

Pilot Scheme on Grid - Connected Rooftop PV Systems



Solar Energy Corporation of India

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SECI- Inception and Objectives

A Government of India Enterprise under the administrative control of MNRE

Incorporated on 20th September, 2011 as a “Not for profit” Company under Section 8 of the Companies Act, 2013

Authorised capital INR 2,000 Crores; Paid up capital INR 42 Crores for FY2013-14

OUR MANDATE:

- ▶ To be the implementing agency for meeting the National Solar Mission objectives
- ▶ To plan and execute an integrated programme on development and deployment of solar energy technologies to achieve commercialization;
- ▶ To own, operate and manage, both grid-connected & off-grid power stations;
- ▶ To promote R&D in Solar

SECI Activities : Ongoing



Broad mandate : Implementation & Facilitate various activities of the JNNSM.

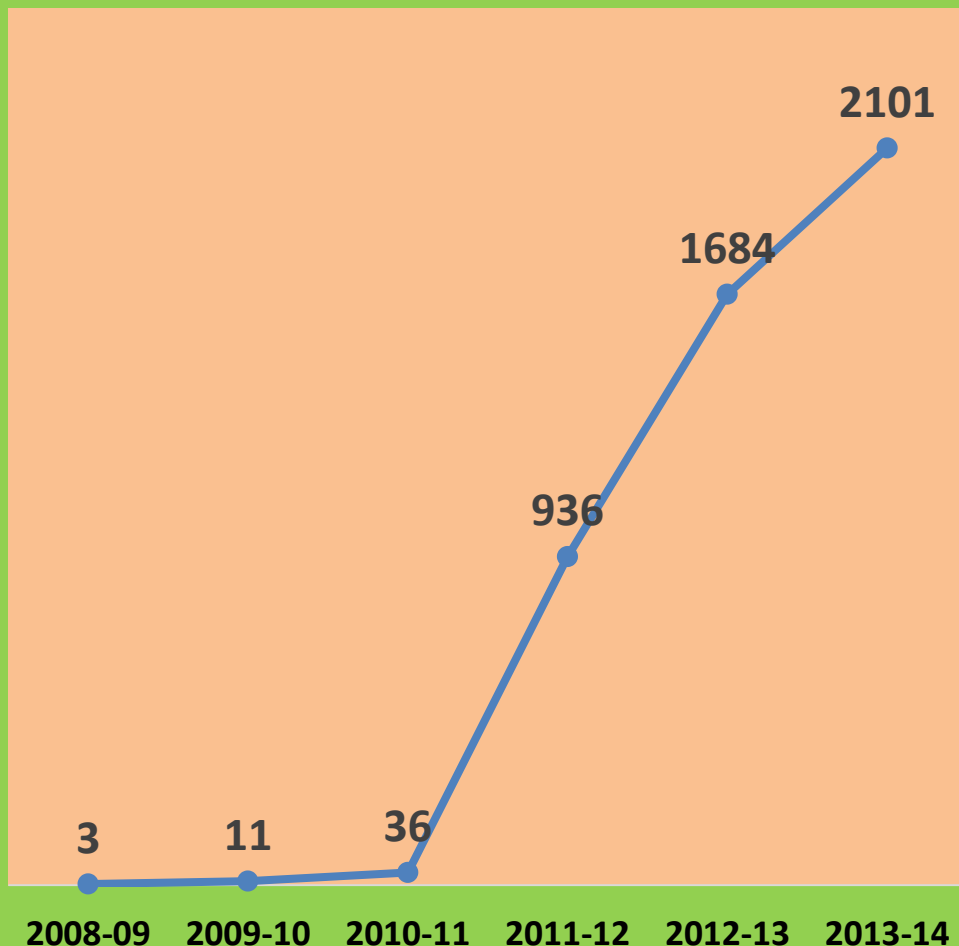
As part of the Mission activities SECI has taken up the following projects/ activities.

- 750 MW Grid connected solar power plants under JNNSM Phase II
- 4000 MW Ultra Mega Solar Power Plant in Sambhar, Rajasthan
- Pilot CSP Projects of around 100 MW
- **Implementation of Grid Connected Solar Roof-Top scheme**
- Development and dissemination of solar home lighting systems/ solar lanterns
- Solar Thermal installations for water/air heating
- Solar Mini/Micro Grids/street lights etc.
- R&D Projects

Growth of Solar Capacity (MW)



Solar Capacity (MW)

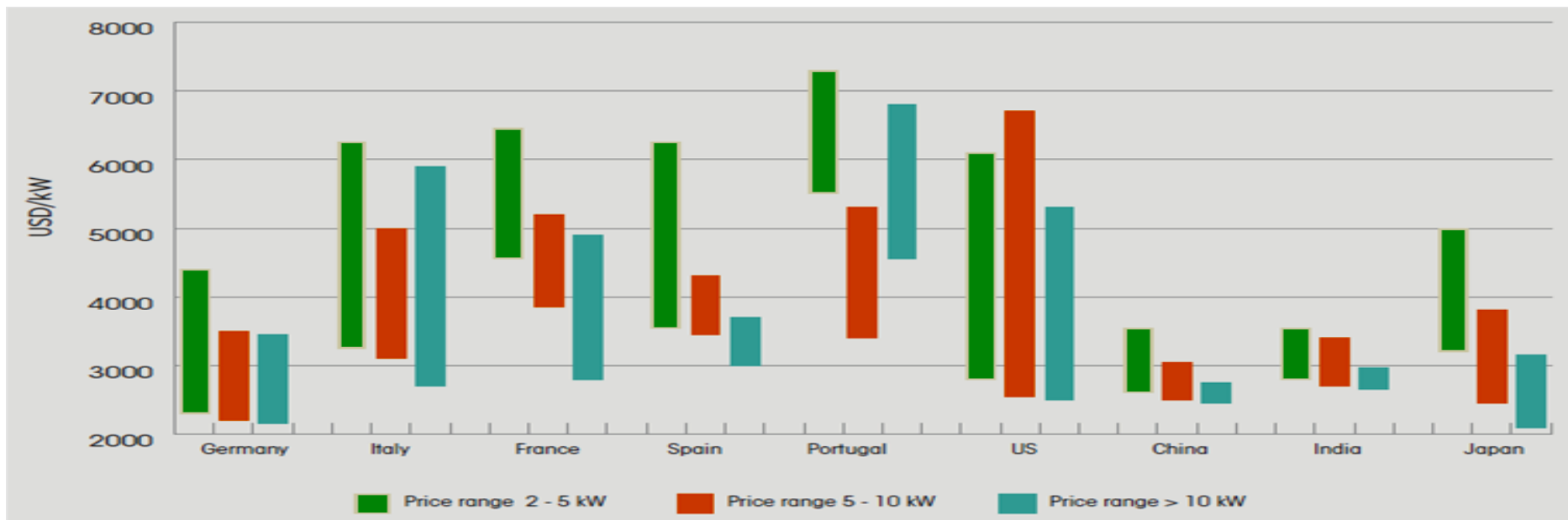


State	MWp	%
Gujarat	860.4	41.0%
Rajasthan	656.15	31.2%
Maharashtra	207.25	9.9%
Madhya Pradesh	162.315	7.7%
Andhra Pradesh	68.9	3.3%
Uttar Pradesh	17.375	0.8%
Tamil Nadu	28.18	1.3%
Jharkhand	16	0.8%
Karnataka	24	1.1%
Orissa	15.5	0.7%
Punjab	9.325	0.4%
Haryana	7.8	0.4%
West Bengal	7.05	0.3%
A & N Island	5.1	0.2%
Uttarakhand	5.05	0.2%
Chhattisgarh	7	0.3%
Delhi	2.6	0.1%
Lakshadweep	0.8	0.0%

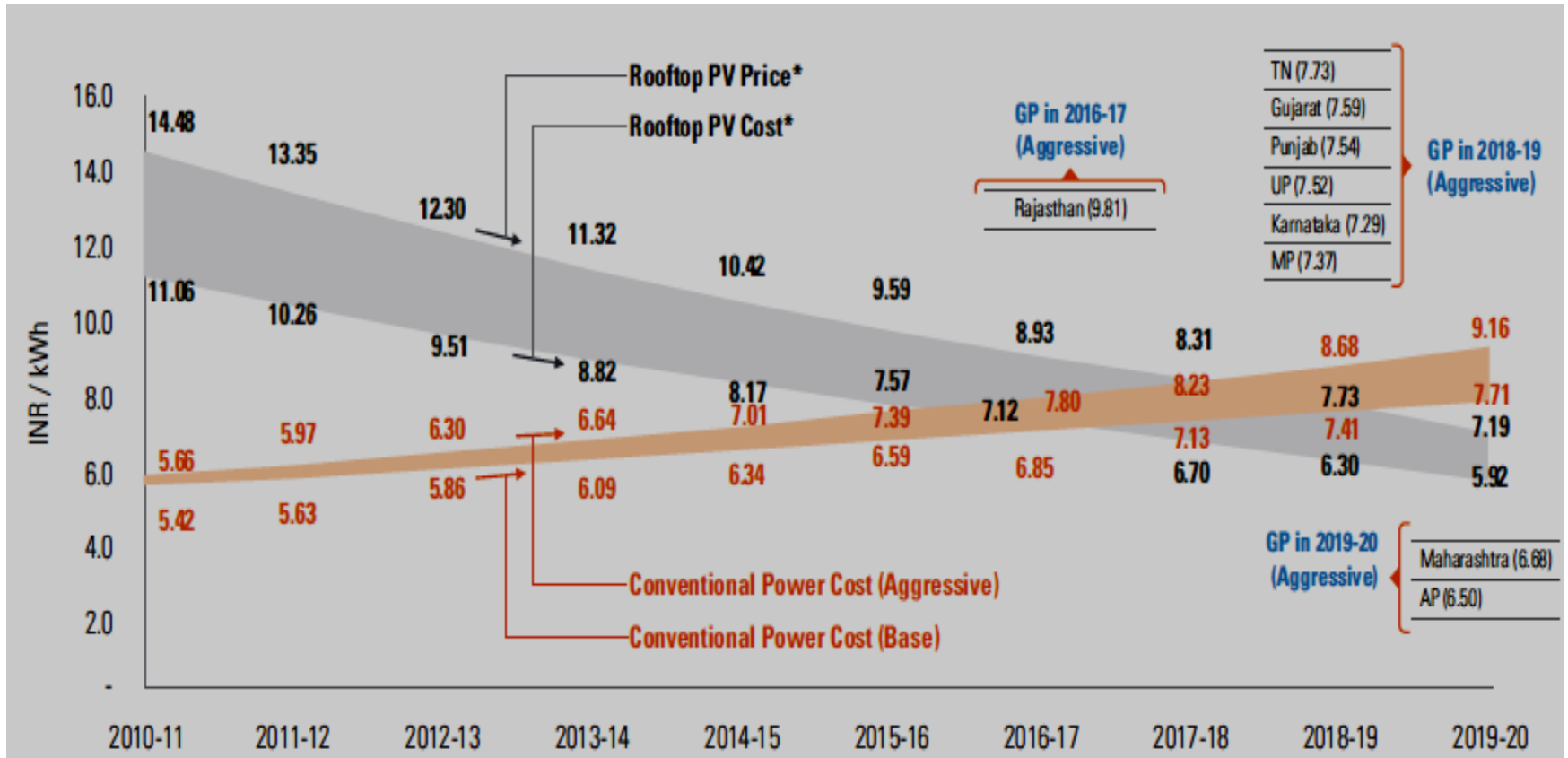
Off grid PV installations in India



- Off grid PV installations are suitable for Indian conditions.
- Presently, capacity is limited to 100 kW under MNRE program.
- 250 MWp sanctioned by the Ministry under NSM and nearly 60 MW commissioned
- Mini and micro grid systems for rural areas are under initial stages of development.
- Roof top installations are picking up.
- Off grid PV system costs have become attractive in India (Rs.100-150/Wp).



Roof top PV-Towards grid parity



Source:KPMG

By 2017 roof top solar power cost will reach the grid parity.

Benefits of Roof top PV

- On national level, reduces requirement of land for addition of solar capacities.
- For consumers, it
 - Reduces the dependency on grid power.
 - Mitigates diesel generator dependency.
 - Long term reliable power source.
- For Discoms, it reduces
 - Day Peak load Demand
 - T&D and conversion losses as power is consumed at the point of generation.
- Most suitable for commercial establishments
 - Max generation during peak usage time.
 - Solar power cost is close to the commercial power cost.



Roof top PV potential in INDIA



- According 2011 Census India is having
 - 330 million houses.
 - 166 million electrified houses.
 - 76 million houses uses kerosene for lighting.
 - 1.08 million houses are using solar for lighting.
 - 140 million houses with proper roof (Concrete or Asbestos / metal sheet).
 - 130 million houses are having > 2 rooms.
- Average house can accommodate 1-3 kWp of solar PV system.
- The large commercial roofs can accommodate larger capacities.
- As a conservative estimate, about 25000 MW capacity can be accommodated on roofs of buildings having > 2 rooms alone if we consider 20% roofs.



States Initiatives in Rooftop



- **Gujarat:** Initiated 5MW Rooftop Project in Gandhi Nagar in PPP model. 25 MW in 5 other cities also announced
- **Tamil Nadu:** Has come up with a draft order on Net-Metering & REC
- **Andhra Pradesh:** Solar Policy 2012 also promoting roof top solar projects
- **Rajasthan:** has come up with rooftop solar policy in solar cities
- **Kerala:** Launched its 10,000 rooftop power plants program for 2012-2013. Apart from the MNRE's 30% capital subsidy, the state also offers discount
- **West Bengal:** Initiated a net-metering solar rooftop model promoting self consumption
- **Uttarakhand:** Attractive feed-in-tariff by Electricity Regulatory Commission
- **Maharashtra:** Solar policy is under draft stage

SECI's Grid Connected Rooftop Scheme



- MNRE launched a pilot scheme in year 2013 for grid connected rooftop PV power projects –being implemented by SECI
- The scheme allows system size from 100 kW to 500 kW
 - Aggregation of capacity from smaller roofs is allowed.
- 30% of the cost would be provided as subsidy and 70% to be met by the consumer
- Systems are to be grid connected and without battery back up
- Mostly in-house/captive consumption and to replace diesel generation
- Surplus solar power to be fed to the grid
- Cities across India being covered under the scheme for wider participation/promotion
- Developers selected through a competitive process

Implementation



- Under the scheme SECI
 - Allocates capacity for each city/State in consultation with MNRE/SNAs
 - Verify project proposals w.r.t. technical specifications and release the sanction for subsidy which is linked to performance up to 2 years
 - Release initial subsidy on successful commissions as per technical specifications (20%)
 - Release 5 % subsidy each at the end of 1st and 2nd year of successful maintenance of the project
 - Help developers for identification of projects through dissemination workshops and to discuss any issues with concern authorities

SECI's Ongoing Scheme of Rooftop PV

Implementing Rooftop projects with 30% subsidy from MNRE

100-500kW capacity projects being set up in select cities

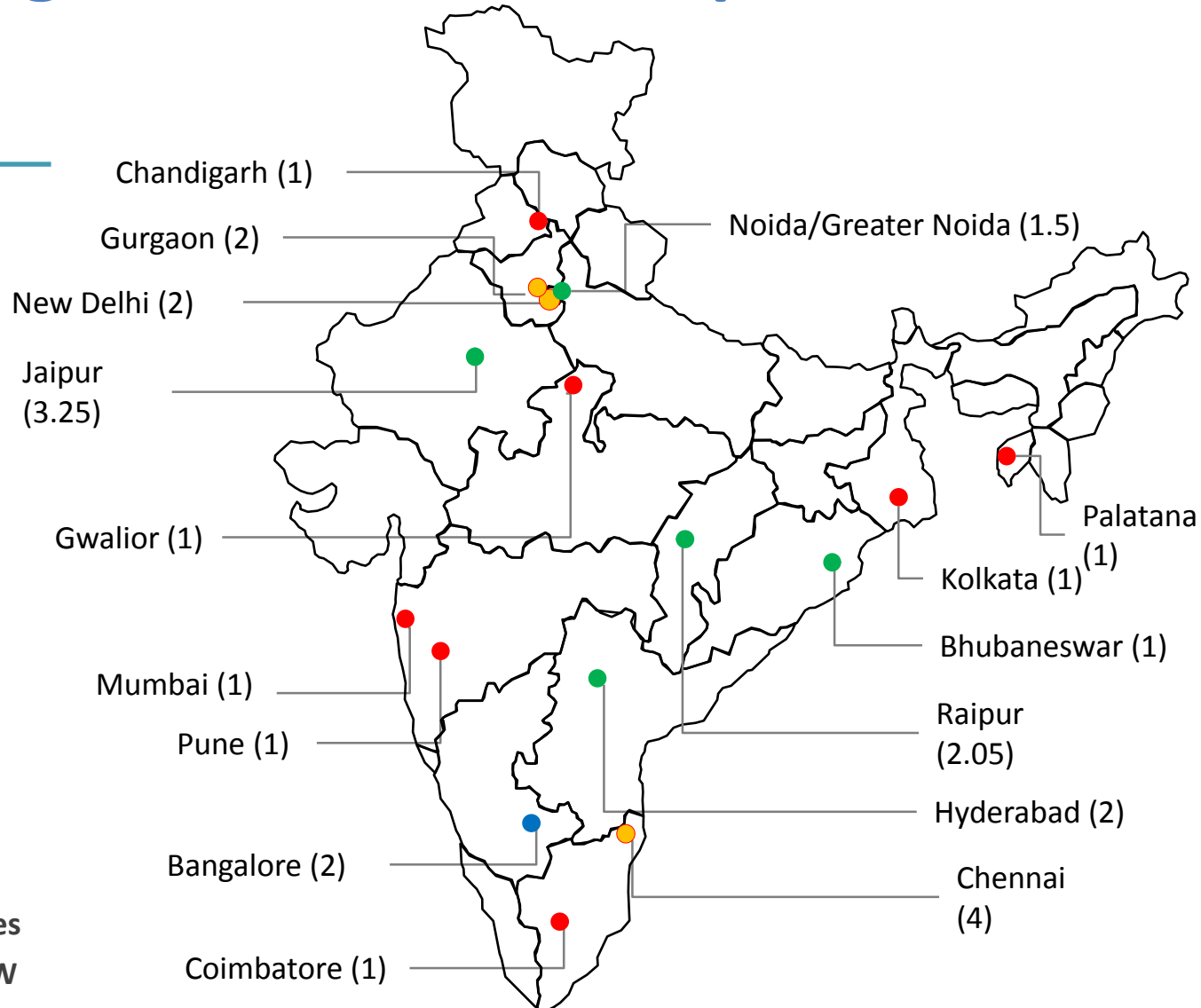
Phase I: 5.5 MW (4 cities)

Phase II: 11.3 MW (6 cities)

Phase III: 10 MW (9 cities)

Legend

- Phase I
- Phase II
- Phase III
- Multiple phases
- () Capacity in MW



Status of Implementation



Phase-I:

- It was launched in April 2013
- Initially started the bidding with the following allocations:
 - Chennai – 2 MW
 - Bangalore – 2 MW
 - Delhi – 1 MW
 - Gurgaon – 0.5 MW
- 3 MW of projects are ready for commissioning
- 630 kW under execution

Phase -II

- It was launched in July 2013
- Revised the bench mark cost to Rs. 90/Wp
- Bids invited for a capacity of 11.3 MW:
 - Jaipur – 3.25 MW
 - Bhubaneswar/Cuttack – 1 MW
 - Hyderabad – 2 MW
 - Gurgaon – 1.5 MW
 - NOIDA/ Gr. NOIDA – 1.5 MW
 - Raipur – 2 MW
- Capacity allocations made for 11.3 MW for 9 shortlisted bidders.
- Around 9 MW capacity rooftop is identified.
- Around 1.5 MW is expected to be commissioned by March 2014.

Phase -III

- It was launched in December 2013
- Bids invited for the capacity 10 MW in the following cities

Chennai	-	2000 kW
Chandigarh	-	500 kW
Coimbatore	-	1000 kW
Delhi	-	1000 kW
Gwalior	-	250 kW
Kolkata	-	1000 kW
Mumbai	-	1500 kW
Palatana	-	1000 kW
Pune	-	1750 kW

- Capacity allocations made for 3.25 MW for Maharashtra among 5 successful bidders
- Rooftop identification is under progress

Phase –III – Maharashtra



- The following developers were selected for Maharashtra.

Mumbai

– Ravano Solar India Pvt Ltd, Bangalore	500 kW
– Enrich Energy Pvt Ltd, Pune	1000 kW
Sub Total	1500 kW

Pune

– Fonroche Saaras Energy Pvt. Ltd, Mumbai	250 kW
– Aditya Green Energy Pvt Ltd, Latur	500 kW
– Tata Power Solar Systems Limited, New Delhi	500 kW
– Ravano Solar India Pvt Ltd, Bangalore	500 kW
Sub Total	1750 kW

Total **3250 kW**

Key Challenges



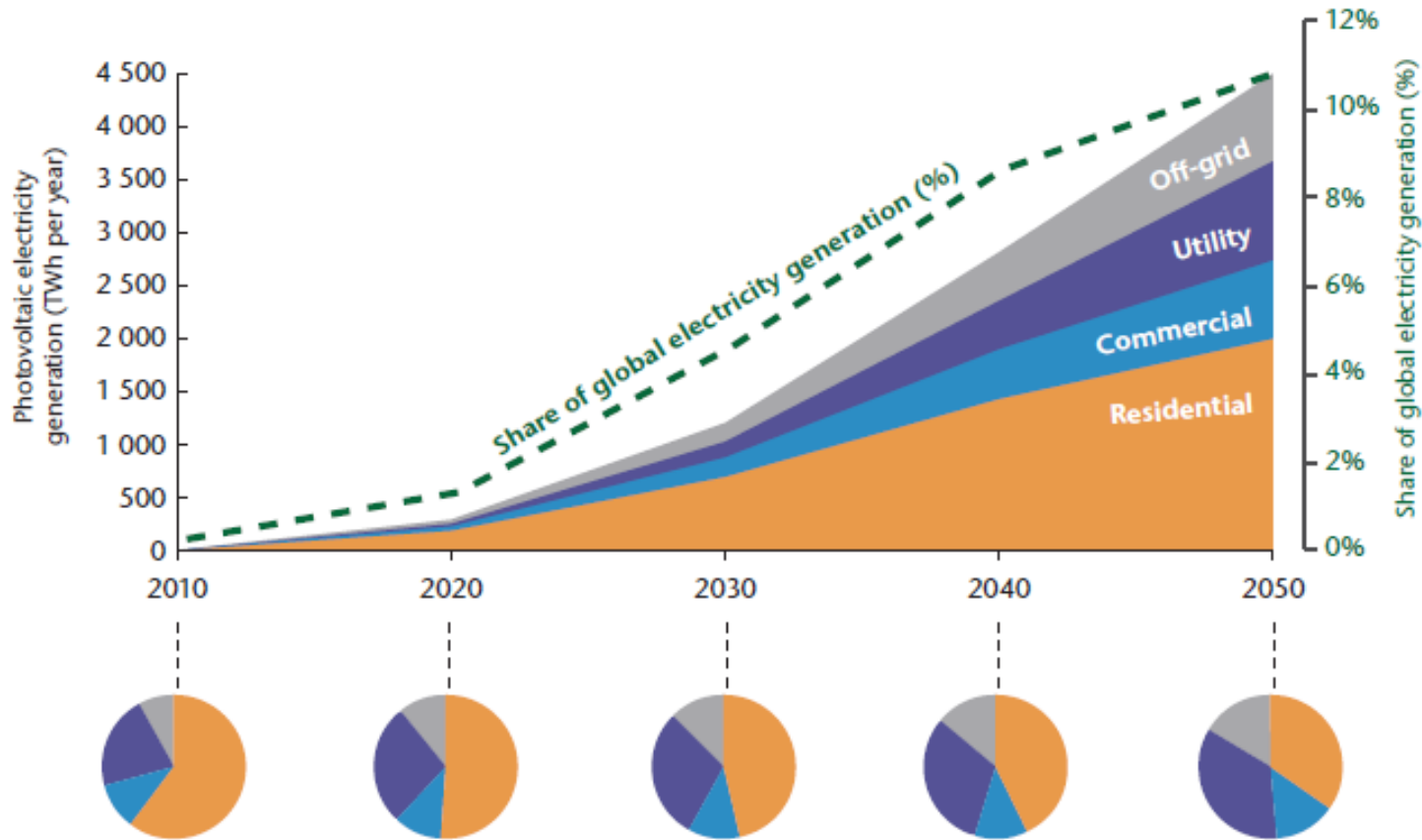
- Grid Connectivity Issues
- Central Electricity Authority has notified connectivity norms on dated 30.09.2013 – Some States like AP/Tamil Nadu/West Bengal have come out with connectivity norms
- Quality, Safety & performance standards
- Metering Standards and Net metering regulations
- Domestic content for cell and modules
- Feed-in-Tariff for surplus power into the grid
- Commitment by DISCOMS to absorb surplus power
- Unwillingness of the rooftop owner for putting up even 70% of cost of project
 - RESCO model is being explored for next phase in addition to capex model.
- Awareness / Promotion in Tier II cities

“Rooftop Solar PV has huge potential and the government policies and regulations should be enabling to promote large scale deployment”



THANK YOU

Global PV installations projections



Residential sector continue to be the major part along with large scale utility power plants

Simple cost estimations

System size	100 kWp
System cost	0.8 -0.9 crore
Subsidy	30%
Expected electricity generation	160000 units
Payback period @ Grid electricity cost (Rs. 6.5/ kWh)	5-6 years
Payback period with Accelerated Depreciation	4-5 years
Pay back @ diesel power cost	3-4 years
Plant life	25 years

State	Tariff (INR/kWh) (HT customers)
Maharastra	9.8
Madhya Pradesh	4.1
Rajasthan	5.5
Andhra Pradesh	6.08
Tamil Nadu	5.5
Karnataka	5.1
Punjab	6.26
Haryana	5.3
Gujarat	4.2

*Connectivity, fixed charges, metering charges, Taxes will be extra (will add between Rs. 1-2).