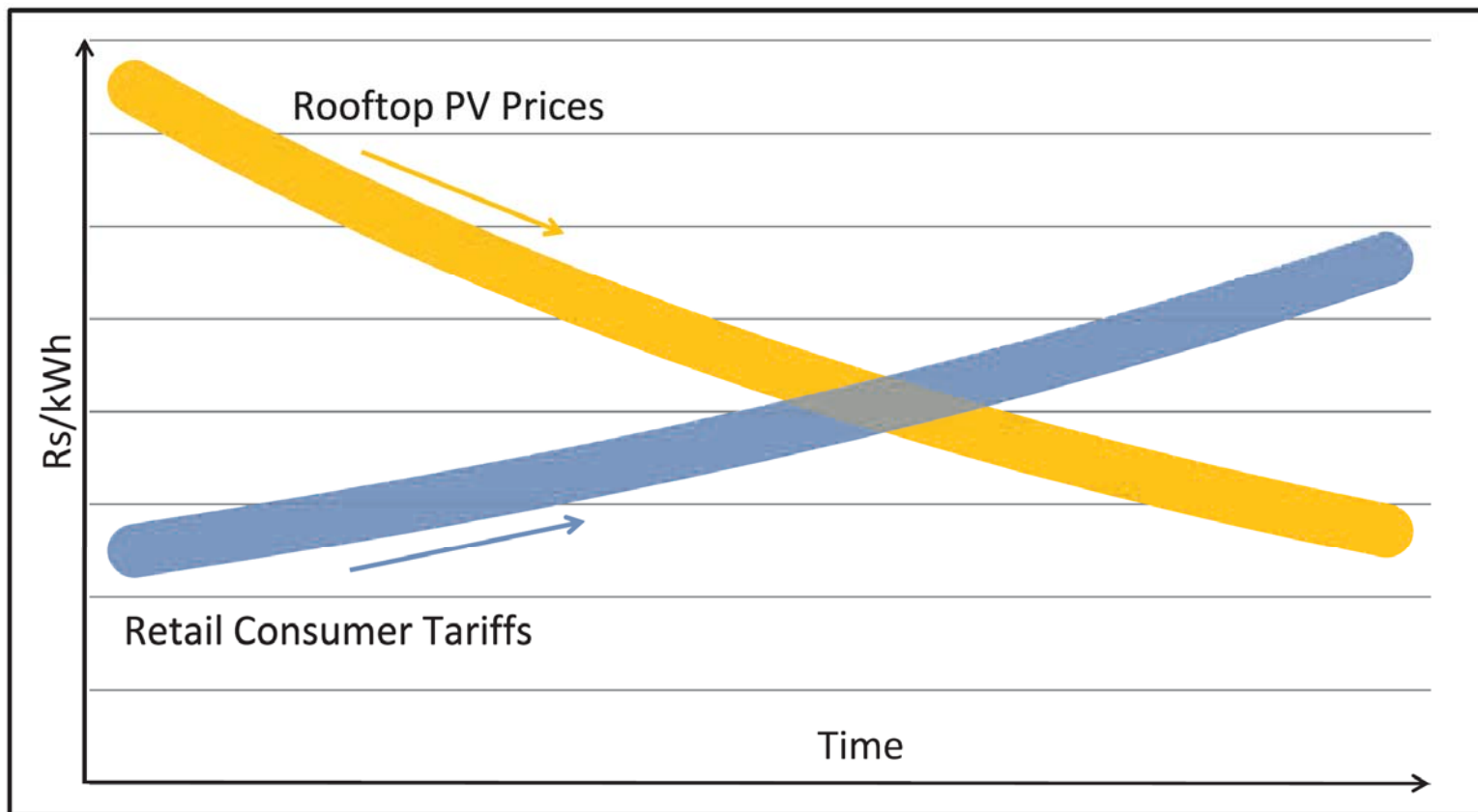


# Outline

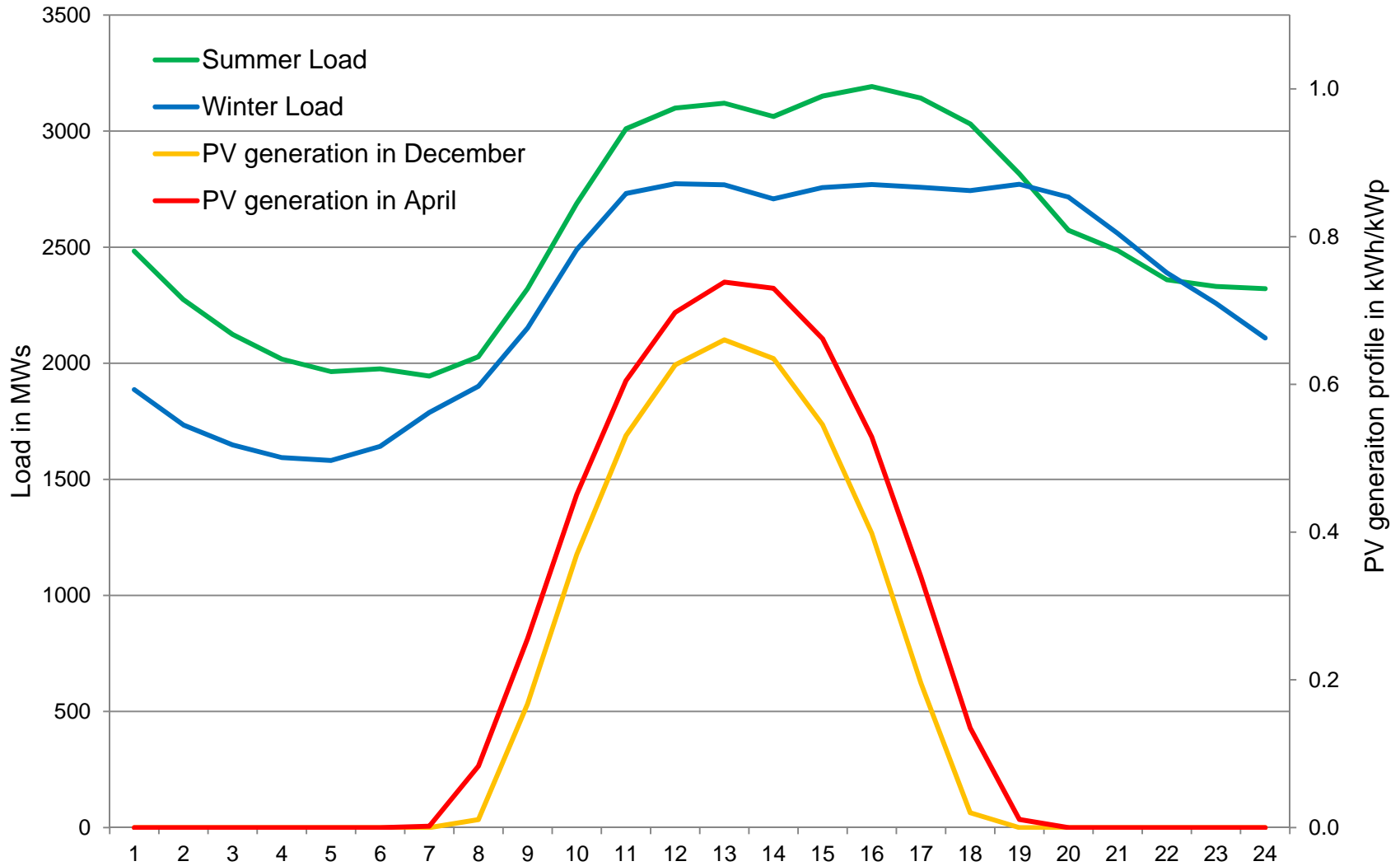
- Why rooftop solar?
- The Indian Experience thus far
- Challenges of Feed in Tariffs
- Net Metering for self consumption
- Way Forward

# Why rooftop solar PV ?

**Benefits of RFTV:** Lower T&D losses; low gestation time; No additional land requirement; local employment; Improvement in tail end voltages and reduction in system congestion.



## Mumbai summer and winter load curves and PV generation profiles in April and December



# Indian Experience and Initiatives

RFTV potential – 20 GW to 100 GW; JNNSM: FIT and Net Metering

State	Policy Highlights
W. Bengal	Net metering for 2-100kW, 16MW rooftop and small installations till 2017.
Gujarat	FIT/sale to utility model, 5MW rooftop in Gandhinagar, 5 more cities to follow (Bhavnagar, Mehsana, Rajkot, Surat, Vadodara).
Kerala	Off-grid rooftop scheme (target 10,000 rooftops ~10 MW) with state capital subsidy. 1 kW panel + inverter+ 7200 Wh Battery bank. Consumers can choose from 14 empanelled companies
Karnataka	Net-Metering, 250 MW till 2014 as mentioned in policy. First program in 5 cities. (Bangalore, Mysore, Mangalore, Hubli and Gulbarga) projects of two sizes – 0.5 kW (1297 nos) and 1 kW 646 nos) totalling to 1.3 MW.
SECI	Total allocation 10 MW – Delhi, Bhubaneswar (1 MW each), Gurgaon, Chhattisgarh, Bangalore, Chennai (2 MW each). System size – 100 - 500 kWp, each bidder can bid between 250 kW and 2 MW capacity. 30% capital subsidy
T. Nadu	Generation Based Incentive model, 50 MW till 2015, details unclear.



# Limitations of FITs

- Difficulty in estimating appropriate tariffs
  - Paucity of reliable up to date information in public domain
  - Fast changing dynamic market
- Higher burden on the utility
  - Smaller system size with relatively higher tariffs
- Higher M&V and Governance challenges
  - Weak metering (Pune urban circles ~11% meters in all segments are faulty or have zero reading or average billing)

# Tariff for commercial and residential segment

Energy charges (Rs./kWh) in major cities; for highest use slabs						
Consumer category	Bengaluru	Hyd.	Kolkata	Mumbai	New Delhi	Pune
Domestic	5.6	7.25	7.75	5.30 - 10.61	6.4	8.78 - 9.50
Commercial	7.2	7	7.8	5.05 - 10.91	7.25 - 8.50	8.44 - 10.91

Many consumer tariffs (in the highest use slab) are very close to solar costs; likely to increase further while solar costs decrease.

Align tariffs of high end usage to reflect solar costs to incentivize shift to rooftop PV, else support for utility finances.

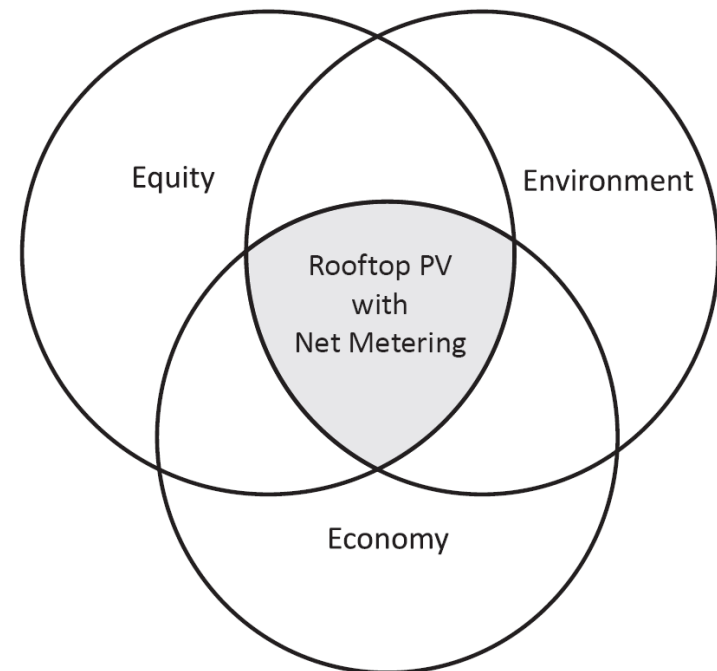
# Self Consumption with Net Metering

- Viability subject to underlying energy charges and electricity usage.
- Utility should provide grid connection at LT level (alleviating need for a battery) with energy banking facility and allow for feeding in of excess generation into grid.
- Monthly billing cycle on net usage; roll over upto one year to allow system sizing to meet annual energy needs rather than the peak demand.
- No Renewable Energy Certificates for Rooftop PV.



# Aligning equity, economy and environment

- **Equity** – higher incremental costs not passed to all consumers
- **Economy** – cost effective for high use; high tariff consumers while avoiding agency problems.
- **Environment** – no batteries; renewable resources, no land or water.



## Conclusion and Way Forward

- Need for facilitating enabling eco-system, instead of subsidising the system cost through capital subsidies and adding to the budgetary demand, policy should focus on removal of procedural hurdles, permitting, and other barriers, in order to facilitate the quick adoption and deployment of RTPV systems.
- **Forum of Regulators:** Recommend a set of standard guidelines (banking, metering, interconnection, agreements etc).
- **Ministry of New and Renewable Energy:** National Net Metering policy and study to gauge solar RTPV potential in India.
- **Central Electricity Authority:** Grid interconnection standards (finalised, to be notified by MoP).

# The New Green Pune Model

- Govt of Maharashtra should come out with the solar rooftop net metering policy.
- Broad estimate of 15 MW/yr potential considering building construction in last 5 years.
- The city of Pune could take the lead in coming out with a pilot net metering program (~ 5-10 MW) in coordination with MSEDCL, MEDA and PMC.

THANK YOU

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# Extra Slides

- National consultation in New Delhi on net metering in grid solar projects on Dec. 20, 2011.
- “Prepare an action plan for introducing **net metering in commercial and residential roof top solar projects.**”
- “With solar power cost coming down from **Rs. 18/-** per unit in 2010 to **Rs. 8/-** per unit in 2012, it should be possible to allow consumers **feed extra power to the grid.**”
- “Come out with **practical solution** to facilitate the process.”
- Address by Dr. Farooq Abdullah

Source: Presentation by Mr Vaman Kuber, dated 13/3/12



According to Drury, E. et al., “Recent studies have found that residential customers weigh several factors in addition to system prices or revenues when considering a potential investment in PV or energy efficiency products. Social marketing studies have found that energy-related decisions are typically less about motivating customers than helping customers overcome barriers to taking actions that are consistent with their motivations”.