



CSE Webinar on

**Scaling Rooftop Solar: Improving
metering arrangements &
appropriate business models**

3rd November 2025

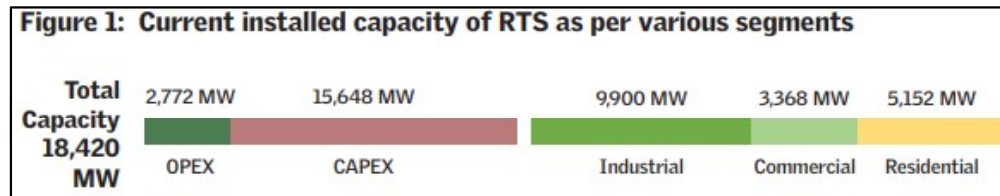
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Rooftop Solar: Background and State of Implementation.

- **Current installed capacity is over 18.4 GW, with C&I at 13.3 GW and Residential 5.1 GW.**
 - Dominant share of CAPEX business models over RESCO/OPEX based
 - Ambitious deployment targets @ 2022, 2027
 - CFA has been a driving factor for residential consumers and electricity costs savings for other users.



- **Multiple Programmes, Policies, and Directives are shaping the RTS markets**
 - JNNSM, Phase I, II and PM SGMBY, and target specific thrust areas.
 - Evolving metering arrangements in states benefitting different categories of consumers.
 - Incentive driven approach; CFA, Green Open Access, attractive FiT.
 - Increase in awareness, declining costs, innovative business models.



Rooftop Solar: Advancing Utility led business models.

- **Prudent for utilities to adopt a technological-facilitation approach**
 - Rapid growth in installed capacity, 4.4 GW in 2021 to 18 GW in 2025 and projections to 30 GW+ by 2027.
 - Changing dynamics of electricity distribution and rising power demand.
 - Ongoing loss of revenue-generating customers to RTS and constrained cost recovery under the existing cost-plus regulation
- **Enabling Utilities to avail revenue benefits from systemic shift to distributed energy generation**
 - Avoided energy costs from power procured from other sources, esp. in meeting peak demand.
 - Operational efficiency via localized T&D losses and deferment of capital expenditures on network infra.
 - New business models and revenue streams with appropriate regulatory and policy alignment.



Rooftop Solar: Consultations on functioning of RESCO RTS

- **CSE's multiple stakeholder consultations:** Thematic enquiry to understand adequacy of current regulations to promote RESCO models.
 - Declining share of RESCO; impact of schemes, tariffs and market perception.
 - Scope of RESCO/OPEX business models; customized business models for various consumers
 - Current operational and financial aspects which hinder adoption.
- **The three most dominant and most emergent implementation challenges arise on;**
 - Demand Aggregation; Project size dictates business viability, data availability on aggregation.
 - Payment Security Mechanism.; cash flow dependent, non-contractual enforcement, grievance redressal.
 - Applicability of a unique business model; Long-term ownership and rentals, customization as per consumer.
- **Institutional facilitation approach by MPUVNL; *Grouping based demand aggregation which addressed;***
 - Information asymmetry ; Virtual Data room with ready information on consumers electricity-use patterns.
 - Achieving cost economics; site-specific tenders instead of capacity, assured payment mechanisms, CFA
 - Operations and Maintenance; revenue tied to optimum functioning of RTS, grievance redressal & facilitation



Rooftop Solar: Findings from consultations and various models.

- **Tariffs realized for RTS systems under MPUVNL model.**
 - Lowest Tariff Rs. 1.38/kWh, with an average of Rs.2.05/kWh based on consumer profiles and grouping for institutions.
 - Credibility of the consumer, i.e. ability to timely pay is a dominant determinant. Tariffs vary on central vs. state.
 - Customized business models enabling ease of business and achieving cost savings.
- **Implementation challenges identified based on site-visits and stakeholder consultations on;**
 - Project Developers; High transactional costs for demand aggregation and payment risks, limited financing.
 - Utilities/SNA; restrictions on metering arrangements, additional administrative costs.
 - Consumers; Trust & awareness, long-term use and ownership, existing low-tariffs.
- **Guidelines for RESCO and ULA models under PM Surya Ghar Scheme;**
 - No mechanism for DA; retains onus of finding new customers on developers.
 - Raises institutional burden; against principle of decentralization, ability of DISCOM to invest in capital-intensive projects.
 - Increases transactional costs for all stakeholders; off-taker risks, PPA standardizations.



Recommendations for advancing RESCO/Utility led business models.

- **Strengthening institutional capacity-building and policy streamlining.**
 - Demand Aggregation; region and segment (e.g C&I) specific DA principles, national data repository.
 - Improving policy confidence; Risks mitigation on contract enforcement & payment defaults, standardization of services and deployment models.
 - Improvements in operational aspects of utilities; own cost-benefit analysis for share of DER in systems, facilitator-based monitoring framework , strong capacity building with focus on revenue enhancing DRE opportunities.
- **Market Development by providing investment and advisory support services.**
 - Clusterisation of RTS projects; group-housing societies, SEZ, Industrial and PSU segments.
 - Reducing risks in RTS markets; Risk assessment matrix factoring contract stability, liability reduction.
 - Enabling existing market mechanisms in RTS; long-term alternate services for revenue maximization via, benchmarking CUF's, rooftop generation data, ancillary services development.
- **Creating financial structures to boost credit-lending in the RTS RESCO Markets.**
 - Credit Extension Mechanism; curating a developer rating system, credit for innovative business models.
 - Standardization of credit extension services; standardization of loan products and documentation for based on business models & PPA types. Uniform procedures for credit access and reducing negotiation times.
 - Domestic low-cost debt financing ecosystem; enhancing credit rating system for developers based on technical competence, bankability of projects.

Discussion paper on KSERC Renewable Energy and related matters 2025 (draft): *Adequate to scale rooftop solar in Kerala?*

- **Frontrunner in RTS adoption in India.**
 - In top five states with 1.5 GW of RTS installations. Potential to integrate 10 GW of solar in state.
 - Highest penetration of solar RTS as compared to total solar installed amongst all states at 81 percent.
 - Flagship business models, SOURA RTS program under RESCO with 3 different models.
- **Regulatory bearings on RTS markets from the new draft rules.**
 - Reduction in net-metering size from 1 MW to 3 kW for all users, and up to 5kW with 30 percent on-site storage.
 - Introduction of net-billing for connected loads above 5kW up to 500 kW.
 - Introduction of gross-metering for connected loads up to 3 MW.
 - Time variable pricing (ToD) of tariffs under 3 different time-zones for all 'prosumers', with energy offset only available during respective time-zones based on a said normalization factor.
 - Feed-in-Tariff rates based on weighted average of SECI determined tenders. Typically, in the ranges of ~Rs 2.10/kWh (net-metering) to Rs. 3.48/kWh (gross-metering).
 - Introduction of grid-support charges @ Rs.1/kW applicable for consumers above 10kW



Regulatory support to enable RTS deployment.

- **Impact on consumers existing and prospective**

- KSEB maintains **99.1** percent of the residential consumers **within 3 kW** loads.
- Net Export tariff; **Rs 2.5/kWh (solar) Rs. 1.33/kWh (peak), Rs. 1.9/kWh (non-peak)**
- Net-import tariffs; Rs. 7-8.50/kWh (for above 5kW) and Rs.5.9-8/kWh (for other consumers), retail electricity tariffs are higher for residential consumers in Kerala.
- Additional monthly expenditures of Rs. **350 to 650 for systems under 5kW**.
- Additional monthly expenditures of Rs. **16300** (10kW), and Rs. **32700** (20kw). Additional costs rise disproportionately with higher sized systems.
- Shifting of consumers towards on-site storage systems for increased benefits, distorts existing business models and payback periods.

- **Agenda for discussion**

- Metering arrangements and their billing provisions aligning with the larger RTS development?
- Exploring alternate existing market mechanisms to integrate storage, utility led or consumer led?
- Transparency from KSERC to remove mis-trust and provide a progressive regulatory architecture, possible impact of introducing similar provisions in other states?



- Thank you

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