MINUTES OF THE THIRTY FOURTH MEETING

OF

FORUM OF REGULATORS (FOR) HELD AT NEW DELHI

DATE : 09TH JANUARY, 2013

LIST OF PARTICIPANTS : At Annexure-I (enclosed).

Business Session – I :

The meeting was chaired by Dr. Pramod Deo, Chairperson, CERC/FOR.

Shri Rajiv Bansal, Secretary, CERC/FOR extended a warm welcome to all members of the Forum.

The FOR thereafter took agenda items for consideration.

Agenda Item No. 1 : Confirmation of the Minutes of the 33rd Meeting of "FOR" held during 07th – 08th December, 2012 at Port Blair (Andaman & Nicobar Islands).

The Forum noted and endorsed the minutes of the 33rd Meeting of FOR held at Port Blair (Andaman & Nicobar Islands) during 07th - 08th December, 2012 with following observations :-

(i) Draft amendments to REC Regulations proposed by CERC may be discussed in the "FOR" 'Working Group of Renewable Energy'.

(ii) The expression, 'if need be' appearing under Agenda Item No.3 (Consideration of Study Report on Retail Sale Competition) should be "omitted".

After discussion, the minutes were confirmed

Arrival of Hon'ble Minister of State (I/C) for Power.

Dr. Pramod Deo, Chairperson, CERC/FOR welcomed the Hon'ble Minister of State (I/C) for Power Shri Jyotiraditya Madhavrao Scindia on his arrival and conveyed to him deep gratitude on behalf of the Forum for his presence and agreeing to interact with the members of the Forum. He also welcomed Shri P. Uma Shankar, Secretary, Ministry of Power and other senior officers of the Ministry. Dr. Deo briefed the Hon'ble Minister about the role being played by the Forum of Regulators (FOR) in evolving consensus on several critical issues facing the power sector. One of the important functions assigned to the Forum, he highlighted, involves harmonization of regulations in the electricity sector in India. The Forum has taken a number of steps in this direction. He argued that the success of national reform agenda is dependent on the co-operation of state players. State Regulators as agents of change have to be in forefront. He highlighted two major issues, viz., political economy of consumer tariff and "open access" regime.

He mentioned that although under the Supply Act of 1948 power to fix tariffs did vest in SEBs, they were generally unable to do this in a professional and independent manner. In practice this was done by State Governments. The result was cross-subsidies reached unsustainable levels. To address this issue and to distance Government from tariff determination, the ERC Act was enacted in 1998. This was based on the political consensus reached in the National

Development Council (NDC) meeting. However, when the bill was being debated in Parliament this consensus broke down: only 16 States notified SERCs. Even after a comprehensive law Electricity Act, 2003, the common perception is 'State Government decides electricity prices'. This is more so in view of the fact that most of the distribution companies are State Government owned entities.

Based on the experience, the Forum has evolved Model Tariff Regulations requiring suo-motu petition by SERCs in the event of non-filing of tariff petition by the DISCOM, periodic automatic pass through of fuel and power purchase price adjustment, etc. However, the support of State Governments is critical to implement these tariff regulations.

On the issue of "open access" for retail large consumers, he mentioned that we have sought to implement a limited form of competition through open access, a model which has not been implemented anywhere in the world. When the entire retail tariff structure is based on cross-subsidies by industry to agriculture and domestic sectors the political barrier to migration of these subsidising consumers is formidable. Dr. Deo quoted the example of MSEDCL (the largest distribution company in Maharashtra). Based on their MD's presentation in a seminar, which he was chairing, the MD informed that the consumers of 1 MW and above are less than 2,000 (1965 to be exact) out of 1.94 crore consumers. But they contribute 41% of his discom's revenue. If you take this cross-subsidy equation into account the cross-subsidy payable by open consumers will be so high that they will have no incentive to leave the system. There are at the same time limitations on availability of surplus power on long-term basis in the market at reasonable rates for such open access consumers. Dr. Deo said that we need to address the broader issue of political economy. If

we move away from average cost of supply to 'cost to serve' model and reserve expensive power for high end paying consumers the scenario will change.

In his keynote address, Shri Jyotiraditya Madhavrao Scindia, Hon'ble Minister of State (I/C) for Power welcomed all the Members of the Forum. He recognized the Regulators as important cog in the wheel of power sector reforms. He stated that the sector needs tremendous attention. In any value chain, there is a need to ensure that every unit of production results in a unit of revenue. He urged the Regulators to act to make this theory a reality. Given the nature of electricity industry, exchange of best practices assumes important. It is in this context that the Forum is expected to play an important role. We should continue to learn from each other's experience. He highlighted the following specific issues :-

- Tariff rationalization – Following APTEL Order, tariff revisions have taken place in almost all States during 2012-13. We should make sure that this does not remain an exercise in isolation. While exercising authority under the law, the Regulators should not look to political masters for guidance. Tariff revision should be institutionalized and the State Governments should be sensitized on the need for such revision in the larger interest of the sector. Fuel and power purchase cost adjustment should be done regularly, preferably on quarterly or monthly basis.
- Grid stability – India is the third largest grid in the world. It is of paramount importance that the grid is operated in a safe and secure manner. CERC has taken a number of steps to ensure grid discipline.

This should be mirrored at the State level. We are working on necessary amendments to the Act to empower the Regulators further in this context.

- Open access – There are two sub sets to the issue of open access. At the inter-State level, open access has been a success. There are issues around interpretation of section 11 of the Act. The matter is sub-judice. We look forward to resolution of the issue in near future. Independent operation of Load Despatch Centre (LDC) is critical to operationalizing open access. There is a need to ring fence the LDCs. At the national level, the process of ring fencing POSOCO is under way. This should be replicated at the State level.

- Regulatory independence – We appreciate the need to enable the Regulator to attract talent and also to provide for a frame work for financial autonomy of the Regulators. We are committed to extend full support to the Regulators on ensuring their independence.

- Promotion of renewable energy – Preferential Tariff and Renewable Purchase Obligation (RPO) are the two important regulatory interventions envisaged for promotion of renewable energy sources. The State Regulators should ensure that the RPO targets set by them are complied with by the obligated entities.

- DSM and Energy Efficiency – Every unit of power saved is a unit of power generated. This underscores the need for greater attention on DSM and Energy Efficiency. The Regulators should implement Time of Day (ToD) tariff to achieve the objectives of DSM and Energy Efficiency.

Business Session – II :

After the address by Hon'ble Minister of State for Power, a presentation was made by Shri Sushanta K. Chatterjee, Deputy Chief (Regulatory Affairs), CERC (copy **enclosed** at **Annexure – II)**. In his presentation, he highlighted the following issues :-

- **"FOR" Overview**
- **APTEL Suo-Motu Order on OP NO.1 of 2011 on Tariff Revision by SERCs**
- **Open Access – Issues**
- **Amendment to Electricity Act, 2003**
- **Regulatory Independence**
- **Regulatory Intervention on Promotion of Renewable Energy**
- **Grid Operation and Security**

After the presentation, the Members of the Forum shared their views in the light of their experiences on the issues facing the sector. The following issues were highlighted by the Regulators :-

- ✓ Most of the conflicts in the power sector arise from the divergence in pursuits of the States and the Centre.
- ✓ While open access is a cherished goal, high level of cross subsidy and cash flow problem of Discoms come in the way of implementation of this concept. There should be some arrangements for sharing between the Centre and the States.

- ✓ Given the aberation in the market, it is premature to mandate competitive bidding for power procurement. The provision of section 62 should be continued till the contentious issues like fuel shortage are resolved.

- ✓ High level of AT&C loss is the most critical issue of power sector reforms. Technical solutions like High Voltage Distribution System (HVDS) and feeder segregation should be tried in all States. Tariff for agriculture should be fixed as per the cost of supply and the Government should pay the subsidy, if committed.

- ✓ Staffing of Regulatory Commission is a matter of serious concern. Higher compensation packages, possibly on CPSU or HRD Model can be designed to enable the Regulators to attract talent.

- ✓ The issues around the projects selected through the competitive bidding process need to be resolved at the earliest. The dilemma around whether tariffs can be changed after they have been discovered through competition needs to be settled to remove the ambiguity and uncertainty in the minds of the stakeholders.

- ✓ Powers of the Regulators to impose penalty are limited. The hands of the Regulators should be strengthened.

- ✓ At the inter-State level in case of purchase of power by the Discoms from the generating company, it should be ensured that all risks are not passed on to the distribution companies.

The Hon'ble Minister appreciated and noted the issues raised and suggestions made by the Regulators.

Business Session – III :

Issues Concerning Renewable Purchase Obligation (RPO).

A presentation on the issues concerning "Renewable Purchase Obligation (RPO)" was made by Shri Tarun Kapoor, Joint Secretary, Ministry of New & Renewable Energy (MNRE) (copy **enclosed** at **Annexure – III).**

The Forum noted the updates on the development of various renewable energy programmes in the country, especially, the progress of JNNSM. After discussion, following was agreed :-

- Section 86 (1)(e) of the Act requires the Appropriate Commission inter alia to "*promote cogeneration and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity* ……". In pursuit of this provision, some State Commissions like Gujarat Electricity Regulatory Commission (GERC) have already provided for guidelines on Grid Connectivity for Rooftop Renewable Energy Projects. Model Regulations on Grid Connectivity for Rooftop Solar PV may be prepared based on the guidelines of Central Electricity Authority and the orders/regulations issued in this context, to facilitate the SERCs to adopt the same and frame their own regulations at the earliest.

- State Nodal Agency (SNA) should be strengthened to assist the SERCs in their endeavour to monitor RPO compliance.
- Suo-Motu proceedings may be initiated by the SERCs to ensure RPO compliance by the obligated entities.

A vote of thanks was extended by Shri Rajiv Bansal, Secretary, CERC/FOR. He conveyed his sincere thanks to all the dignitaries present in the meeting. He also thanked the staff of "FOR" Secretariat for their arduous efforts at organizing the meeting.

The meeting ended with a vote of thanks to the Chair.

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/ ANNEXURE – I /

LIST OF PARTICIPANTS ATTENDED THE THIRTY FOURTH MEETING OF

FORUM OF REGULATORS (FOR)

HELD ON 09TH JANUARY, 2013 AT NEW DELHI

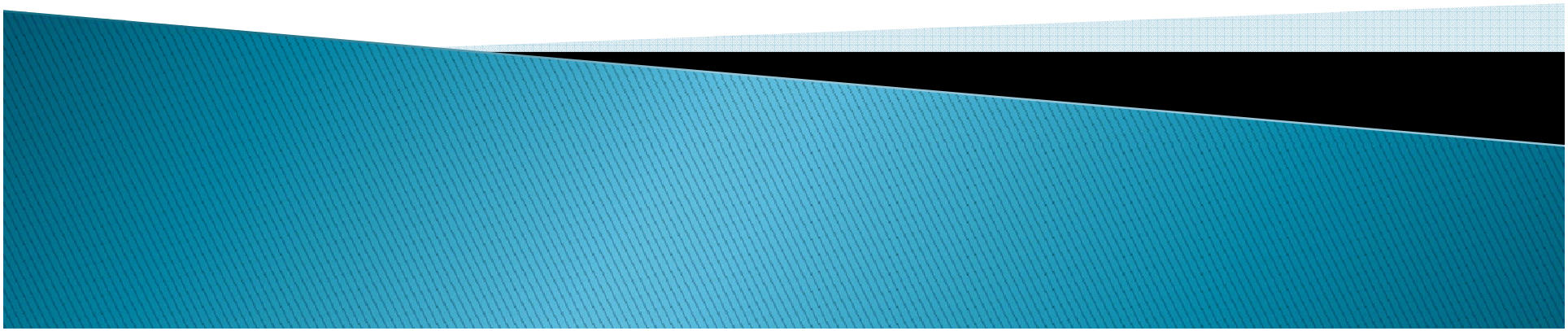
S. No.	NAME	ERC
01.	Dr. Pramod Deo Chairperson	CERC – in Chair.
02.	Shri Digvijai Nath Chairperson	APSERC
03.	Shri Umesh Narayan Panjiar Chairperson	BERC
04.	Shri Manoj Dey Chairperson	CSERC
05.	Shri P.D. Sudhakar Chairperson	DERC
06.	Dr. P.K. Mishra Chairperson	GERC
07.	Shri R.N. Prasher Chairperson	HERC
08.	Shri Subhash Chander Negi Chairperson	HPERC
09.	Shri S. Maria Desalphine Chairperson	J&KSERC
10.	Dr. V.K. Garg Chairperson	JERC for Goa & All UTs except Delhi
11.	Shri M.R. Sreenivasa Murthy Chairperson	KERC
12.	Shri V.P. Raja Chairperson	MERC
13.	Shri Anand Kumar Chairperson	MSERC
14.	Shri Satya Prakash Nanda Chairperson	OERC
15.	Shri D.C. Samant Chairperson	RERC

16.	Shri Jag Mohan Lal Chairperson	UERC
17.	Shri P Parameswaran Member	KSERC
18.	Shri Virinder Singh Member	PSERC
19.	Shri K. Venugopal Member	TNERC
20.	Shri Shree Ram Member	UPERC
21.	Shri Rajiv Bansal Secretary	CERC/FOR
22.	Shri Sushanta K. Chatterjee Deputy Chief (RA)	CERC
SPECIAL INVITEES		
01.	Shri P. Uma Shankar Secretary	MOP
02.	Shri Ashok Lavasa Additional Secretary	MOP
03.	Ms. Jyoti Arora Joint Secretary	MOP

Agenda

34th Meeting of Forum of Regulators

9th January, 2013



In this presentation…

- FOR Overview
- APTEL Order (OP1 of 2011) on Tariff Revision
- Open Access in Power Sector
- Grid Operation and Security
- Renewable Energy- Regulatory Intervention
- Regulatory Independence
- Amendment to Electricity Act, 2003

I. FOR Overview

- Constituted in February, 2005- under section 166(2) of the Electricity Act, 2003.
- **Objective:** Harmonization in approach to regulation in the electricity sector in India.

✓FOR has been playing a key role in evolving consensus on several critical issues facing the sector.

FOR Overview…..

Key Initiatives of FOR

- Assessment of reasons for poor financial health of distribution utilities.
- Evolved Renewable Energy Certificate (REC) mechanism.
- Standardization of Distribution Franchisee Model.
- Determine Capital Cost Benchmarks for Distribution Business.
- Standardization of Regulatory Accounts.

FOR Overview……

FOR has evolved "**Model Regulations**" on:-

- Multi Year Distribution Tariff.
- Protection of Consumer Interest.
- Terms and Conditions of Intra-State Open Access.
- Demand Side Management for SERCs.
- Renewable Energy Certificate (REC) Framework for SERCs.
- Standards of Performance for Distribution Licensees.
- Model Supply Code .

II. APTEL Order OP1 of 2011 on Tariff Revision

- FOR Study on assessment of financial viability of discoms.
  - Timeliness of tariff determination process.
  - Disallowance of legitimate costs.
  - Fuel Purchase Adjustment.
  - Untreated gap/Regulatory Assets.
- Model Tariff Regulations of FOR: to address above issues

Study led to "APTEL Order OP1 of 2011"

- ✓ **APTEL directed SERCs/JERCs to revise tariff every year and initiate suo-motu hearings in case of delay in filing or non-filing of tariff petitions by Discoms.**
- ✓ **Except Assam, all Sates/UTs have issued tariff orders for 2012-13.**

III. Open Access in Power Sector

- Open Access, a mechanism for encouraging competition and providing choice to consumers.
- Open Access –Stages
  - Inter-State transmission- responsibility of CERC
  - Intra-State transmission and distribution- responsibility of SERCs.

- ✓ Open Access at inter-state level is fully operational.
- ✓ Open access to consumers yet to take off in large scale.

Open Access Issues….

Open Access for Consumers

- Issues in implementation of Open Access at State level
  - Existence of cross subsidies in tariff -Discoms resist losing paying/ subsidising consumers.
  - Non-impartial role of SLDCs.
  - High level of open access charges.
  - Non-availability of surplus power at reasonable rates.

✓ **FOR deliberated such issues and evolved Model Open Access Regulations.**

✓ **FOR recommended ring fencing of SLDCs.**

✓ **FOR prepared a position paper on Open Access.**

Open Access Issues…..

Restriction on export of power (under Section 11)

- **Section 11**- empowers State Govt to give direction to generating companies to operate and maintain generating stations under 'Extraordinary Circumstances'.
  - States (Karnataka, TN, Orissa and Andhra Pradesh) have invoked Section 11 to prohibit export of power from their State treating 'power shortages' as extra ordinary cirscumstances.
- Several orders of CERC preventing misuse of Section 11 have been challenged in the High Courts.
- CERC and MOP have moved Supreme Court against Karnataka High Court Order.

✓ The Act may need to be amended to resolve this issue.

IV. Grid Operation and Security

- Grid Code at Centre and State level for Safe and Secure Operation.

Indian Electricity Grid Code (IEGC)

- The Commission can take suo-motu cognisance of the instances of grid violation (including overdrawal).
- RLDCs are under statutory obligation- to report the instances of serious and repeated violation of the Grid Code.

UI Regulations

- UI charges linked to frequency to discourage deviation from scheduled generation and/or drawal.
- Restriction on infirm injection.

Grid Operation and Security….

Section 142- Power to Regulators to impose penalty not exceeding Rs 1 Lakh on contravention of orders, rules and regulations.

Section 143 - Power to adjudicate and impose penalty

- CERC has imposed penalty on a number of occasions.
- Orders have been challenged in the court.

- Grid- A mesh of transmission lines and sub-stations and generating switchyards.
  - SERCs need to adopt similar approach to enforce grid discipline.

V. Renewable Energy- Regulatory Intervention

- Diversification of Energy resources for Energy Security.
- Regulatory framework
  - Preferential Tariff Regulation by CERC and SERCs.
  - Renewable Purchase Obligation (RPO) mandated under the Act- Target set by SERCs
  - Framework for Grid Integration - under IEGC.
  - Renewable Energy Certificate (REC) mechanism – market based instrument
    - to promote Renewable Energy
    - for RPO compliance

Renewable Energy- Regulatory Intervention….

- FOR has facilitated (through CTU) a study on infrastructure requirement for evacuation of renewable energy sources.
- FOR study on achievable renewable purchase obligation based on RE resource assessment and impact on tariff.
  - Findings/Outcome- Impact of incremental increase in RPO across states is not significant.
- The challenge ahead lies in ensuring compliance of the RPO target set by the Regulatory Commissions.

VI. Regulatory Independence

- Regulatory Commissions- Lack of autonomy a challenge.

Staffing

- Inadequate staff strength- posts filled through deputation.
- Pay Structure- strictly based on pay structure of Central/State employees.
  - Benefits like Pension, CGHS facility, Govt. accommodation not available to CERC officials.
  - Govt like pay structure does not attract people from PSUs or open market or even from Govt.

✓ Need to attract manpower with adequate qualification and skill level to deal with the challenges ahead.

✓ Staffing pattern needs restructuring.

Regulatory Independence….

Operationalisation of separate fund

- Urgent need for removing ambiguity in terms of operation and maintenance of ERC fund to ensure freedom and autonomy as envisaged in the Act.

Skill Building Needs for Staff

- ERCs - knowledge based organisations.
  - Need flexibility- to send employees abroad for training.
  - Need for ERCs to be empowered to decide and approve the needs for skill enhancement of officers/staff including those involving foreign visits.

VII. Amendment to Electricity Act, 2003

Regulatory experience on implementation of the legislation- Need for amendment in the Act.

Section 11:

Issue: Section 11 has been used to restrict export of power and to deny open access in many States.

FOR Proposal

- The expression "extraordinary circumstances" in section 11 should be modified to delete the words 'public order' and 'such other circumstances'.
- A proviso under Section 11 should be added to stipulate that the direction under this provision cannot be given by the Appropriate Government to deny open access.

Amendment to Electricity Act, 2003.....

Section 62 and Section 63:

Issue: Govt task force seeks to omit provision of tariff determination by regulatory commissions for the generating company under Section 62.

Para 5.1 of the Tariff Policy- all the future requirement of power should be procured competitively by the distribution licensees.

FOR Proposal

- Given the experience of competitive bidding processes in different states, both the options of tariff determination - namely, the options of Section 62 and Section 63 – should exist as they are in the existing Act, at least till we have fuel shortages.
- No amendment should be made to the provisions of Section 62 and Section 63.

Amendment to Electricity Act, 2003….

Section 64(1), 64(3), 62(4):

Issue: involving suo-motu petition, framework for periodic fuel and power purchase price adjustment formula.

FOR Proposal

- Section 62 and Section 64 should be suitably amended to provide for suo-motu petition and framework for periodic fuel and power purchase price adjustment formula.

Amendment to Electricity Act, 2003……

Performance of Regulators

New provision proposed by Task Force: To constitute a review committee consisting inter alia of Government officers, for review of performance of regulators. To incorporate non-performance as one of the grounds for removal of regulators.

FOR Proposal

- Proposal for review of performance by a Govt. Committee goes against the spirit of 'distancing of government from regulations'.
- Regulatory Commission is a collegiate body. Hence, non-performance of the Regulatory Commission cannot be a ground for removal of an individual member.
- The proposal of the Govt Task Force to amend sections 89 and 90 should be dropped.
- Peer review of performance of regulators should be done by FOR.
- FOR can be strengthened through rules.

Amendment to Electricity Act, 2003….

Empowerment of Regulatory Commission

Issue: Need to address limitations of penal powers available with the regulators under section 142 of Act.

FOR Proposal

- Section 142 should be amended to provide that the orders of the Appropriate Commission would have the force of a decree of the court, in line with Orissa Reforms Act.

Thank You

Presentation

before

Forum of Regulators

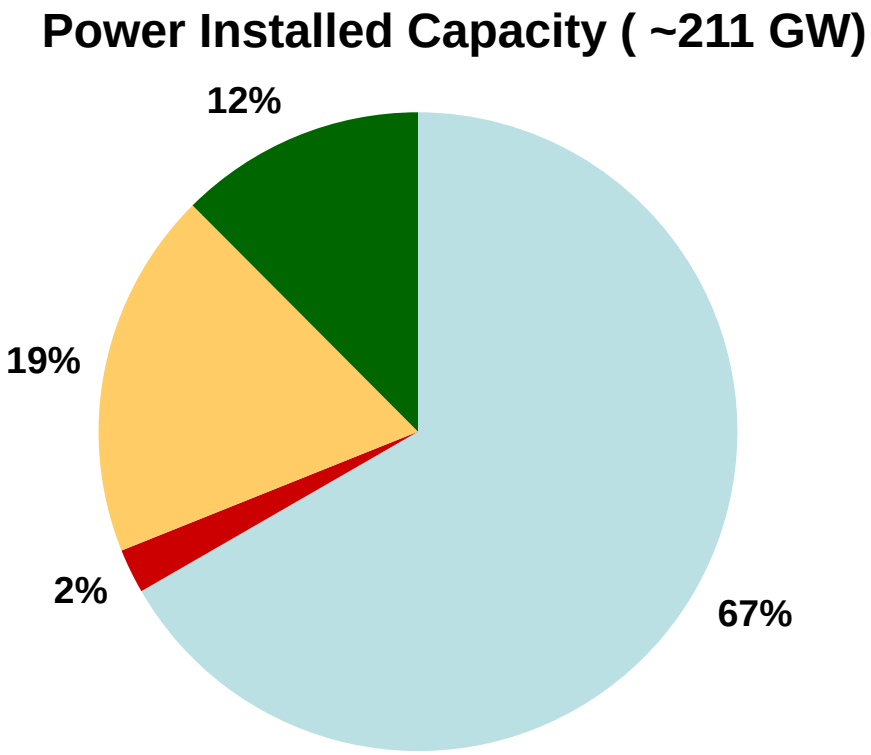
Tarun Kapoor
Joint Secretary
Ministry of New and Renewable Energy
Government of India

34th Meeting of Forum of Regulators
January 09, 2013

In This Presentation

- Updated Status
- Phase-II of JNNSM
- RPO Compliance Position
- Solar Roof-Top
- Manufacturing in Solar

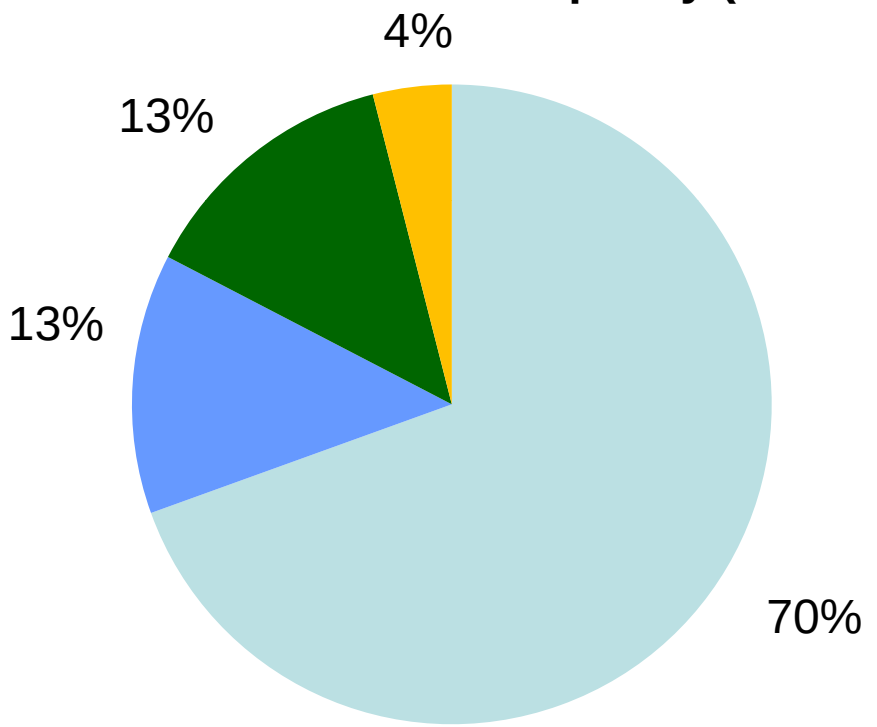
Indian Power Sector (30 November 2012)



Thermal	Hydro	Nuclear	Renewable
1,40,976 MW	39,324 MW	4,780 MW	26,368 MW

Renewable Power Capacity (31 December 2012)

Installed Renewable Power Capacity (~ 26.4 GW)



Wind	Small Hydro	Solar	Biomass
18,321 MW	3,465 MW	1176 MW	3,535 MW

State-wise Solar Installations

(as on 31 December 2012)

State/UT	MW	State/UT	MW
Andhra Pradesh	**21.8**	Punjab	**9.3**
Chhattisgarh	**4.0**	Rajasthan	**200.15**
Gujarat	**824.0**	Tamil Nadu	**16.1**
Haryana	**7.8**	Uttar Pradesh	**12.4**
Jharkhand	**16.0**	Uttarakhand	**5.1**
Karnataka	**14.0**	West Bengal	**2.1**
Madhya Pradesh	**7.4**	Andaman & Nicobar	**0.1**
Maharashtra	**20.0**	Delhi	**2.5**
Orissa	**12.0**	Lakshadweep	**0.8**
TOTAL			**1176**

JNNSM: Phase-I, Batch-I

Scheme		Projects allotted		Projects Commissioned		Min^{m} / Max^{m}/ Weighted Avg. bid tariff	% Reduction in tariff
		No.	MW	No.	MW		
Large PV projects through NVVN		30	150	26	130	10.95/12.76/12.16 Rs. / Unit	32 %
				2 Projects Cancelled			
Migration Scheme	SPV	13	54	11	48	CERC applicable tariff	
	ST	3	30	1	2.5		
RPSSGP Scheme (PV)		78	98.05	68	87.80	CERC linked tariff	
Solar Thermal projects through NVVN		7	470	Scheduled for commissioning by May 2013		10.49/12.24/11.48 Rs. / Unit	25 %

JNNSM: Phase-I, Batch-II

Scheme	Projects allotted		Projects Commissioned		Minimum bid tariff	Maximum bid tariff	Weighted Average bid tariff	% Reduction in tariff
	No.	MW	No.	MW				
Large PV projects through NVVN	28	350	Scheduled for commissioning by Feb. 2013		7.49 Rs. / Unit	9.44 Rs. / Unit	8.77 Rs. / Unit	43 %

20 MW already commissioned

State Initiatives

State	Target
Gujarat	Had announced around 968MW solar capacity;709 MW already commissioned
Andhra Pradesh	RFP for 1,000 MW already issued
Tamil Nadu	RFP for 1,000 MW already issued. Nearly 499MW bids received
Orissa	Allocated 50MW in two phases of 25MW each
Rajasthan	Called bid for 200MW solar capacity
Karnataka	Allocated 80 MW of solar power projects planned to be commissioned in 2013
Chhattisgarh	Aims at capacity of 500MW till March 2017
Uttar Pradesh	Aims at capacity of 500MW till March 2017
Madhya Pradesh	Plans to add 300 MW of solar power under its solar policy. 200MW has already been bid out
Maharashtra	Has announced 205MW

JNNSM- Phase II

Targets for JNNSM Phase –II

- Utility Grid Power including rooftop **10,000 MW**
- Off Grid Solar Applications **1000 MW**
- Solar Collectors **15 million sq mt**

Separate Targets for other applications

- Rooftop PV Programme – 1000 MW
- Energy Access – 20,000 (Villages/hamlets/basti/padas)
- Off-Grid Lighting Systems – 10 lakhs
- Solar Cities – 15 (In addition to existing target of 60 cities)
- Solar Water pumps – 25,000 Systems
- Telecom Towers – 25,000 Systems
- Solar Water Heating Systems – 8 Million Sq.m of Collector area
- Solar Cooker & Steam Generating Systems – 50,000 Systems
- Industrial Process heat application – 400 , 250 Sq.m each on an average
- Manufacturing – 4/5 GW Capacity
- Solar Monitoring & Assessment – 60 Monitoring Stations
- Human Resource Development – 1 Lakh trained & Specialized personnel
- Solar Parks (250 MW capacity and Land area of 600 hectare) – Not Defined
- Hybrid Systems – Not defined

Implementation Model Options for Ph-II

- Bundling Scheme
- Generation Based Incentive (GBI) Scheme
- Viability Gap Funding Scheme

Proposed Implementation Models

- GBI Mechanism may be used for rooftop and small solar systems
- VGF mechanism may be used to select project developers under large solar project scheme
- National Clean Energy Fund (NCEF) to be used for VGF support
- Discussions with MoP may be initiated for bundling scheme
- Bundling scheme may be implemented for only one technology

Proposed Implementation Models

- Solar PV with bundling - 500 MW
- Solar PV with VGF mechanism - 1500 MW
- Solar Thermal with VGF mechanism - 500 MW
- Laddhakh & Other Special Areas - 500 MW

Phase II: Capacity Award under Central Scheme

Schemes	2012-13	2013-14	2014-15	2015-16	2016-17	SUM
Rooftop & Small Solar						
PV		100	100	-	-	**200**
Bundling						
PV		800	-	-	-	**800**
Thermal		-	-	-	-	**-**
VGF						
PV		750	770	-	-	**1520**
Thermal		-	1080	-	-	**1080**
Total						
PV		**1650**	**870**	**-**	**-**	**2520**
Thermal		**-**	**1080**	**-**	**-**	**1080**
SUM		**1650**	**1950**	**-**	**-**	**3600**

- To timely execute the target capacity, all the Capacity allocation is distributed to initial two years of the Plan period
- Due to lack of performance parameters of Solar thermal projects, Share of Solar Thermal capacity is kept low for phase-II

Investment required for JNNSM Phase-II

- Grid Connected Solar - Rs. 90,000 Crs
- Off-Grid Solar - Rs. 25,000 Crs
- Supporting infrastructure - Rs. 25,000 Crs

Total - Rs. 1.4 Lakh Crore

Thrust Areas for promotion of Off-grid solar JNNSM Phase-II

- Improved Energy Access for remote areas
- Heating/Cooling applications that would encourage income generation opportunities (such as Cooling, Cold Storage, water purification, Space Heating)
- Replacement of Diesel and Kerosene – Telecom towers,
- Distributed Generation : (e.g. rooftop PV applications)
- Use in industry (Space Heating, water pumping)

RPO Compliance position

Current state-wise Total RPO targets

State	2012-13	2013-14	2014-15
Andra Pradesh	5.00%	5.00%	5.00%
Arunachal Pradesh	Regulation not issued		
Assam	4.20%	5.60%	7.00%
Bihar	4.00%	4.50%	5.00%
Chhattisgarh	5.75%		
Delhi	3.55%	5.00%	6.45%
JERC (Goa & UT)	3.00%		
Gujarat	7.00%		
Haryana	2.05%	3.10%	
Himachal Pradesh	10.25%	10.25%	10.25%
Jammu and Kashmir	5.00%		
Jharkhand	4.00%		
Karnataka	10.25%		
Kerala	3.90%	4.20%	4.50%
Madhya Pradesh	4.00%	5.50%	7.00%
Maharashtra	8.00%	9.00%	9.00%
Manipur	5.00%		
Mizoram	7.00%		
Meghalaya	1.00%		
Nagaland	8.00%		
Orissa	5.50%	6.00%	6.50%
Punjab	2.90%	3.50%	4.00%
Rajasthan	7.10%	8.20%	
Sikkim	Regulation not issued		
Tamil Nadu	9.00%		
Tripura	2.00%		
Uttarakhand	5.05%		
Uttar Pradesh	6.00%		
West Bengal		4.25%	5.30%

> NAPCC Target in 2012-2013

- **RPO trajectory specified by different states is not uniform**
- **Few states need to set RPO targets as per NAPCC guidelines**

Current state-wise solar RPO targets

State	2011-12	2012-13	2013-14	2014-15
Andra Pradesh	0.25%	0.25%	0.25%	0.25%
Arunachal Pradesh	Not Issued			
Assam	0.10%	0.15%	0.20%	0.25%
Bihar	0.50%	0.75%	1.00%	1.25%
Chhattisgarh	0.25%	0.50%		
Delhi	0.10%	0.15%	0.20%	0.25%
JERC (Goa & UT)	0.30%	0.40%		
Gujarat	0.50%	1.00%		
Haryana	0.00%	0.05%	0.75%	
Himachal Pradesh	0.01%	0.25%	0.25%	0.25%
Jammu and Kashmir	0.10%	0.25%		
Jharkhand	0.50%	1.00%		
Karnataka	0.25%	0.25%		
Kerala	0.25%	0.25%	0.25%	0.25%
Madhya Pradesh	0.40%	0.60%	0.80%	1.00%
Maharashtra	0.25%	0.25%	0.50%	0.50%
Manipur	0.25%	0.25%		
Mizoram	0.25%	0.25%		
Meghalaya	0.30%	0.40%		
Nagaland	0.25%	0.25%		
Orissa	0.10%	0.15%	0.20%	0.25%
Punjab	0.03%	0.07%	0.13%	0.19%
Rajasthan	0.50%	0.75%	1.00%	
Sikkim	Not Issued			
Tamil Nadu	0.05%			
Tripura	0.10%	0.10%		
Uttarakhand	0.03%	0.05%		
Uttar Pradesh	0.50%	1.00%		
West Bengal			0.25%	0.30%

> Tariff policy Target by 2013

< Tariff policy Target by 2013

< As per Tariff policy Target by 2013

- **RPO trajectory specified by different states is not uniform**
- **Few states need to set RPO targets as per tariff policy guidelines**

Solar capacity requirement

As per Tariff policy, Solar RPO has to begin with 0.25 % by 2013 and reach 3% by 2022

Year	Solar RPO (%)	Solar Capacity Requirement for RPO compliance (MW)
	(B)	
2012-13	0.25%	1,536
2013-14	0.50%	3,291
2014-15	0.75%	5,291
2015-16	1.00%	7,560
2016-17	1.25%	10,127
2017-18	1.75%	15,176
2018-19	2.25%	20,885
2019-20	2.50%	24,839
2020-21	2.75%	29,247
2021-22	***3.00%***	***34,152***

Demand based on the National Electricity Plan for Generation January 2012
CUF based on CERC norms are used to arrive at MW capacity

To achieve 3% RPO compliance by 2022, ~34,000MW of solar capacity would be needed

State RPO Compliance Status FY 2012-13 (Solar)

Initiatives taken	State	Solar RPO Target (2012-13)	Capacity required for meeting Solar RPO	Total Capacity Tied Up as on 07.01.2013*	Installed capacity as on 07.01.2013	Gap to be fulfilled in 2012-13
		%	(MW)	(MW)	MW	(MW)
√	Andhra Pradesh	0.25%	148.6	77.5	23.75	71.14
	Arunachal Pradesh	0.00%	-	0.025	0.03	0.00
	Assam	0.15%	6.1	5	-	1.14
	Bihar	0.75%	68.8	0	-	68.82
√	Chhattisgarh	0.50%	63.6	29	4.00	34.61
	Delhi	0.15%	25.8	2.525	2.53	23.25
	JERC (Goa & UT)	0.40%	30.9	1.685	1.69	29.22
√	Gujarat	1.00%	480.2	968.5	824.09	-488.33
	Haryana	0.75%	181.0	8.8	7.80	172.20
√	Himachal Pradesh	0.25%	13.0	0	-	12.99
	Jammu and Kashmir	0.25%	21.9	0	-	21.89
	Jharkhand	1.00%	40.2	36	16.00	4.23
√	Karnataka	0.25%	97.9	159	14.00	-61.14
	Kerala	0.25%	31.6	0.025	0.03	31.61
√	Madhya Pradesh	0.60%	192.3	207.86	7.25	-15.51
√	Maharashtra	0.25%	226.8	30.5	21.00	196.29
	Manipur	0.25%	0.9	0	-	0.91
	Mizoram	0.25%	0.6	0	-	0.63
	Meghalaya	0.40%	5.2	0	-	5.18
	Nagaland	0.25%	0.9	0	-	0.90
√	Orissa	0.15%	21.9	79	13.00	-57.11
	Punjab	0.07%	20.2	51.825	9.33	-31.60
√	Rajasthan	0.75%	248.1	330.4	206.15	-82.30
	Sikkim	0.00%	-	0	-	0.00
√	Tamil Nadu	0.05%	27.5	20.105	17.05	7.36
	Tripura	0.10%	0.6	0	-	0.61
	Uttarakhand	0.05%	3.5	5.05	5.05	-1.58
√	Uttar Pradesh	1.00%	516.1	93.375	12.38	422.74
	West Bengal	0.25%	62.9	52.05	2.05	10.88

Source: CEA base data for 2011-12 and escalated for 2012-13 based on 18th EPS escalation rates for the same period

* Based on the data provided by NVVN, State Agencies & Project developers

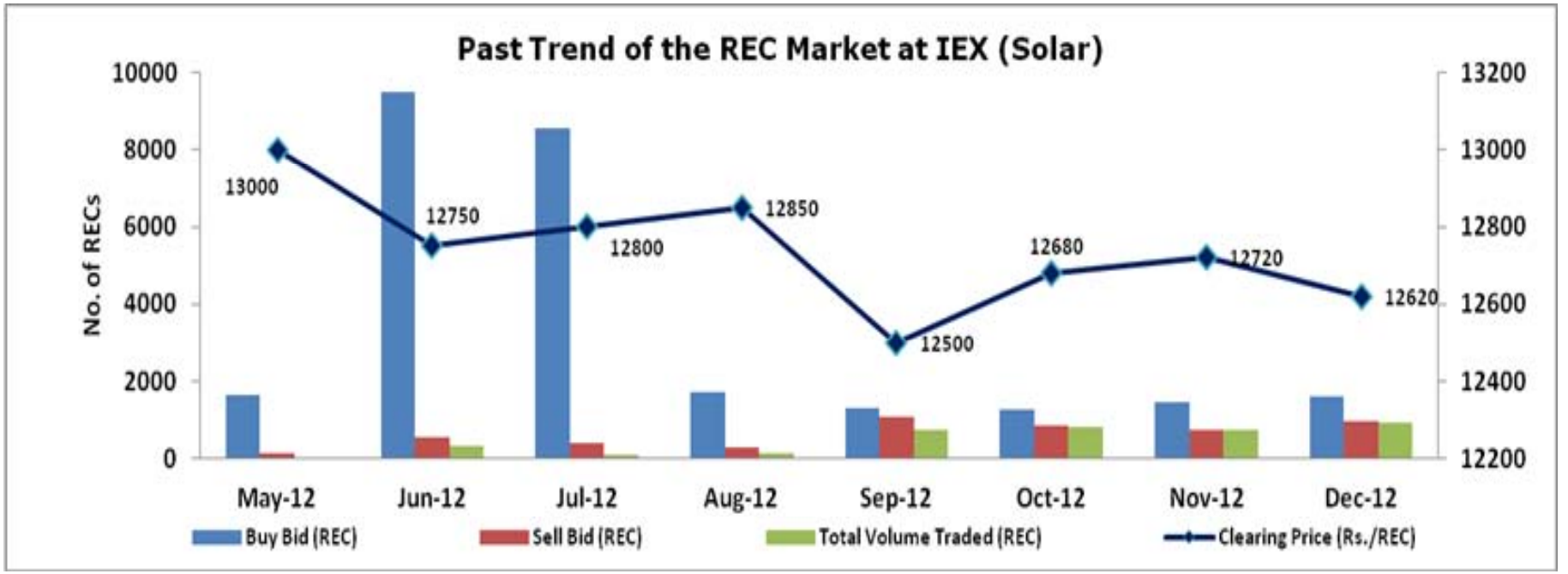
Status of REC market

Month, Year	REC Issued	REC Redeemed
Dec, 2011	88,055	111,621
Jan, 2012	102,348	171,524
Feb, 2012	200,736	206,188
Mar, 2012	203,819	199,737
Apr, 2012	122,369	71,226
May, 2012	230,697	168,685
June, 2012	259,125	236,827
Jul, 2012	382,712	158,399
Aug, 2012	474,784	274,272
Sep, 2012	569,567	265,606
Oct, 2012	621,358	224,491
Nov,2012	394,088	133,571
Total	**3,649,658**	**2,222,147**

Source: www.recregistry.nic.in

Large number of RECs have remain unsold

Solar REC Pricing and volume Trends



Prices have come down considerably - possible reason : non-compliance of RPO/Lack of interest in REC

Status of solar REC Projects

Sr No.	Company Name	State	Capacity (MW)	Date of Accreditation	Date of Registration
1	R. H. Prasad & Company Private Limited	Rajasthan	0.25	31-08-2012	N/A
2	Star DeltaTransformers	Madhya Pradesh	0.5	04-12-12	N/A
3	Deepak Spinners	Madhya Pradesh	1.0	04-12-12	N/A
4	Enrich Energy Pvt. Ltd.	Maharashtra	1	06-12-12	N/A
5	Jaibalaji Business Corporation Pvt. Ltd.	Maharashtra	1	06-06-12	25-06-12
6	M/S Gupta Sons	Madhya Pradesh	0.5	05-09-12	22-05-12
7	Omega Renk Bearings Pvt. Ltd.	Madhya Pradesh	0.105	05-09-12	14-06-12
8	Kanoria Chemicals and Industries Ltd.	Rajasthan	5	28-03-12	20-04-12
9	Numeric Power System Ltd.	Tamil Nadu	1.055	20-07-12	04-10-12
10	M AND B Switchgears Ltd.	Madhya Pradesh	2	02-03-12	04-04-12
11	Jain Irrigation Systems Ltd.	Maharashtra	8.5	20-10-11	22-05-12

Total Projects accredited = 21MW
Total Projects registered = 18MW
Total projects commissioned= 5.36 MW

Almost 6,541 Solar REC have been issued till 31-12-2012 and 6,228 Solar RECs have been redeemed

Captive Compliance Requirement

Company Name	Captive Power Capacity (MW)	Solar Capacity Required for solar RPO compliance (MW) in 2012-13
J.K. Lakshmi Cement Ltd.	93.00	3.00
Indian Petrochemical Company Ltd.	257.00	3.40
Bharat Petroleum Corporation Ltd.	189.00	4.00
Wardha Power Company Ltd.	405.00	4.20
Ultratech Cement Ltd.	129.00	5.00
KSK Energy Ventures Limited	540.00	5.57
J.S.W. Steel Limited.	600.00	6.20
Prakash Industries Ltd.	300.00	6.20
Vedanta Ltd.	1215.00	7.52
National Aluminium Company Ltd.	1255.00	7.80
Visa Steel Ltd.	405.00	8.40
Gujarat Alkalies and Chemicals Ltd.	247.00	8.70
Ambuja Cement Ltd.	290.00	10.00
Steel Authority of India(SAIL)	578.00	12.00
Bokaro Power Supply Company Pvt. Ltd.	302.00	12.50
Bajaj Hindustan Ltd.	323.00	13.50
Essar Group	367.00	14.27
Hindustan Zinc Ltd.	474.00	14.70
Jindal Steel and Power Ltd.	873.00	15.00
Sterlite Industries India Ltd.	675.00	16.80
Hindalco Ltd.	1358.00	41.70
Tata Steel Ltd.	1882.50	77.60
Reliance Industries Ltd.	2089.00	81.00
	Total	379.06

List of some large captive consumers with compliance requirement > 1MW

State RPO regulations – Few select states (1/2)

State	Favorable Provisions
Himachal Pradesh	The state has defined a longer trajectory for RPO targets (till 2021-22) in line with the Tariff Policy
Maharashtra, Rajasthan	Maharashtra has mandated each Distribution Licensee to submit the estimated quantum of purchase from renewable energy sources for each year under the Business Plan as well as under MYT Petition
Uttar Pradesh	The renewable purchase obligation specified for the year 2012-13 shall continue beyond 2012-13 until any revision is effected by the Commission in this regard. *This brings clarity and provides certainty to investors.*
Bihar	0.25% out of the renewable purchase obligation in the year 2010-11 shall be procured from solar generation and shall be increased at a rate of 0.25% every year thereafter till 2014-15 or until reviewed by the Commission. *This brings clarity and provides certainty to investors.*
Delhi	In case the total off grid usage/generation capacity exceeds 10% of the total RPO obligation of Delhi DISCOMs, the Commission may re-fix the RPO obligations of the distribution licensees taking into consideration such off grid usage/generation capacity

Most of the states have mandated the State Agency to submit quarterly status to the Commission in respect of compliance of renewable purchase obligation by the obligated entities. However, implementation needs to be enforced

State RPO regulations – Few select states (2/2)

State	Off-setting provisions
Bihar	If solar certificates are not available in a particular year, then in such cases, additional non-solar certificate shall be purchased for fulfillment of the Renewable Purchase Obligation (RPO).
Gujarat	The RPO regulations are not applicable on captive as well as open access consumers.
Karnataka	Captive users can sell their surplus power only to the distribution companies (ESCOMs) at a price not exceeding the APPC
Rajasthan	Solar RPO in Rajasthan is applicable on DISCOMS only.
Maharashtra	Captive user(s) consuming power from grid connected fossil fuel based co-generation plants, are exempted from applicability of RPO target and other related conditions as specified in these Regulations.
Kerala	The regulation does not specify the min capacity for Captive consumers for applicability of RPO.
Rajasthan	In case of genuine difficulty in complying with the renewable power purchase obligation because of non-availability of renewable energy and/or certificates, the obligated entity can approach the Commission to carry forward the compliance requirement to the next year or seek its waiver.

Definition of APPC is not uniform across states – States such as Rajasthan, TN do not include short term power purchase cost in APPC

RPO Issues

- Enforcement
- Some states have no plans or policies
- REC continuation beyond 5 years
- Lapsing of Non-Solar RECs
- Roof-Top contribution to RPO

Solar Roof-top

Solar Roof-top

- Price Rs 1 Lakh/ KW including AMC structure etc
- Can get 30% MNRE subsidy and Accelerated Depreciation benefit
- Can generate power at Rs 5-6 per Kwh for 25 years
- Space requirement is 30-50 sq m per KW including movement space

MNRE pilot for Roof-top

- Karnataka – Bangalore – 2 MW
- Tamil Nadu – Chennai – 2 MW
- Chhattisgarh – Raipur – 2 MW
- Haryana – Gurgaon – 2 MW
- Orissa – Bhubaneswar – 1 MW
- Delhi – 1 MW

Issues to be Resolved

- Grid Connectivity Guidelines for Distributed Generation
- Feed-In-Tariff with subsidy and AD Benefit
- Metering

Regulatory Issues

Section 86 (1) (e) of Electricity Act states:

"promote cogeneration and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licence;"

CEA Sub-Group Report

As per the Report of subgroup-I on Grid Interactive Rooftop Solar PV System published by CEA in December 2009

9.3 **VOLTAGE LEVELS:**

Though rooftop systems shall be generally connected on LV supply, large solar PV system may have to be connected to 11 kV system. Following criteria have been suggested for selection of voltage level in the distribution system for ready reference of the solar suppliers.

- Up to 10 KW PV system supply Low Voltage single phase supply shall be provided.
- Thereafter up to a level of 100 kW PV system, three phases low voltage supply shall be provided.
- In case load is more than 100 kW and does not exceed 1.5 MW, SPV system connection can be made at 11 kV level.
- In case load is more than 1.5 MW PV system and does not exceed 5 MW, SPV system connection can be made at 11kV/33 kV/66kv level or as per the site condition.

Manufacturing of solar

Manufacturing

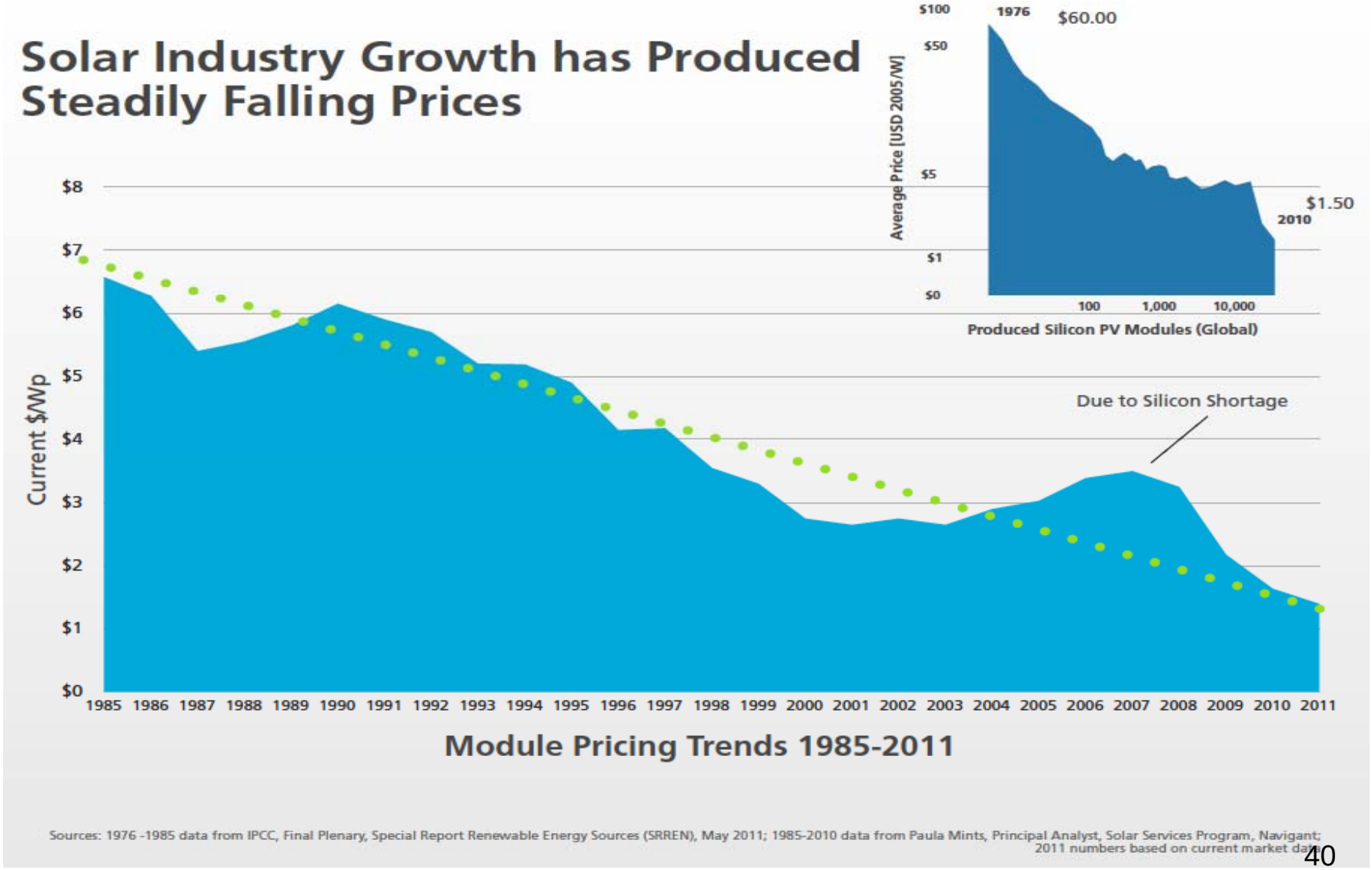
- Objectives under JNNSM:
  - To take a global leadership role in solar manufacturing
  - 4-5 GW equivalent of installed capacity by 2022
  - Setting up of dedicated manufacturing capacity for poly silicon material to annually make about 2 GW capacity of solar cells
- Manufacturing capacity of solar cells and solar modules increased from 200 MW and 650 MW in 2009 to approx. 1000 MW and approx. 1950 MW respectively.
- There is no customs & Excise duty on cells and modules; recently, custom duty is also waived on raw materials required to manufacture cells and modules.

Manufacturing capacity of Solar Cells and Modules in India

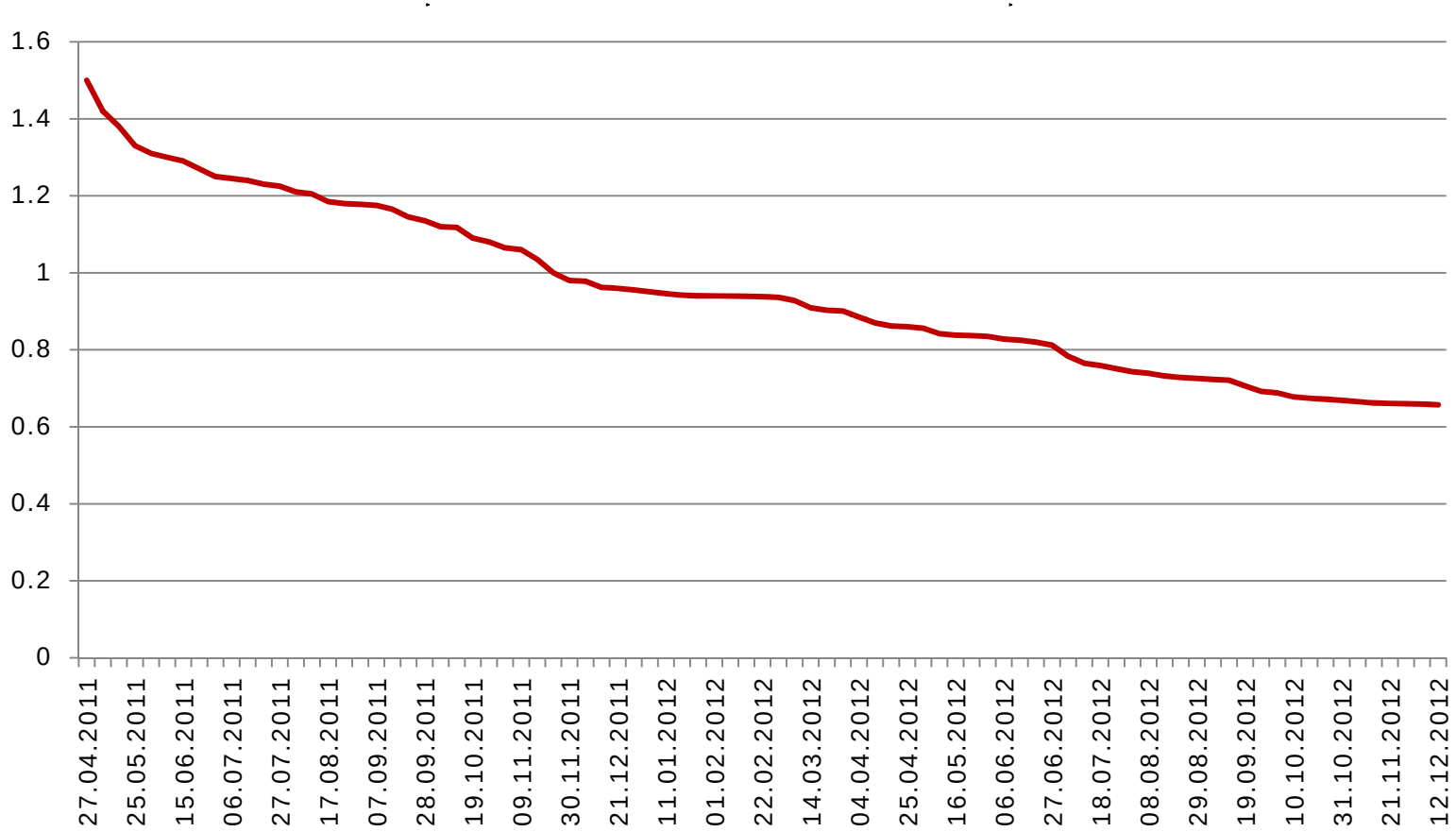
2012 Numbers	Existing	MW Capacity
Companies	Cells	Module
Access Solar		18
Ajit Solar		20
Alpex		35
Bharat Heavy Electricals Limited (BHEL)	8	8
CEL		10
EMMVEE Solar		120
Euro Multivision Ltd.	40	
Evergreen		20
Enfield Solar		20
Green Brilliance		45
HHV		50
Indosolar Ltd	360	
Jupiter Solar	45	
KL Solar	7	6
Kotak Urja Pvt. Ltd.		15
Lanco		75
Maharishi Solar Technology	2.5	17

2012 Numbers	Existing	MW Capacity
Companies	**Cells**	**Module**
Microsol		14
Moser Baer	250	280
Photon Energy Systems		50
photonix		15
PLG Power		100
Premier Solar Systems (P) Ltd.		30
Rajasthan Electronics & Instruments Ltd.	2	2
Reliance Industries Ltd		30
Shurjo		5
Solar Semiconductor	30	195
Surana Ventures		40
TATA BP Solar	96	125
Titan Energy		100
TopSun Energy		5
UPV Solar - Udhaya Energy Photovoltaics Pvt Ltd	12	7
USL Photovoltaics PVT Ltd.	6	10
Vikram Solar		100
Waaree Energy		60
Websol Energy System Limited	120	100
XL Energy Ltd.	60	210
Total	**1,038.50**	**1,937.00**

Historical Module Price Trend: prices fall as the production increases



PV Module Prices have fallen drastically in last 24 months



Source: PV Insights

Domestic Content Requirement – Phase-I of JNNSM

Programme	Solar PV	Solar Thermal
Solar Grid connected power projects – Batch 1	Crystalline silicon technology - to use the modules manufactured in India Thin film and CPV technology – allowed to be imported	30% of the total project cost to be indigenous
Solar Grid connected power projects – Batch 2	Crystalline silicon technology - to use the cells and modules manufactured in India Thin film and CPV technology – allowed to be imported	NA
Roof top and small Projects (up to 2 MW)	Crystalline silicon technology - to use the modules manufactured in India Thin film and CPV technology – allowed to be imported	
Off Grid	Use of modules manufactured in India.	

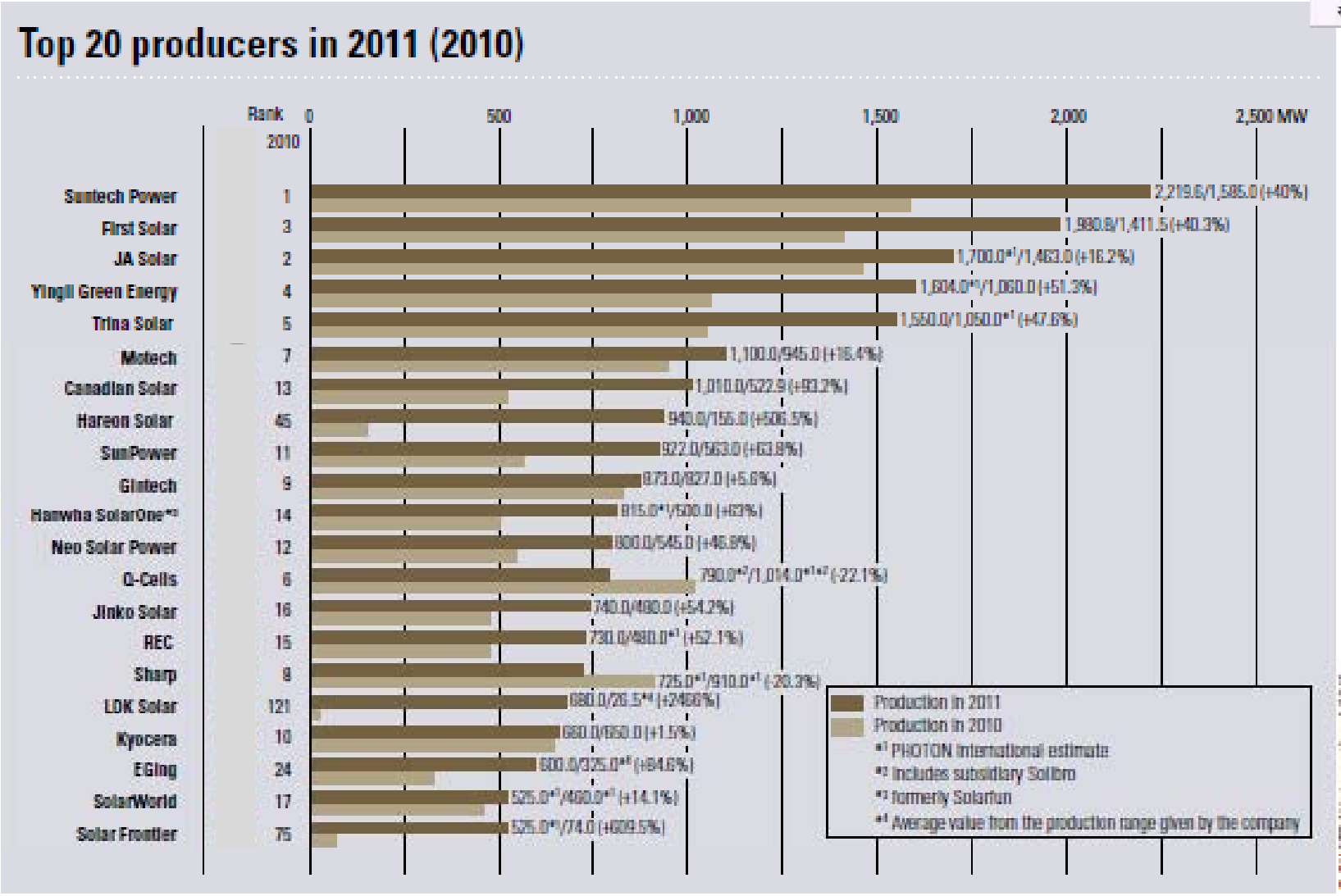
Market vs Production
(Global PV manufacturing has shifted from Japan to Europe to China)

Source: EPIA Global Outlook 2015 (published 2012)

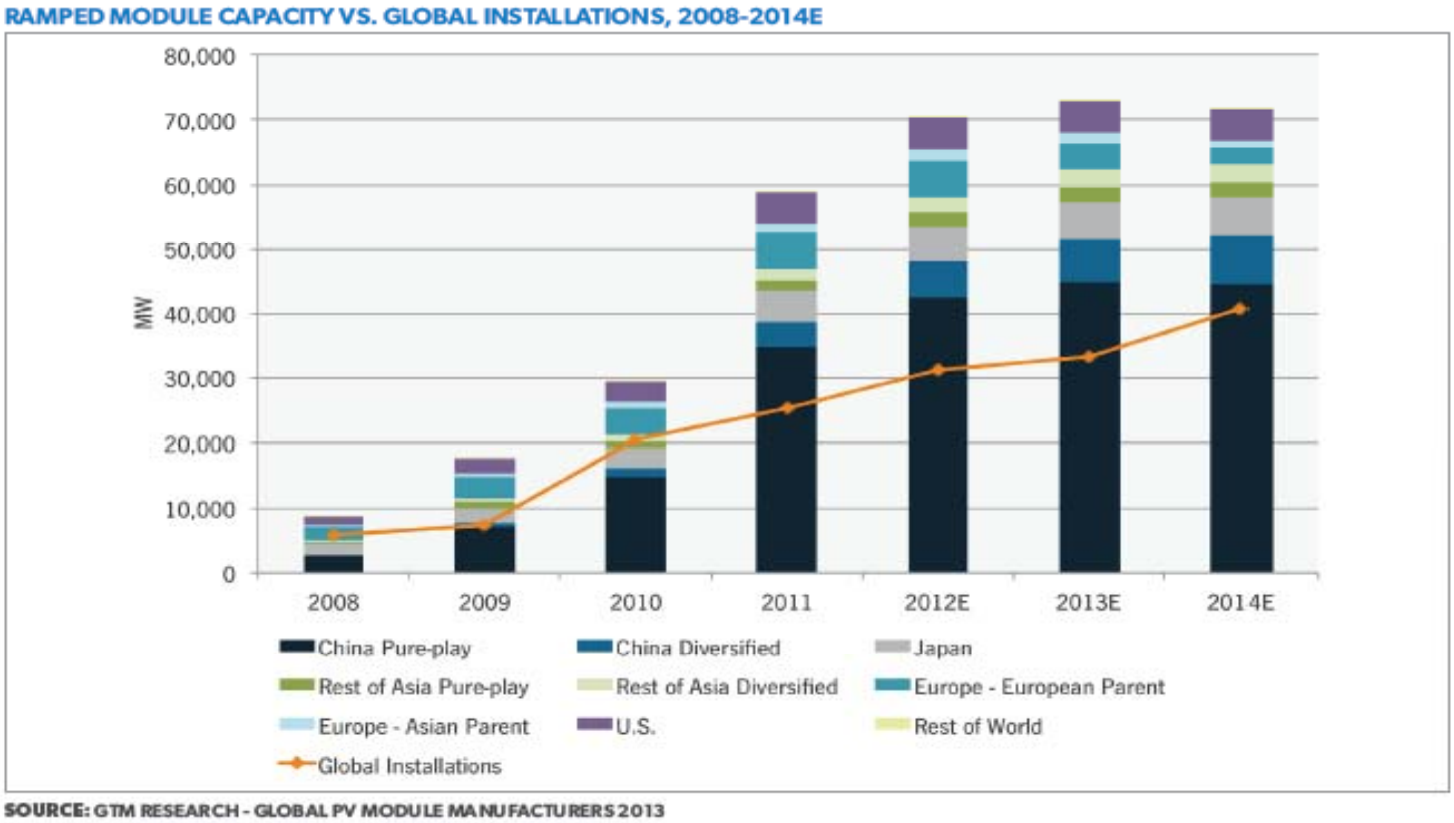
Over 10 year period 2000-10

- ✓ Japan PV production reduced from ~40-50% to less than 10% globally.
- ✓ PV installation in EU increased from less than 10% to over 80%, PV production in EU reduced from ~20% to 10% globally (negligible in 2012)
- ✓ China/Taiwan PV production increased from negligible to ~60% globally (will be over 80% in 2012).

In 2011, China/Taiwan had 12 Companies out of 20 Top Modules Producers



Quick Capacity Additions of PV production in China is leading to closure of manufacturing world over

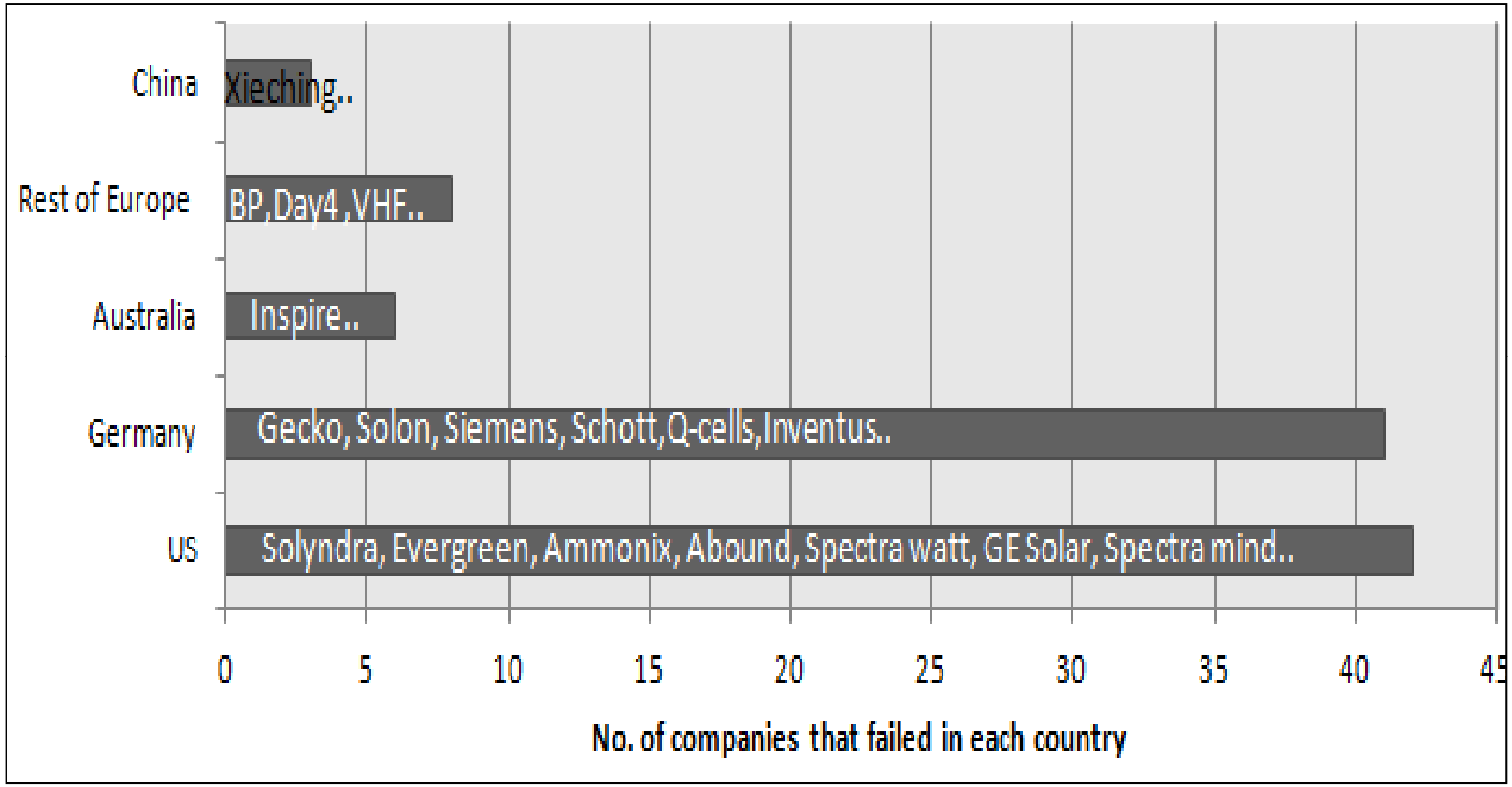


"The twin malaises of rampant overcapacity and commoditization have combined to result in a slew of plant closures, market exits and insolvencies over the past year and a half. However, the victims thus far have mostly been smaller producers in high cost regions, and this has done very little to alleviate the industry's troubles. With overcapacity likely to persist through much of 2013 and the balance sheets of most producers under severe stress, there is very little doubt that much more consolidation is on the way, and that the global PV module landscape is headed for a significant transformation." – Shyam Mehta GTM Research

GTM Research predicts 180 photovoltaic manufacturers worldwide will either go out of business or be gobbled up by other firms by 2015, and that 88 firms will very likely shut down production capacity in countries with expensive costs of doing business, including the U.S.

Source: GTM Research Report 2012

Solar PV Companies are closing down (2011-12 data)



Many small as well as big solar companies have closed down, filed for bankruptcies or reduced operations across the globe, mainly in US and Germany

Balance of System (Manufacturing in India)

	Current Players	Announcements	Capacity (MW eq.)
Inverters (<100 kW)	More than 20		As needed
Inverters (>100 kW)	OPS, AEG, ABB, Numeric	Five (Bonfig, Advanced Energy…….)	> 500 MW
Array Combiner Boxes (Junction Boxes)	Trinity Touch, Nordic India, VNT, ESK India, CAPE, Volex		> 2300
Cables	Siechem (Pondichery), Nicco (Kolkata), KEI (Okhla)		>7000
Structures	Numerous Manufacturers Across India	Big groups like Tata, L&T etc.	As needed

JNNSM has triggered huge manufacturing activity related to BOS, especially inverters and array combiner boxes in India).

It is expected that these products will better respond to high humidity, high temperatures and dust conditions in India and faster O&M response as compared to currently imported products, mainly from Europe.

BOM for Modules (Manufacturing in India)

Material	Supplier	Quantity Min/Year	Unit	QTY in MW	Origin
Junction Box	Volex	720000	Nos	169	Chennai
	Yukita	2880000	Nos	678	Greater Noida
EVA	Lucent	10M	M^2	711	Ahmedabad
	Renesys	8M	M^2	500	Bangalore
	Brij Footcare	1M	M^2	71	Delhi
	Allied	5M	M^2	355	Meerut
Backsheet	Polycom			300	Mumbai
	Renewsys			500	Bangaloe (Announed)
Glass	Borosil	105	T	500	Gujraat
	Allied	480000	M^2	69	Meerut
Ribbon	G and G			450	Bangalore
	Sukriti				
Frame	Alom	2400	MT	2 GW	Hawrah
	Valco	1600	MT	1.2 GW	Baddi
	Hindalco /Century			5 GW	No limitation on capacity
	Banco	2000	MT	1.6 GW	Vadodara

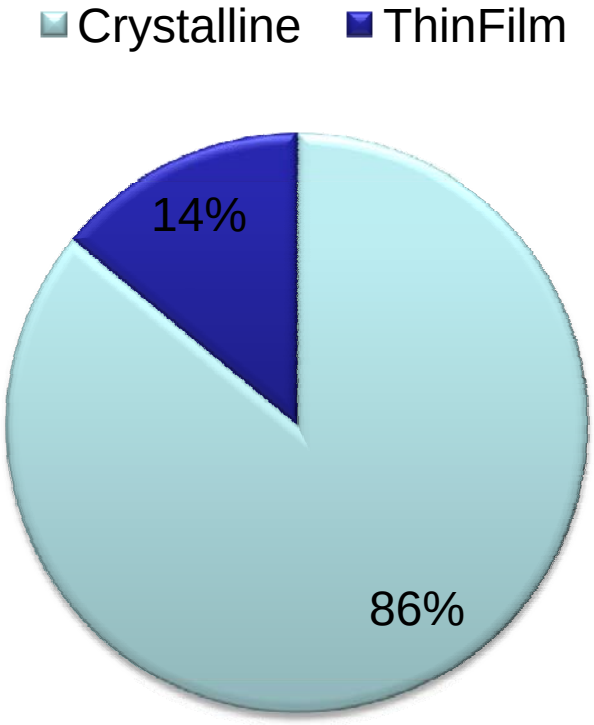
JNNSM has triggered huge manufacturing activity related to Module components. Most of the capacity creation has happened since 2010

There are many announcements for capacity additions

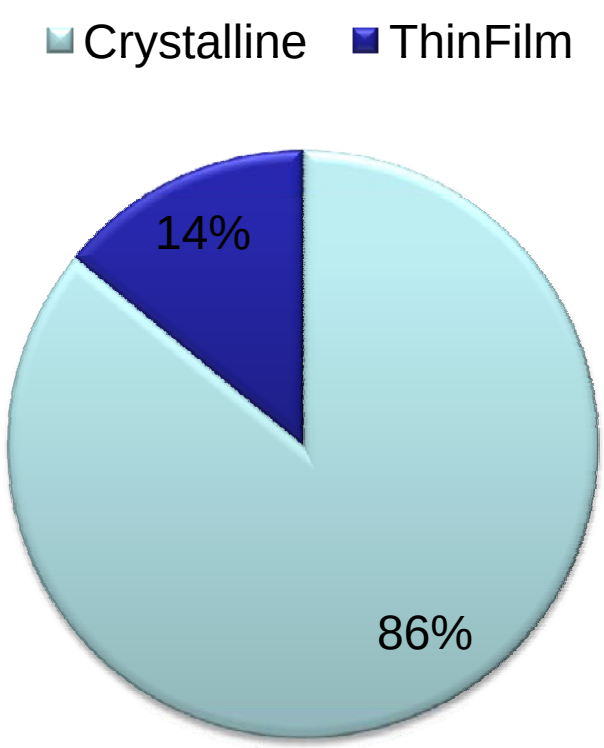
PV technologies deployed in the Indian Market vis-à-vis that globally

PV Installations-Globally

Global: PV Installations Cumulative Total ~67000MW



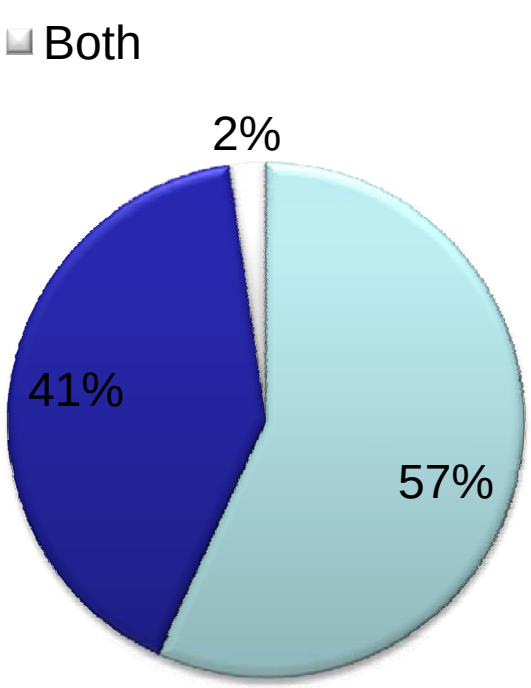
Global: PV Installations 2010 to 2011 ~44000MW



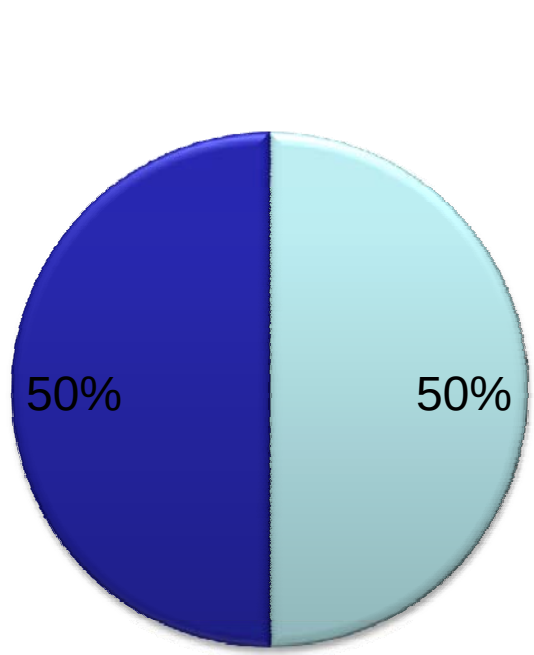
PV technologies deployed in the Indian Market vis-à-vis that globally

PV Installations-India

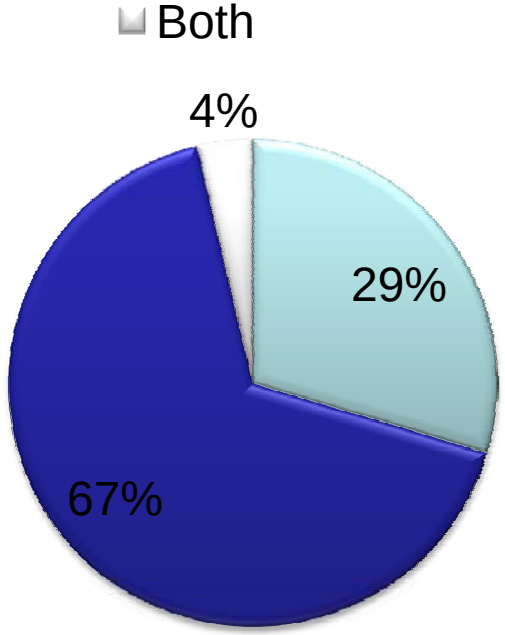
Installations under RPSSGP programme



Installations under Batch-I, Phase-I



Installations under Batch-I, Phase-I



Thank You

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