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Workshop  
on

“Addressing Barriers to Scaling-Up Renewable Energy”

Session 3:

**Implementation Challenges, Financing Schemes and Innovative  
Business Models for Deployment of Solar Rooftop**

9 May, 2017  
Mumbai

# Contents of Presentation

1. Background and Context
2. Solar Rooftop Targets and achievement
3. Role and Responsibilities of Key Stakeholders for development of Solar Rooftop
4. Financial assistance available for Solar Rooftop PV systems
5. Solar Rooftop Business models
6. Implementation Challenges
7. Issues needs deliberations

# Background and Context

- Revised Targets under JNNSM- **100 GW installed capacity by 2022 includes 40 GW** from Solar Rooftop PV systems;
- Initial phase of solar development focused on Large scale Solar PV projects which has now achieved Grid Parity;
- Now its time to focus on Solar Rooftop Development;
- Solar Rooftop Development -its not just generation capacity addition, it involves no. of issues like
  - Grid Connectivity,
  - Role and Responsibilities of Stakeholders,
  - Third party involvement,
  - Lender's concern,

# Purpose of the Workshop:

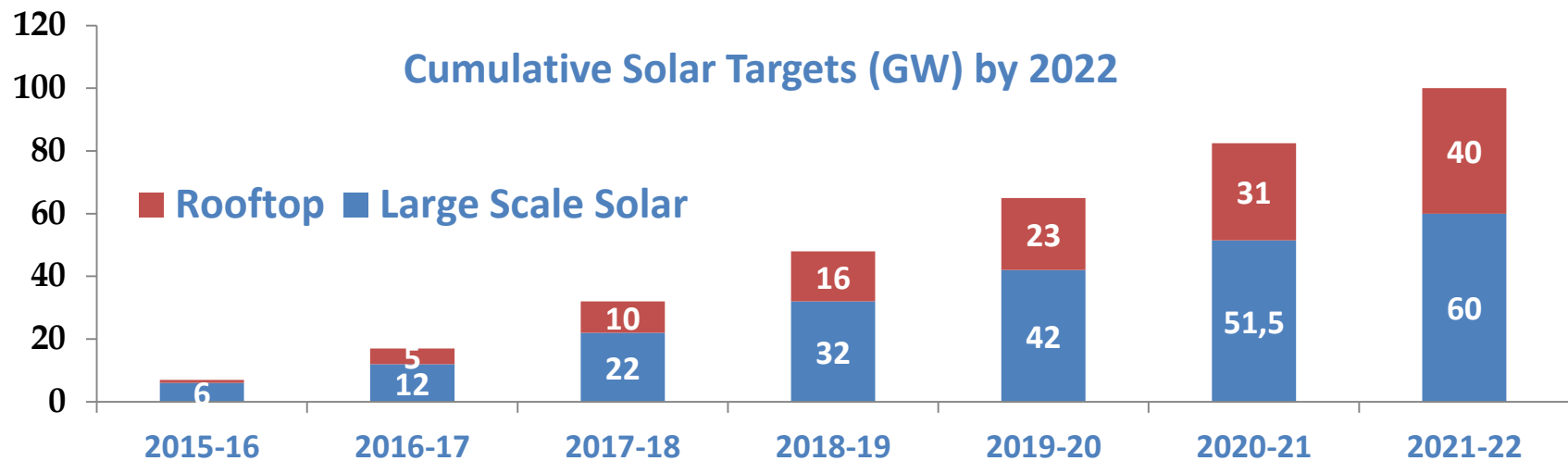
- Identify the challenges /barriers to implement Solar Rooftop Projects;
- Discuss business models to promote deployment of solar rooftop systems;
- Discuss policy, regulatory and technical issues, both at the Central and State level;
- Suggestions for modification of State policies and regulations;
- Frame a feasible plan of action.

# India's solar Targets- 100 GW by 2022

## Category 1: Rooftop Projects (Target- 40 GW)



## Category 2: Large Scale Projects (Target- 60 GW)



**Installed Capacity of Solar Rooftop in India as on 31-12-216 is about 550 MW and 2500 MW capacity Projects are in Pipeline**

# Development of Solar PV

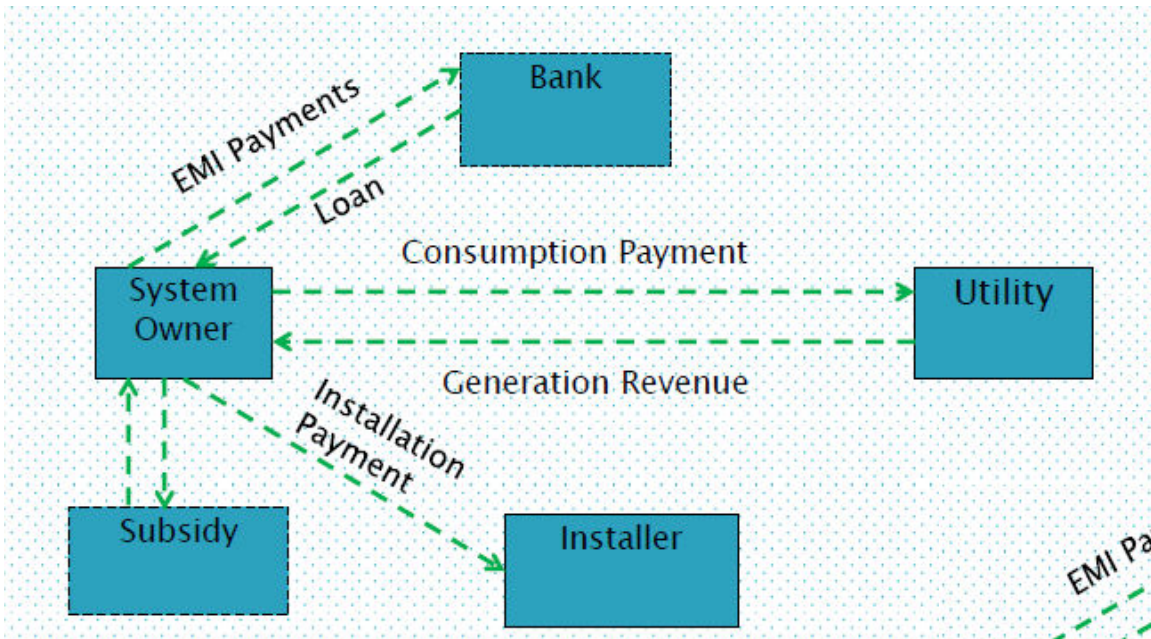
## Solar PV emerged as fastest growing technology over the past decade mainly due to:

- Large scale adoption by Utilities and Private Sector
- Increased awareness of Climate Change hazards
- Energy Security Consideration
- Facilitating policy and Regulatory Framework
- Decline in Solar Energy Generation Cost
- Emergence of New and Innovative Business Models

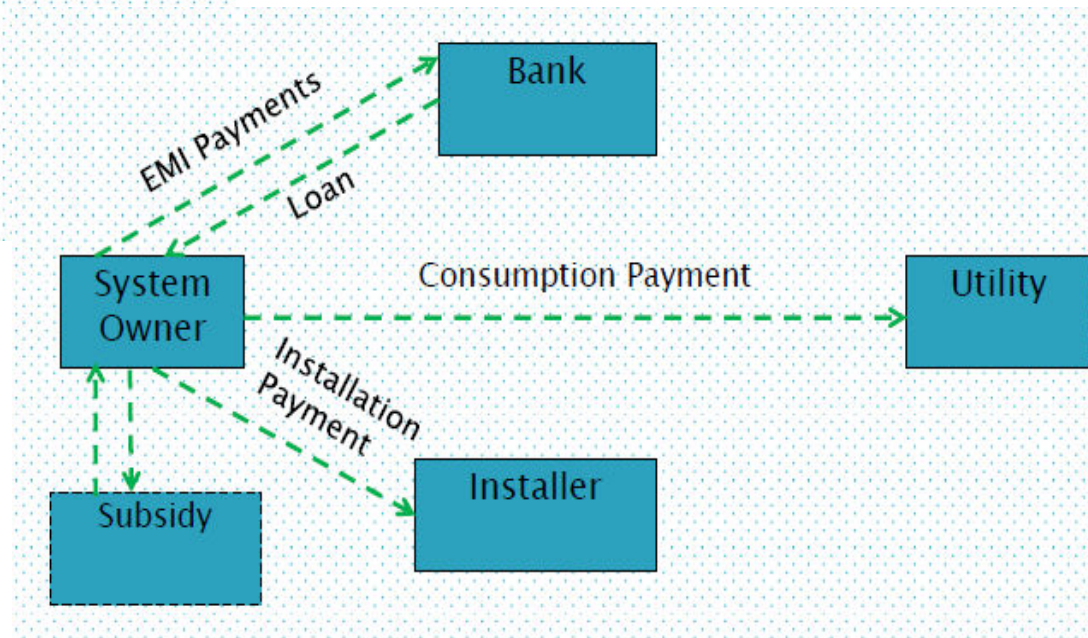


# Self Owned Solar Rooftop Models:

## Gross Metering Model

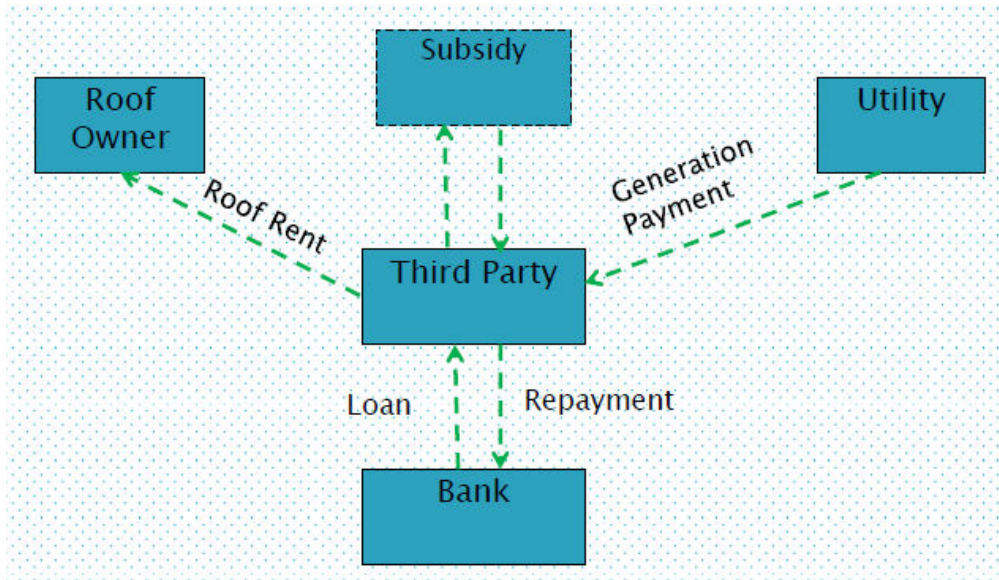


## Net Metering Model

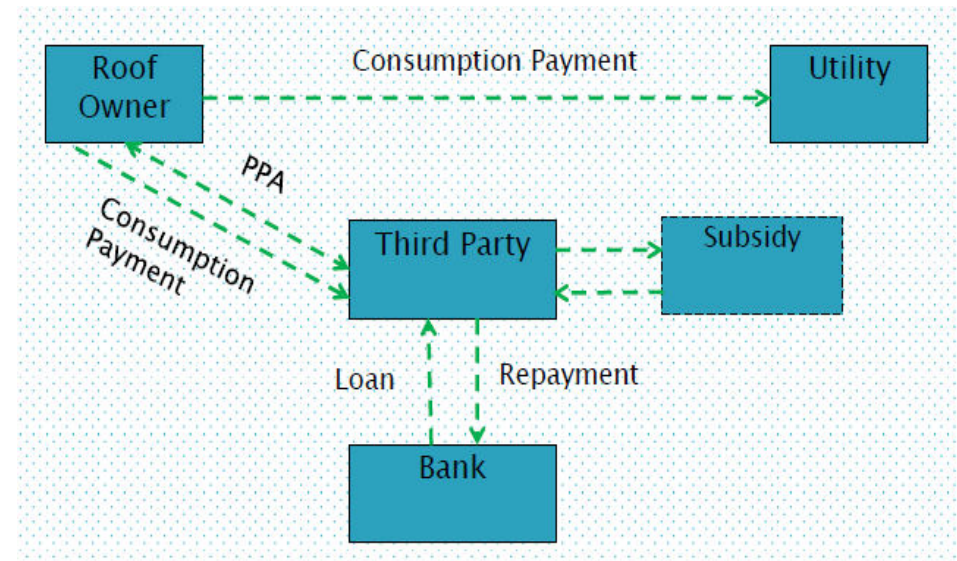


# Third Party Owned Models

## Gross Metering Model

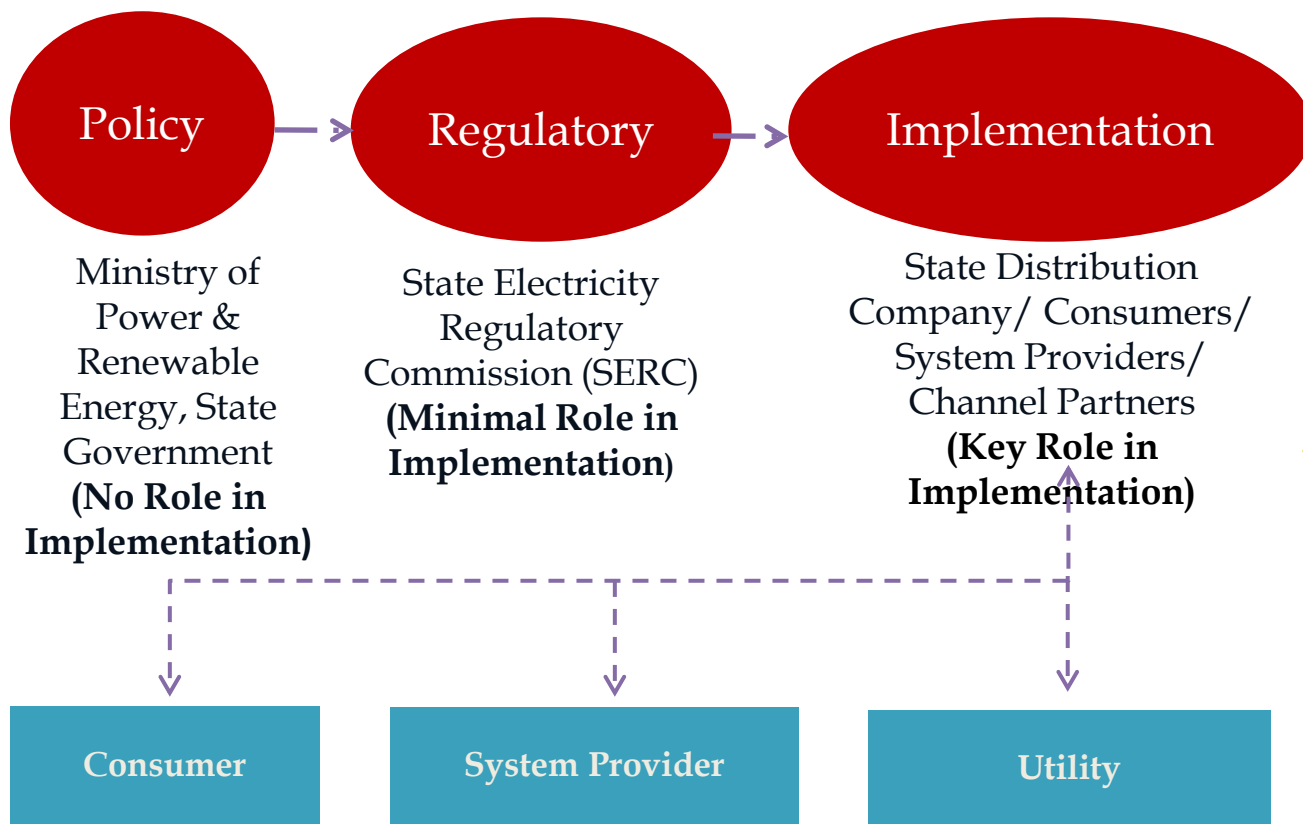


## Net Metering Model





# Role and Responsibilities of Stakeholders



## Key Drivers

- Economies of scale and learning curve will reduce the relatively higher capital and transaction costs
- Cost of technology is coming down on its own
- Aggressive targets need aggressive scale up

*“... efficiency of DISCOMs will increase only when there will be a reduction in aggregate technical and commercial (AT&C) losses... use of net metering could provide a solution to the problem of high AT&C losses -*

*Mr. Amitabh Kant, CEO, NITI Aayog”*

# Solar Rooftop faces multiple challenges

## 1. Policy & Regulation

- Appropriate incentive mechanisms
- Gaps in regulatory framework
- Technical challenges like transformer loading levels and evacuation challenges



## 4. Financing & Market Structure

- Understanding amongst banks and FIs - risk mapping, business models and project financing
- Availability of lenders engineers/technical staff for evaluation of project proposals

## 2. Implementation (Utility)

- Rationale for promoting solar rooftop
- Standardized Interconnection Processes
- Training & capacity building of Utility Staff
- Engagement of senior management

## 3. Implementation (Market)

- High customer acquisition costs
- Lack of standardized business models
- track record of successful projects
- Limited consumer awareness
- marketing/ sales outreach
- quality suppliers & vendors
- trained manpower

# Key Challenges for 3<sup>rd</sup> Party model – 1/2

- Following are the main challenges with 3<sup>rd</sup> Party owned Business Models:
  - 1. Contract Sanctity**
    - Needs easily enforceable payment security mechanism
  - 2. Availability of Financing and Capacity of FIs to Evaluate Rooftop Projects**
    - Easy financing schemes by Bankers for 3<sup>rd</sup> Party investment who is not Rooftop owner
  - 3. Solar Equipment Leasing**
    - AD benefits to Equipment owner but Service tax applicable which erodes the most of the AD benefits

# Key Challenges for 3<sup>rd</sup> Party models – 2/2

- Following are the main challenges with 3<sup>rd</sup> Party owned Business Models:

## 4. Rooftop Leasing

- Access to Rooftops for life of the project is main concern. Issues like redevelopment of building,
- Tenants can not participate in this model,
- Benefits and liabilities of successor in case of sale of property ownership

## 5. Role of Utilities-

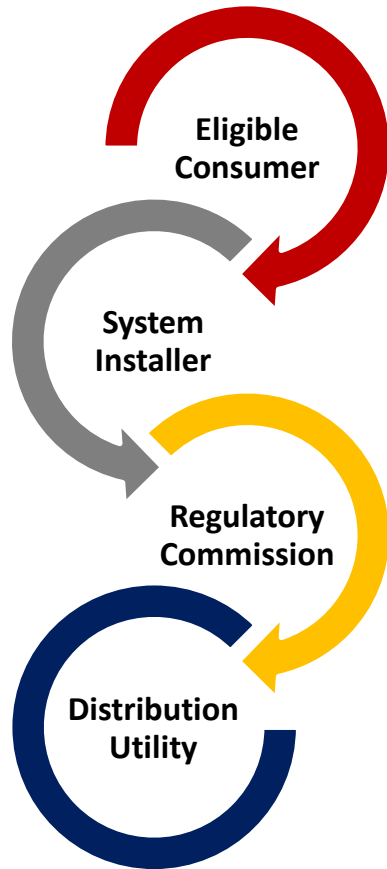
- Lack of clarity for interconnection of solar rooftop projects in Captive mode
- Third Party Wheeling not available in many cases
- Lack of Awareness among Utilities for benefits of solar Rooftop systems to Utility Grid

## 6. Mis-Match of Capacity limits under Net metering and Rooftop Availability

- Some of the Rooftop owners such as schools, warehouses are having higher rooftop capacity but lesser consumption which limits the optimum utilisation of Rooftop

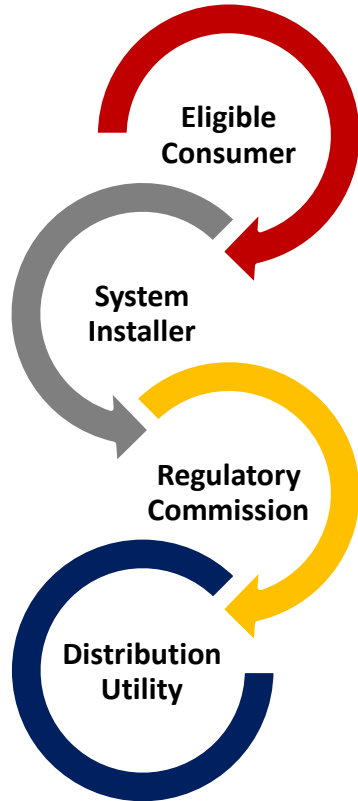


# Additional Requirements/Refinement (1/2)



- **Focus on Key Stakeholders**
  - Net metering guidelines should focus on all the key stakeholders
  - Roles, Responsibilities, Requirements, Guidelines etc. for key Stakeholders must be captured under the guiding framework
- **Process Manual**
  - As Stated above, the guiding framework must include process manual for all key Stakeholders.
- **Development lifecycle**
  - The guidelines need to capture the complete project development lifecycle and lay down specific suggestions for key stakeholders
  - Steps required for Interconnection, graphical representation of key steps, timelines, charges, forms/formats required, line diagrams etc. are required.
- **Safety Requirements**
  - Safety is one of the key requirements in case of grid tied rooftop systems
  - This aspect needs to be elaborated with all potential risks and measures required to be followed by utility and consumers

# Additional Requirements/Refinement (2/2)



- **Cost Economics and Approved vendors**

- Cost economics vis-à-vis monthly energy bill/consumption and possible savings in energy bill may be provided as ready reference for consumers
- Information on financing scheme, capital subsidy from MNRE/State Government, if any, may also be provided
- List of approved vendors/agencies for installation of solar rooftops may be included with the guidelines for ready reference

- **Information Dissemination**

- Clarity in terms of Application process, interconnection study, selection criteria, inspection requirements, safety provisions, etc. needs to be captured in detail

- **Presentation of Information**

- The presentation of information needs to be more descriptive with step-wise flow chart and easy to understand schematic diagrams, etc.
- The same can be effectively used as an information manual for eligible/interested consumers

# Issues for Deliberation:

- SPV rooftop installations are at nascent stage as against targeted SPV rooftop installations of 40 GW by 2022;
- Capital subsidy alone may not be the solution to achieve targeted installations;
- Comprehensive solar solutions which can be easily available and implementable is the need of hour.
- Large participation across the consumer segment through creating awareness about benefits of RTSPV
- Need of synchronisation between stake holders i.e Government nodal agencies, consumers and system integrators and Distribution Utilities.
- Government policies needs emphasis on encouraging power generation through decentralised SPV rooftop systems at the point of consumption
- Third Party performance assessment of the RTSPV projects
- Generation based incentives for end-users including the house hold segment.



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**Thank You**

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