

**MINUTES OF THE FORTY FOURTH MEETING**  
**OF**  
**FORUM OF REGULATORS (FOR) HELD AT NEW DELHI**

**DATE : 01<sup>ST</sup> DECEMBER, 2014**  
**LIST OF PARTICIPANTS : AT ANNEXURE-I (ENCLOSED).**

The meeting was chaired by Shri Gireesh B. Pradhan, Chairperson, Central Electricity Regulatory Commission (CERC) and Forum of Regulators (FOR). He extended a warm welcome to all members of the Forum. The Chairperson welcomed Ms. Chandra Iyengar, Chairperson, Maharashtra Electricity Regulatory Commission (MERC), Shri Ismail Ali Khan, Chairperson, Telangana State Electricity Regulatory Commission (TSERC), and Shri Subhash Kumar, Chairperson, Uttarakhand Electricity Regulatory Commission (UERC) who were attending the FOR meeting for the first time.

The FOR thereafter took agenda items for consideration.

**Agenda Item No. 1 : Confirmation of the Minutes of the 43<sup>rd</sup> Meeting of “FOR” held during 16<sup>th</sup> – 18<sup>th</sup> October, 2014 at Hotel Royal Fort Orchid, Mussoorie (Uttarakhand).**

The Forum noted and endorsed the minutes of the 43<sup>rd</sup> Meeting of FOR held at Hotel Royal Fort Orchid, Mussoorie (Uttarakhand) during 16<sup>th</sup> – 18<sup>th</sup> October, 2014.

**Agenda Item No. 2 : To consider and discuss the report of the Working Group on “Power Supply Challenges & Way Forward”.**

Chairperson, CERC & FOR conveyed that the Forum in its Meeting held on 27.6.2014 decided, in pursuance of the request by the Hon’ble Minister of Power, to constitute a Working Group from amongst the Members of the FOR to examine the issues inter alia connected with power supply challenges and suggest a way forward. The Working Group met on 27.8.2014 and 10.10.2014 in CERC, New Delhi and decided that in order to carry out a detailed study on the above, two small Sub-Groups consisting of members from the Working Group be constituted.

**Sub-Group (I) - to study the issues relating to “24X7 Power Supply to the Consumers & Impact thereof” :**

During the 43<sup>rd</sup> FOR meeting, the Forum made specific suggestions subsequent to the presentation made by Shri M.R. Sreenivasa Murthy, Chairperson – KERC & Chairman of the Sub-Group (I) - highlighting the issues relating to “24X7 Power Supply to the Consumers & Impact thereof”. The Sub Group (I) submitted a report on the subject matter, while taking into account all suggestions / observations made by the Forum in its earlier meeting. A presentation was made by Shri Sushanta K. Chatterjee, Joint Chief (RA) highlighting the major findings from the demand-supply analysis, contours of strategy for achieving objectives, summary of recommendations as well as projected requirement of investment in respect of generation, transmission and distribution sectors (**enclosed as Annexure-II**).

The report made specific recommendations, including inter alia amendment to Coal Mining Nationalization Act to ensure fuel availability, usage of gas based generation / pumped storage to meet peak demand, payment security to RE generators, measures for energy efficiency, implementation of ancillary services, reduction in concept to commissioning time for transmission projects, amendment in policy for payment at present market value to the land owners for acquisition of RoW, optimal use of RoW, accurate estimation of demand, DTC level metering, adoption of HVDS for distribution, segregation of agricultural feeders, creation of state-level power planning cells etc.

The report also reiterated that the requirements of 24x7 power supply would be met only if the generation capacity was augmented as envisaged in the National Electricity Plan and the transmission & distribution losses were reduced to about 17.5% by 2018-19 as assumed in the 18<sup>th</sup> EPS. In addition, necessary steps were required to be taken for implementation of energy efficiency measures to significantly moderate energy consumption and peak demand. It was also emphasized that the distribution utilities should be able to contract power to meet the full demand in their area of supply.

In order to achieve 24x7, reliable, secure and quality power supply to all consumers, the Sub-Group projected estimated the total investment estimated to be Rs.15,70,397 Cr.

### ***Discussion & Decision :***

The Forum discussed the report at length and observed as under :

1. The transmission constraints are also a major factor responsible for the generation assets getting stranded and also for the low off-take of power by the distribution companies.

2. The threshold limit of urban population to avail the benefit of RAPDRP Scheme should be suitably modified to ensure coverage of larger areas into the RAPDRP fold.

The Forum endorsed the report with the suggestion that the above observations be suitably incorporated and the report be finalized by the Chairperson, FOR and sent to the Ministry of Power.

**Sub-Group (II) - to study the issues relating to “Feeder Segregation of Rural & Agricultural Loads” :**

During the 43<sup>rd</sup> FOR meeting, the Forum made specific suggestions subsequent to the presentation made by Shri Pravinbhai Patel, Chairperson – GERC & Member of the Sub-Group (II), highlighting the issues relating to “Feeder Segregation of Rural & Agricultural Loads”. The Sub-Group (II) submitted a report on the subject matter, while taking into account all suggestions / observations made by the Forum in its earlier meeting.

The report stated that State-wise experience, where the segregation of agriculture feeders was taken up, remained largely satisfactory and salutary. However, it was recommended that each State should take measures to develop customized implementation criteria to suit its specific requirements and for successful implementation of the program. States with a higher agricultural load could take up segregation in the first instance, based on the economic and technological environment as well as implementation capacity. A phased approach should be adopted at the national level to prioritize the agriculture intensive States. The States with higher agricultural sale than a suitable norm (say 10% of total consumption) could be given higher priority as feeder

segregation would result into more benefits in such States. Other States with lower agricultural sales could also be considered for assistance, if they so desire.

The report recommended that a minimum metering infrastructure including inter-alia Metering at feeder level, advanced remote metering infrastructure for DTRs was essential to assess and derive the desired benefits from feeder segregation. It was recommended that 100% metering of connections of consumers of all categories would facilitate the utility to fully account for the energy supplied, and thus make subsidy payments more transparent. Adoption of HVDS would reduce line losses. It was suggested that distributed generation such as solar pump sets could provide power to remote areas where costs of line laying and maintenance were significant and solar radiation was reasonably high. The expenditure for feeder separation on pan India basis was estimated to be to the tune of Rs.1, 67, 000 Cr.

### ***Discussion & Decision :***

The Forum discussed the report and observed as under :

- While it would be desirable to give priority to States with agricultural sale exceeding 10% of the total consumption, other States with less than this threshold limit of consumption (which could be due to lower level of electrification of agriculture in such States) should also be given due weightage for implementation of feeder segregation
- The financial impact of implementation of feeder segregation at pan India level should be explained with justification in the main report.

The Forum endorsed the report with the suggestion that the above observations be suitably incorporated and the report be finalized by the Chairperson, FOR and sent to the Ministry of Power.

**Agenda Item No. 3 : Presentation and Discussion on “Outsourcing Model for Implementation of DSM Programmes and State Energy Conservation Fund Capitalized through a Public / System Benefits Charge” – by M/s. EESL.**

A presentation (**enclosed** as **Annexure-III**) was made by Shri Saurabh Kumar, MD, M/s. EESL on key issues involved in “Outsourcing Model for Implementation of DSM Programmes and State Energy Conservation Fund Capitalized through a Public / System Benefits Charge”, which *inter alia*, included the following :

1. Flagship Projects
2. EESL – Replicable Business Models
3. DSM Based Efficient Lighting Programme
4. Programme Design: Utility driven DSM Implementation by appointing outsourced entities
5. EESL’s Investment and Administration based Service
6. EESL’s Transaction Support Service
7. Creation of State Energy Conservation Fund and its proposed Structure

During the course of presentation, Shri Saurabh Kumar highlighted the projects handled by EESL with various SERCs for implementation of DSM. He further analyzed the importance of key issues relating to creation of state energy conservation fund and its proposed structure.

The Forum appreciated the presentation.

**Agenda Item No. 4 :      Presentation and Discussion on "Necessity of Sharing Customer Information of Electricity Utilities with Credit Information Companies – Best Practices in US and Applicability in Indian context" – by a Credit Information Company (CIC), recognized by RBI.**

The Forum was informed that a Working Group was constituted by the Reserve Bank of India (RBI) on “Comprehensive Financial Services for Small Businesses and Low Income Households”. The objectives of the Working Group also included working out modalities of sharing data by the electricity utilities with credit utility companies.

The Working Group of RBI, having understood that the consumer data of the electricity utilities is governed by the Regulations of SERCs, suggested that the issue of sharing of customer information of the electricity utilities with Credit Information Companies be taken with the Forum of Regulators.

In the light of the above, a presentation (**enclosed** as **Annexure-IV**) was made by a Credit Information Company highlighting the issues relating to sharing of customer information of electricity utilities with credit information companies and the best practices adopted in US and possible applicability of the same in Indian context.

The Forum decided that a small Working Group from amongst the Forum members be constituted to examine the matter along with implications for power sector. The Group could engage with RBI directly for further clarifications, if any and submit a report on this issue for further consideration of the Forum.

**Agenda Item No. 5 :      Presentation and Discussion on "Regulated Tariff Vs. Competitive Tariff " – by DG, APP.**

A presentation (**enclosed** as **Annexure-V**) was made by Shri Ashok Khurana, Director General, Association of Power Producers (APP) on key issues involved in “Regulated Tariff Vs. Competitive Tariff”, which *inter alia*, include the following :

1. Role played by private sector in power generation.
2. Different modes available for determination of tariff, i.e., Section 62 and Section 63.
3. Way forward for revival of stranded generation projects.
4. Tariff determination for prospective capacity addition.
5. How to ensure competitive and commercially viable price discovery in an equitable and sustainable framework.

Shri Ashok Khurana highlighted the major factors impacting the energy charges and the capacity charges in the case of stressed assets. He further recommended one time shift of all the stressed competitively bid projects and projects with capped tariffs, to regulated tariff regime under Section 62. He also recommended a hybrid approach (combinations of Sections 62 and 63) for future projects.

The Forum noted the presentation.

**Agenda Item No. 6 :**                      **Presentation and Discussion on "Measures for Reduction of Technical and Commercial Losses in Distribution : Best Practices In Punjab".**

A presentation (**enclosed** as **Annexure-VI**) was made by Shri Virinder Singh, Member, PSERC, on key issues involved in “Loss Reduction Initiatives in Punjab”, which *inter alia*, include the following :



1. Segregation of Agricultural Feeders
2. Steps taken to tackle high AT&C losses

Shri Virinder Singh highlighted inter alia the major challenges segregation of feeders and metering of rural / AP feeders. He further analyzed and presented the positive outcomes of adoption of pillar box meter installations and accuracy achieved in calculation of AT&C losses owing to feeder segregation.

The Forum noted and appreciated the presentation.

#### **Other issues :**

##### ***1. Profile of the Forum of Regulators :***

- a. Chairperson, KERC opined that there was an urgent need for enhancement of the profile of the Forum of Regulators.
- b. As part of the exercise, the Forum could consider bringing out a monthly newsletter containing review of best practices adopted by various ERCs, issue press-releases after each FOR meeting, holding periodic press briefings, interactions with stakeholders etc.
- c. FOR Secretariat could submit a detailed blue-print including inter-alia, details of activities proposed to be taken up, the requirement of additional manpower, office space etc.
- d. In order to meet the above objectives, a detailed proposal on the need for hiking the subscription fee of Members also be presented.

##### ***2. Next FOR meeting:***

- a. Chairperson, KERC offered to host the next meeting of the Forum. It was decided to hold the same during January, 2015 in Karnataka.

Chairperson, CERC thanked 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 vote of thanks to the Chair.

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**LIST OF PARTICIPANTS ATTENDED THE FORTY FOURTH MEETING**

**OF**

**FORUM OF REGULATORS ( FOR )**

**HELD ON 01<sup>ST</sup> DECEMBER, 2014 AT NEW DELHI**

S. No.	NAME	ERC
01.	Shri Gireesh B. Pradhan Chairperson	CERC – in Chair.
02.	Shri Naba Kumar Das Chairperson	AERC
03.	Shri Digvijai Nath Chairperson	APSERC
04.	Shri Umesh Narayan Panjiar Chairperson	BERC
05.	Shri Narayan Singh Chairperson	CSERC
06.	Shri P.D. Sudhakar Chairperson	DERC
07.	Shri Pravinbhai Patel Chairperson	GERC
08.	Shri Jagjeet Singh Chairperson	HERC
09.	Shri Subhash Chander Negi Chairperson	HPERC
10.	Shri Basharat Ahmed Dhar Chairperson	J&KSERC
11.	Justice (Retd.) Shri N.N. Tiwari Chairperson	JSERC
12.	Shri S.K. Chaturvedi Chairperson	JERC for Goa & All UTs except Delhi
13.	Shri M.R. Sreenivasa Murthy Chairperson	KERC
14.	Shri T.M. Manoharan Chairperson	KSERC
15.	Ms. Chandra Iyengar Chairperson	MERC
16.	Shri Satya Prakash Nanda Chairperson	OERC

17.	Shri Vishwanath Hiremath Chairperson	RERC
18.	Shri S. Akshayakumar Chairperson	TNERC
19.	Shri Ismail Ali Khan Chairperson	TSERC
20.	Shri Niharendu Chakraborty Chairperson	TERC
21.	Shri Desh Deepak Verma Chairperson	UPERC
22.	Shri Subhash Kumar Chairperson	UERC
23.	Shri Alok Gupta Member	MPERC
24.	Shri Virinder Singh Member	PSERC
25.	Shri Sushanta K. Chatterjee Joint Chief (RA)	CERC
<b>SPECIAL INVITEES</b>		
26.	Shri M. Deena Dayalan Member	CERC
27.	Shri A.K. Singhal Member	CERC
28.	Shri A.S. Bakshi Member	CERC
29.	Shri A.K. Saxena Chief (Engg.)	CERC

**Report of the Sub-Group (I)**  
**on**  
**Strategy for Providing**  
**24x7 Power Supply**

**Forum of Regulators**

**1.12.2014**

# Index

- Objectives of 24x7 Power Supply
- Demand Supply Analysis
- Demand Supply Analysis: Major Findings
- Contours of Strategy for Achieving Objectives
- Summary of Recommendations:
  - Generation
  - Transmission
  - Distribution
- Projected Investment:
  - Generation
  - Transmission
  - Distribution

# Objectives of 24x7 Power Supply

- Reliable 24x7 power supply to domestic, industrial and commercial consumers by 2018-19
- Power supply for irrigation pump for 8 to 10 hours a day depending upon the agro climatic factors in different States
- Access to all unconnected households by 2018-19

# Demand Supply Analysis

- As on 31.8.2014
  - The installed generation capacity was about 253 GW.
  - Peak Demand met less than 130 GW against the Unrestricted Peak demand of 156 GW
  - The inability to meet the peak demand was mainly due to
    - Coal and gas power plants operating at low PLF because of fuel supply constraints
    - Low off-take from discoms.
- Projected requirement for future
  - By 2018-19, as per the 18<sup>th</sup> Electric Power Survey (EPS) of Central Electricity Authority (CEA)
    - Energy requirement is expected to be 1552 Billion Units (BU)
    - Peak demand about 229,465 MW.



# Demand Supply Analysis: Major Findings

- The energy requirement and demand projections take into account the requirements of electricity supply to all households by 2016-17.
- The requirements of 24x7 power supply as defined above will be met only if
  - The generation capacity is augmented as envisaged in the National Electricity Plan.
  - The T&D losses are reduced to about 17.5% by 2018-19 as assumed in the 18<sup>th</sup> EPS.
  - Energy efficiency measures are implemented to significantly moderate energy consumption and peak demand.
- The distribution utilities are able to contract power to meet the full demand in their area of supply.

# Contours of Strategy for Achieving Objectives

- Ensuring adequate capacity additions and power procurement from conventional and renewable sources
- Optimizing energy mix to reduce power procurement costs and improving operational efficiency of state generation plant(s)
- Strengthening the Transmission and Distribution (T&D) network
- Substantial reduction of AT&C losses as per a specified loss reduction trajectory
- Energy conservation and energy efficiency measures to reduce specific end-use energy consumption
- Assisting distribution utilities to become efficient service providers and improve their financial viability.
- Every state will need to prepare its own detailed roadmap/plan for achieving the objective of 24x7 power supply

# Summary of Recommendations: **Generation** (1/4)

- Considering the low level of per capita consumption in the country,
  - generation capacity addition should be vigorously pursued even beyond the target set for the 12<sup>th</sup> and 13<sup>th</sup> Plans.
- Achieving a high PLF of 80 to 85% for coal-based thermal plants
  - should receive the highest priority.
  - Adequate coal linkages and supplies should be ensured for all commissioned capacities and for the plants likely to be commissioned within the next five years.
- **Generation Projects:**
  - The generation projects envisaged for completion by 2018-19, need to be given priority in fuel linkage.
  - For continuity of 24x7 power supply beyond 2018-19, other projects envisaged in the 13<sup>th</sup> plan should also get initiated with their fuel linkages being considered.

# Summary of Recommendations: **Generation** (2/4)

- **Domestic Coal Supply:**

- The projected domestic coal requirement will be over 800 Million tonnes by 2016-17 against the projected availability of only 560 million tonnes for the power sector.
- Amendment of Coal Mining Nationalization Act is required to enable auction of coal blocks to interested mining companies.

- **SPV for Coal Blocks:**

- Special Purpose Vehicle (SPV) be constituted to expeditiously obtain environmental and other clearances before auctioning coal blocks for exploitation by mining companies.

- **Coal Logistics:**

- It is recommended to ensure adequate rakes capacity to transport coal.
- Use of washed coal should be promoted alongside augmentation of coal supply for achieving higher PLFs.

# Summary of Recommendations: **Generation** (3/4)

- **Gas Based Power Plants:**

- Gas based generation for meeting the peak demand may be bundled with other sources of energy to make peak power affordable for distribution companies.

- **Renewable Based Generation:**

- Considering that the renewable have a short gestation period, there should be emphasis on renewable capacity addition particularly in solar and wind energy.
- Discoms should be made to make payment to RE generators on priority, preferably by opening LCs.

- **Operationalize and augment pumped storage capacity:**

- There is a need to operationalize the existing pumped storage capacity
- Over the next five years another 5000 MW of umped storage should be planned to meet the peak demand and manage the variability of renewable energy sources.

# Summary of Recommendations: **Generation** (4/4)

- **Adopt Energy Efficiency:**
  - There is need to promote adoption of efficient appliances particularly lighting devices and irrigation pumps.
  - Efficient pumps can save 50 Billion Units (BU) per annum and avoid about 10,000 MW of generating capacity.
- **Renewable Energy Management Systems:**
  - It is recommended to establish “Renewable Energy Management Centres” at least in the States of Karnataka, Tamil Nadu, Andhra Pradesh, Maharashtra, Gujarat, Rajasthan and Madhya Pradesh to begin with.
- **Ancillary Services:** In order to have higher penetration of the renewable energy generation,
  - Ancillary services like frequency balancing mechanisms through gas based power plants, hydro plants, pumped storage plants and also emerging cost effective storage technologies should be promoted.

# Summary of Recommendations: **Transmission** (1/2)

- Prune time to complete the project
  - Concept to Commissioning time to ~40 months.
  - Conceptualization-to-award process from ~21 months to ~5-6 months
  - MoP can save ~5-6 months - key clearances in parallel to the project bidding phase.
- Policy for Realistic Compensation for land acquisition:
  - Land acquisition for ROW to build transmission lines
  - Facilitation through policy for payment of compensation to land owners based on the present market value.
- Optimum utilization of existing ROW:
  - Optimal utilization of existing ROWs through construction of multi circuit lines
  - Up-gradation and re-conductoring of existing lines can save valuable time, cost, RoW and forest cover.

# Summary of Recommendations: **Transmission** (2/2)

- Use of High Performance Conductors in Existing & New Lines:
  - Use of High Performance Conductors
  - HTLS to increase power transfer intensity.
- The loadability of the existing transmission system:
  - should be increased by adding adequate reactive power compensation through series compensation / dynamic shunt compensation / FACTS / mechanically switched capacitor banks.
- Underground lines for all transmission below 220 kV.
- Transmission infrastructure as recommended in the report on Green Energy Corridors prepared by FOR / MNRE at
  - Intra-state / Inter-state / Inter-regional levels to evacuate additional capacities of renewable energy and remove the transmission constraints.



# Summary of Recommendations: Distribution (1/3)

- Accurate estimation of demand duly factoring in:
  - Increased electrification of rural areas / Demand side management measures
- Each state would need to undertake an intensive study to with focus on
  - Load estimation / growth, Actual level of transmission and distribution losses
- The strategy for 24x7 power supply must include
  - Universalization of consumer level and DTC level metering.
  - SERCs should mandate implementation of DTC metering with Advanced metering systems as part of the capital expenditure of the distribution utilities.
- Mission mode approach for achieving 100% electrification of unelectrified households, particularly in states, which have less than the national average proportion of electrified households.
- A separate machinery with special funding arrangements to implement the programme in states like Bihar, Assam, Uttar Pradesh, Jharkhand and Orissa, which have less than 50% of the households with electricity supply

# Summary of Recommendations: Distribution (2/3)

- A special programme for aggressive reduction of AT&C losses to reduce the losses at the rate of 2 % per year over the next five years.
- Support for Discoms to strengthen distribution networks by
  - Adopting High Voltage Distribution System (HVDS)
  - Improving the metering system
- Feeder segregation to separate agricultural feeders from other rural feeders.
- Replacement of inefficient irrigation pumps with
  - Star rated pumps should be made mandatory where agricultural consumption exceeds 10 % of the total electricity consumed in a state.
  - Adoption of solar irrigation pumps should be encouraged by providing 50 % of the cost as subsidy.

# Summary of Recommendations: **Distribution** (3/3)

- For the financial health of the sector, it is essential to ensure availability of
  - Adequate institutional finance
  - Timely payment of subsidies by State Governments
  - Adequacy and regularity of tariff revision by the SERCs
- One time liberalization of financial restructuring package introduced on the recommendation of the Shunglu Panel to clean up the balance sheets of all distribution utilities.
- Accountability of each level of discom accountable for sale of power in every feeder.
- Discoms required to function as commercial entities for providing service with regard for financial returns.
- Establishment of Power Planning Cells to undertake long term planning and coordination

# Projected Investment: **Generation**

- The generation investment envisaged by 2018-19
- The prevailing rate per MW has been considered
- Average rate of 6.5 Cr. per MW is considered for RE
- Total investment required is around Rs. 7,23,397 Cr.
- A major share of this investment is likely to come from the private sector.

Year	Thermal	Nuclear	Hydro	High RE	Total
<b>Total addition – MW</b>	51560	11500	13889	40810	117759
<b>Cost per MW in Rs. Cr</b>	4.5	10	8	6.5	--
<b>Investment Rs. Cr</b>	232020	115000	111112	265265	723397

# Projected Investment: Transmission

- The total investments for development of transmission system is estimated at about Rs 2,00,000 Crore.
- By 2018-19, an additional investment of Rs,1,20,000 Cr. is required
  - For transmission system Rs.90,000 Cr.
  - For reactive power compensation Rs.30,000 Cr.
- Total investment required in the transmission system is difference of Rs.320,000 & Investment already made in first two years of 12<sup>th</sup> plan.

# Projected Investment: Distribution

- Expansion of distribution networks to ensure electricity supply to the 80 million un-electrified households.
- The financial implication of the extension of service to the un-electrified households is estimated at about Rs.1,60,000 Cr. at an average cost of about Rs. 20,000 per household.
- Feeder segregation and other improvements requires Rs. 1,67,000 Cr.
- Reduction of AT&C losses to about 17.5 % by 2018-19 (NEP). This and the load growth would require an investment plan of about Rs. 1,75,000 Cr.
- In addition to present R-APDRP spending of 10,000 Cr. towards IT enabled services, Rs. 25,000 Cr. is estimated to be required for Distribution Management.
- Total Investment in Distribution System would be Rs. 5,27,000 Cr.

# Projected Investment: Total and Impact

- Total investment: In order to achieve 24x7, reliable, secure and quality power supply to all consumers, the total investment estimated is
  - around Rs. 15,70,397 Cr.
- Impact on Tariff:
  - The investment of Rs. 15,70,397 Cr. will result in the sales of about 1280 BU.
  - The cost of servicing this capital works out to Rs. 1.59, while the loss reduction to 17.5% by 2018-19 from the current level will result in a reduction of about 50 paise in the tariff.
  - Effective increase in cost of service corresponding to capital investment will be Rs. 1.09.

Thank you



# **DSM Outsourcing Model and ECF through Public Benefits Charge**

***Presentation***

***Saurabh Kumar***

***Date: 1<sup>st</sup> December, 2014***

***Venue: Delhi***



# Flagship Projects

S No:	Sector	Project	Annual Energy Savings Achieved	Estimated Investments in 2014-15 and 2015-16
1	Home efficient lighting (DELP)	<ul style="list-style-type: none"> <li>Replacement of inefficient incandescent bulbs to LEDs in households</li> </ul>	56 million kWh/ 6 lakh replacements	Rs. 500 crores (2 crores replacement)
	Project completed in Puducherry			<b>500 MW load reduction</b>
2	Agriculture Demand Side Management	<ul style="list-style-type: none"> <li>Replacement of inefficient agriculture pumps with energy efficient pumps</li> </ul>	4867 kWh/ pump replacement	Rs. 100 crores (10,000 pump replacement)
	Project completed in Hubli			<b>10.5 MW load reduction</b>
3	Urban EE – Street lighting in ULBs	<ul style="list-style-type: none"> <li>Replacement of 3 lakhs inefficient street lights across the states of AP, Delhi, Puducherry, Tripura, Kerala, and Nashik</li> </ul>	186 million kWh	Rs. 300 crores
	Project under implementation in Nashik			<b>10.5 MW load reduction</b>



# EESL – Replicable Business Models

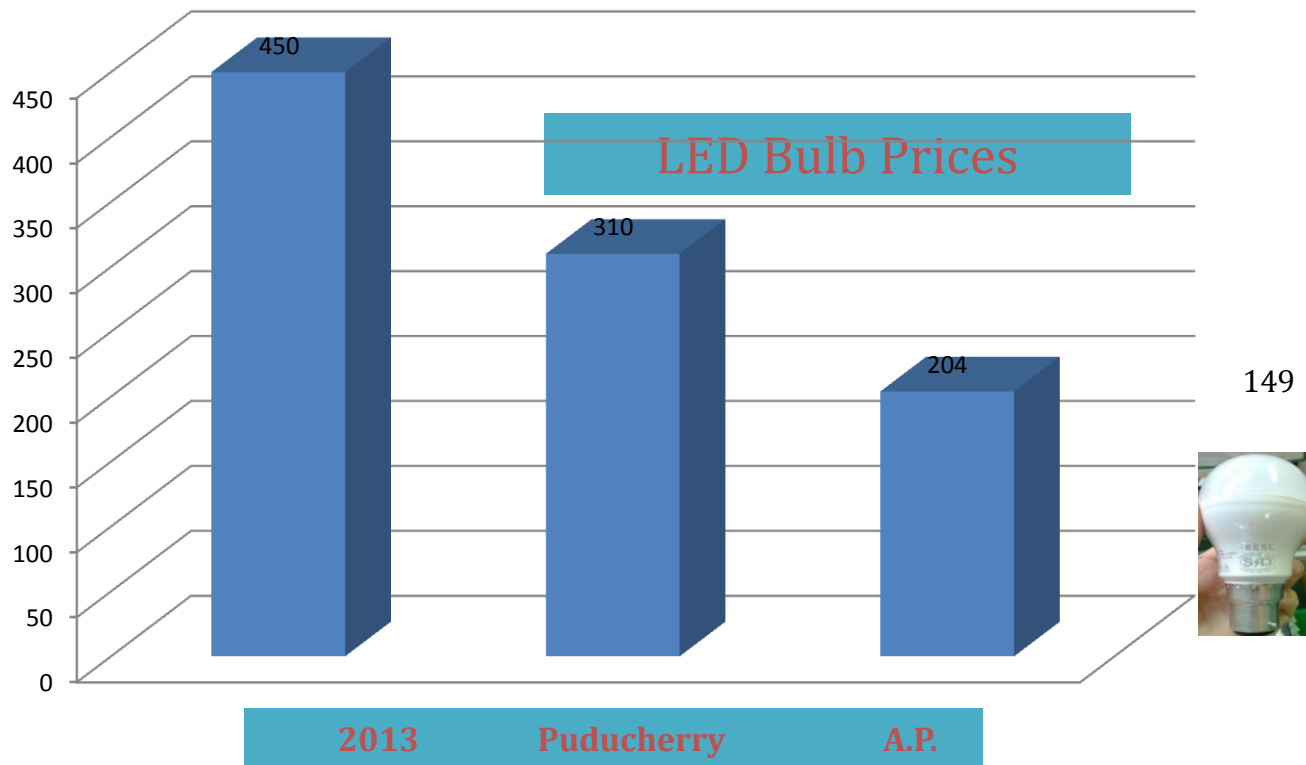
- No upfront capital investment by states/ ULBs
- 
- Incentives for participating entities – LED bulbs at Rs. 10 to household consumers, free EE pumps for farmers, maintenance free LED street lights
- Deemed savings approach – demonstration of energy savings upfront
- Risk mitigation – technical risk through back to back arrangement with suppliers.
- Financial risk – BG, ESCROW and Revolving LCs – Approval by ERCs for bulb and agriculture programme (part of ARR) and state govt guarantee for Street Lights
- Awareness and outreach in project areas

# DSM based Efficient Lighting Programme (DELP)



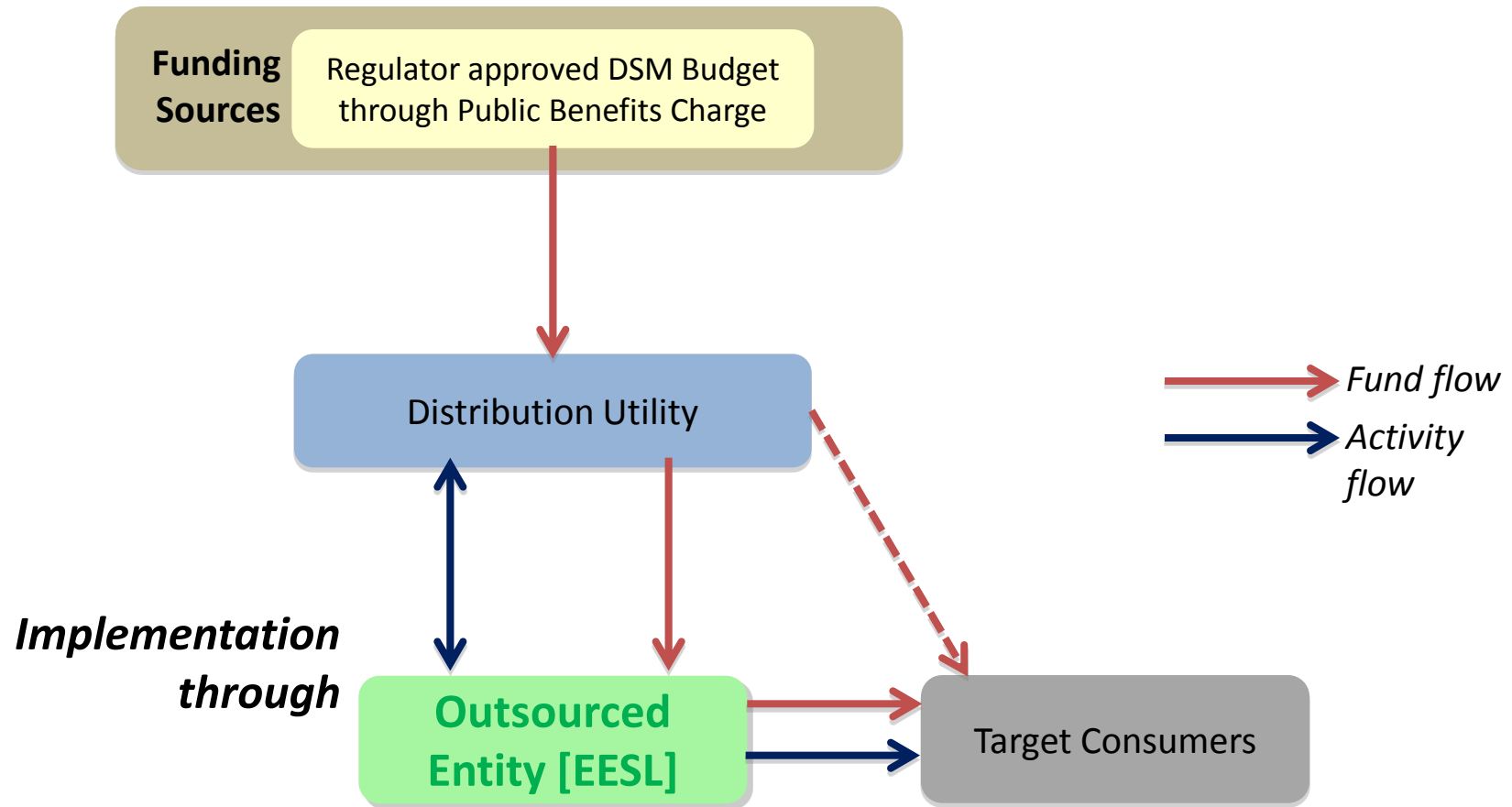
# DELP – Effect on Market Prices of LEDs

- ✓ LED bulb prices reduced by 50%
- ✓ LED street lights prices reduced by 30%
- ✓ Warranties of 5-10 years provided – high quality luminaries being procured.





# Program design: Utility-driven DSM implementation by appointing Outsourced Entities



# HVAC EE Program in MSEDCL is expected to result in total demand savings of 1.17 MW per annum

Clears all cost-benefit tests as per MERC's DSM Regulations

## MSEDCL

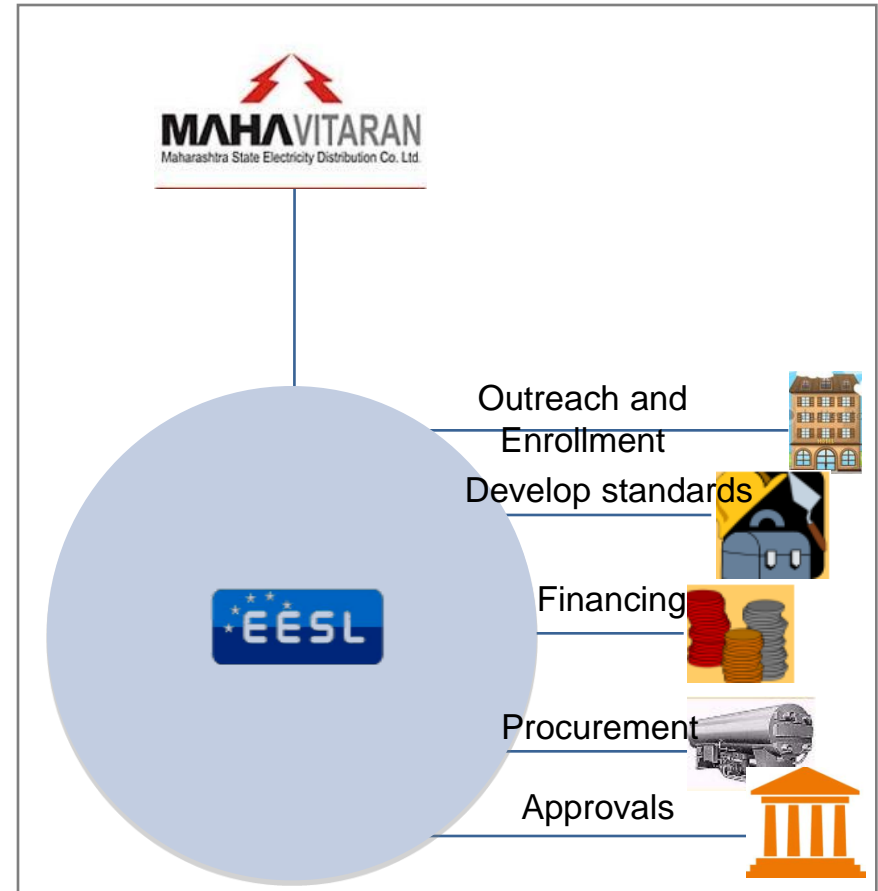
	<i>Target</i>	<i>Annual Energy Savings</i>	<i>Annual Demand Savings</i>	<i>Rebate (25%)</i>
Fan replacement	20,000	1.35 MU	0.44MW	Rs0.7 Cr
Unitary AC replacement	-	-	-	-
Chiller replacement	15	2.59 MU	0.77MW	Rs0.83 Cr
Chiller retro-commission	15	0.55 MU	0.00	Rs0.45 Cr
		<b>4.49 MU</b>	<b>1.17MW</b>	<b>Rs 1.98 Cr</b>

# EESL integrated source for designing, marketing, and implementing MSEDCL's DSM Programme



Traditional Approach

**Vs**



EESL's Approach



# EESL provide its services in any of the two ways

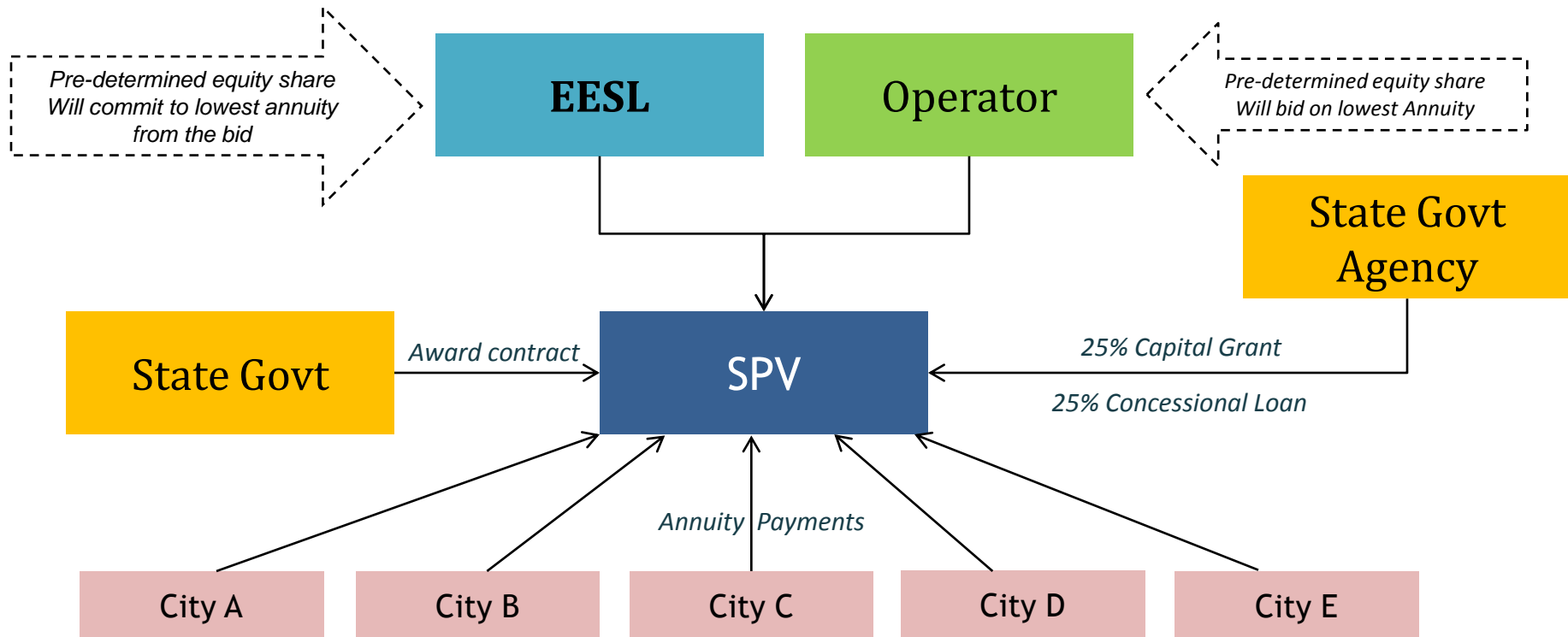
## EESL's Investment and Administration based Service

- Identifying, designing and implementing the identified intervention using EESL's own funds
- Following government norms of procurement, EESL sources the goods and services by open and competitive bidding
- Contractual agreement between EESL and equipment supplier, that ensures entire technical performance risk is passed on to the supplier for achievement of expected outcome
- State-wide awareness campaigns, and customer enrollment program
- Two-pronged approach adopted for Monitoring and Verification – on real-time basis and through third party

## EESL's Transaction Support Service

- Consumer outreach, awareness and marketing
- Finalization of technical specs
- Development of procurement bidding documents
- Development of contract documents to be signed between vendor partners & facility owners
- Desk support and program management
- Field implementation through vendor partners – delivery, replacement, disposal
- Implement M&V protocol

# SPV for Bundled Street Light Projects



EESL involvement to increase bankability from private sector perspective

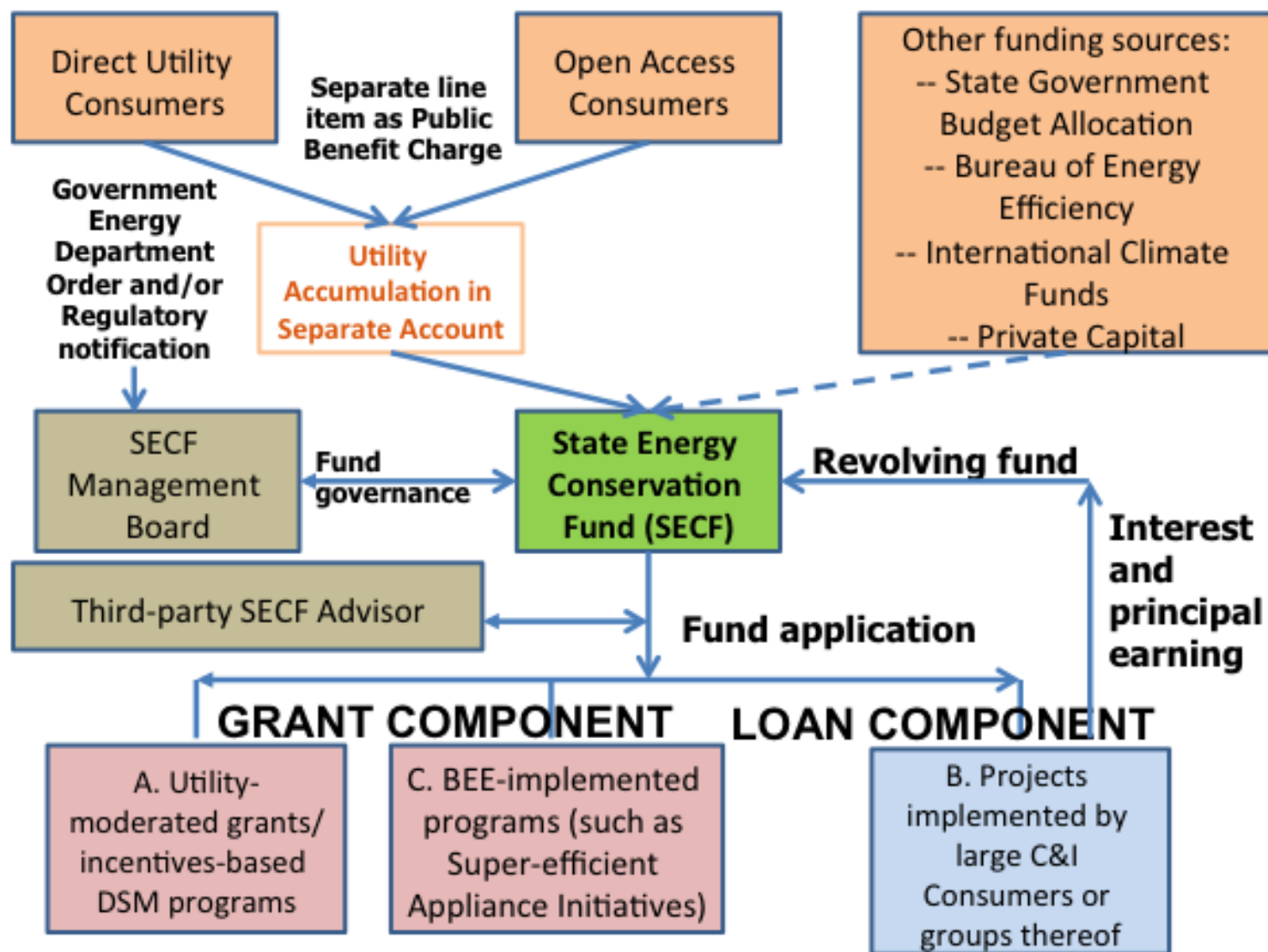
Proposed structure to have no financial impact to State Government

## EESL's role in Gujarat DISCOMs

- Commission has notified DSM regulations that mandates the DISCOMs to prepare and implement DSM action plans of worth INR 50Cr each
- Support on DSM petition filing to UGVCL and PGVCL
- DSM Programs prepared on AgDSM, replacement of incandescents, ACs, and Fans for submission to GERC
- Transaction support to DISCOMs for implementing DSM programs – Energy Audits, Installation of Solar Pumps, and Replacement of ICLs and Fans

- Lack of immediate financing → key barrier for DSM implementation by utilities
- DSM costs recoverable through ARR, but utility needs to spend upfront and recover later → dedicated fund provides a large advantage
- Suggested mechanism for creation of Energy Conservation Fund :
  - **Allow collection of Public Benefits Charge:** from all consumers at pre-defined fixed price per unit for pre-defined fixed period of time (say Rs. 0.01/kWh); also leveraged through SDA Energy Conservation Fund
  - **Types of programs funded:** e.g. rebates to residential & small commercial consumers on first cost of efficient equipment, energy audits for large consumers, administrative costs of third party implementer, etc. → pre-defined at outset
  - **Types of offtake:** Grants/ loans/ incentives; set up as a Revolving Fund
  - **Fund management & capitalization:** Through Fund Manager – e.g. commercial banks/ other funding conduits or EESL
  - **Additional funding:** Potential equal funding from State Government
- ECF set up at State/ utility level
- Public Benefits Charge collected in Maharashtra would be Rs. 90 Crores per year and in Karnataka would be Rs. 50 Crores per year – would give substantial boost to project implementation

# Proposed structure



## ERCs leading by example

### Punjab

- Commission notified DSM regulations that allowed for recovery of costs incurred in DSM activities through adopting DSM funding approaches
- Accordingly PSPCL, created DSM fund by levying a public benefit charge of 1 paise per unit of electricity sold to all consumer categories
- INR 37.74 Crores have been claimed in petition for FY14-15 towards creation of DSM funds.

### West Bengal

- To promote usage of efficient lighting technology, commission directed a 25% tariff rebate on usage of metered, LED street lights
- In order to reduce overall system T&D loss and to flatten load curve, the commission has directed a load factor rebate on improvement of existing system load factor

### Gujarat

- Commission has notified DSM regulations that mandates the DISCOMs to prepare and implement DSM action plans of worth INR 50Cr each.

**Thank You**

# CONSUMER SERVICES DATABASE™ (CSD)

To: Forum of Regulators  
1<sup>st</sup> Dec'14





- Equifax Credit Information Services Pvt. Ltd. (ECIS) is a credit information company that was granted its “Certificate of Registration” on 26<sup>th</sup> March, 2010 by Reserve Bank of India to carry out business
- ECIS is a joint venture among Equifax Inc. and seven leading Indian financial institutions – SBI, BOI, BOB, BOI, Union Bank, Kotak Mahindra Prime, Religare Finvest, Sundaram Finance Ltd.
- Equifax (NYSE:EFX) is a **\$2.3 billion** global information solutions company and member of the **S&P 500** with a heritage dating back **115 years**.
- Equifax maintains data on more than **600 million consumers, 81 million businesses**, and **247 million employee files** worldwide.



## **Credit information means any information relating to-**

- 1) the amount and the nature of loans or advances, amounts outstanding under credit cards and other credit facilities granted or to be granted, by a credit institution to any borrower.
- 2) the nature of security taken or proposed to be taken by a credit institution from any borrower for credit facilities granted or proposed to be granted to him.
- 3) the guarantee furnished or any other non-fund based facility granted or proposed to be granted by a credit institution for any of its borrower.
- 4) the credit worthiness of any borrower of a credit institution.

## **Specified users means-**

- 1)an Insurance company
- 2)cellular or phone services company
- 3)credit rating agency registered with SEBI
- 4)stock broker
- 5)trading member.
- 6)SEBI
- 7)IRDA.

## **Recommendation - Nachiket Mor Committee on Comprehensive Financial Serves for Small Businesses and Low Income Households**

- There is a need to develop a robust legal and regulatory framework around customer data generated in various transactions (credit and payments, digital and off-line), with the objective of customer ownership of their own transactions data and its use, among others, for signalling credit-worthiness. RBI should constitute a Working Group comprising TRAI, CERC, and Credit Information Companies to develop a framework for sharing of data between telecom companies, electrical utilities, and credit bureaus.
- This framework should be in keeping with the FSLRC's draft Indian Financial Code which recommends the creation of regulations on the collection, storage, modification and protection of personal information by financial services providers; and establishment of mechanisms to ensure that consumers have access to, and are given an effective opportunity to seek modifications to, their personal information.

## **Terms of Reference - RBI Working Group development of a framework for sharing of data between telecom companies, electrical utilities, and CICs.**

- Reporting by electric utilities / telecom companies of data pertaining to their customers' bills payments in an appropriate format for sharing with Credit Information Companies that would reflect the credit worthiness of their customers
- Collection, storage, modification, ownership and consumer protection issues around collection and sharing of such data keeping in view the draft Indian Financial Code of FSLRC
- Examining the feasibility of the above from the point of view of extant legal and regulatory framework and changes required therein for the purpose of signalling credit worthiness
- Benefits of such reporting for the various stake holders viz. customers, electric utilities and telecom companies, CICs and the credit information system at large

## Equifax and utilities have partnered to build a unique industry database

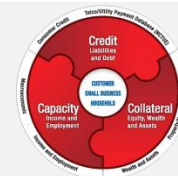
### Telco, Satellite TV, and Utilities Exchange



- › Members are from Telco, Cable and Satellite TV, and Utilities markets
- › Members control and own the data
- › Responding to consumer advocacy pressure to report



- › Manage the data for CSD
- › Highly entrusted stewards of the data since 1996
- › Permitted use of the data in member and non-member markets
- › Data usage rights and restrictions apply



### *We've come a long way...*

**1997:** Exchange was founded and Equifax was selected as the vendor

**2008:** Alternative Payments Database was created to capture full payment history

**2010/2011:** Technology enhancement and work through data certification, data quality and full file reporting/contribution

**2002/2003:** 37 regional companies merged into exchange and added cable satellite providers (DOJ approved)

**2009:** First three companies agree to contribution – 145M accounts and 90M unique consumers

**2012:** Total database size has increased to 300M accounts and 171M+ unique consumers

- › Member-owned
  - › Established in 1996 and approved by the DOJ
  - › Member Board of Directors
  - › Not-for-profit
  - › FCRA-compliant exchange database
  - › Blind trade reporting
  - › Must contribute data to join and extract data
  - › Membership is available to Utilities, Wireless, Wireline, and Cable and Satellite TV industries.
- › Members Share:
    - › Identity data
    - › Tradeline - level information = Identity data 24+ month payment history
    - › Service types and providers
    - › Unpaid final's
    - › New applications

## IExchange has grown to over 300M accounts

### Consumer Services Database (CSD)

Consumer identity, contact and payment information in the Telco, Cable and Satellite TV and Utilities space

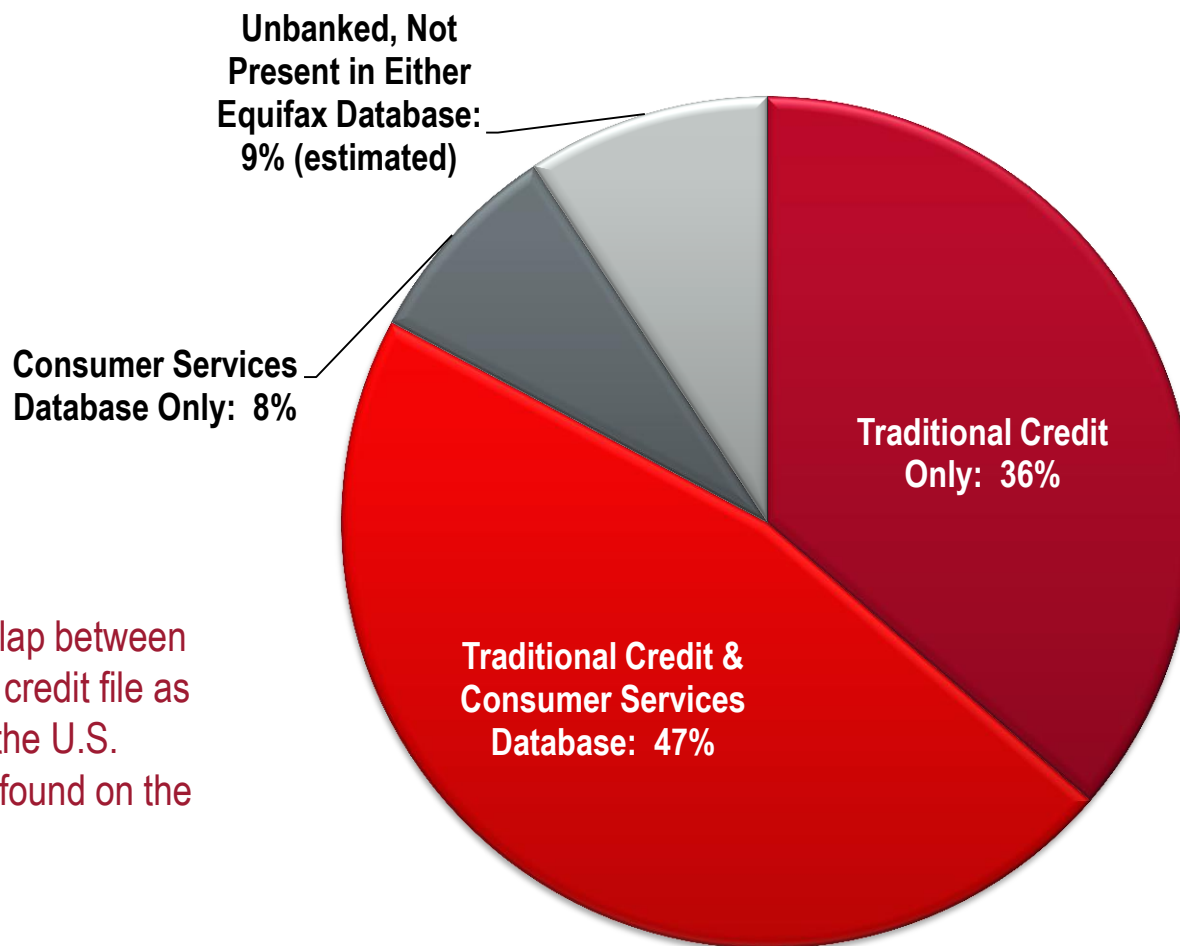
- More than 60 Data Contributors (wireless, landline, cable, satellite and utility providers)
- 186 Million Unique Consumers from 325+ Million Unique Accounts, 25MM not in traditional credit
- Historical data back to May 2010 (some back to May 2009); plus history of open accounts/snapshot

CSD is the data source from which the Insight Scores and other products are delivered.

### Characteristics of the database

- › A differentiated alternative data source
- › Information from industries that touch virtually all U.S. consumers
- › Access to difficult-to-reach 25MM unbanked/ underbanked consumers
- › Database has scale at a national level

Alternative data (i.e., phone, TV, utilities) creates an overlap of consumers and incremental “hits” not accounted for in the traditional credit file.



High degree of overlap between CSD and traditional credit file as well as a portion of the U.S. consumer base not found on the traditional credit file.

*Based on 260MM credit active consumers*

- CSD data is owned by the Exchange members and usage is governed by the contract
- The *Ask Data* process is key to the management and verification of usage requests
- Some examples of what the data can and cannot be used for:

## Approved Uses

- Prescreen Exclusion / Suppression
- Risk Score
- Skip Locate and Authentication/ ID products (Header Only)
- Fraud (Header Only)
- Account Management Score
- Non-Member: modeling products and/or services to assess risk and/or authenticate the credit bureau population Owner/Occupancy Model

## Uses that Require Internal Review

- Follow standard data usage request process for these uses:
- Account Management: Cross-Sell
  - Packaged Attributes
  - Triggers (Member)
  - Triggers (Non-Member)
  - Portfolio Health/Benchmarking
  - Analytic Insight – Response/Profit
  - Fraud – Out of Wallet Questioning
  - Usage patterns
  - Identity Confirmation/Phone Match

## Restricted Uses

- Marketing List Generation / Database Extracts (Member)
- Raw Data
- Equifax will NOT provide specific account (trade line) data elements to any non-member 3rd party



- › Bureau reporting and Consumer Services Database™ reporting are NOT the same thing... stay in control of your data
- › Consumer Services Database™ trades
  - Are *anonymous* – underlying service providers are never disclosed
  - Cannot be used for any target marketing purposes
- › For these reasons, participation does not compromise customer portfolio or subject customer data to the scrutiny of their competitors
- › Members maintain control and ownership over their data and its usage
  - Governed by the Exchange Membership By-Laws
- › Simplified reporting requirements compared with bureau reporting
- › Significant efficiency gains over exclusive financial-driven scores

- 



↓


An illustration of two white, stylized human figures standing on a light gray surface. They are both reaching towards a large puzzle piece that is half green and half blue. The figure on the left is placing a green piece, and the figure on the right is placing a blue piece, suggesting a collaborative effort to complete a task.



↓



## Collection Agencies



—



**Develop a framework keeping with the FSLRC's draft Indian Financial Code which recommends the creation of regulations on the collection, storage, modification and protection of personal information by services providers; and establishment of mechanisms to ensure that consumers have access to, and are given an effective opportunity to seek modifications to, their personal information.**

- › Define the modalities of setting up an exchange/bureau
  - What is the scope of participant sectors – Utilities, Telecom, Satellite tv?
  - Reporting by electric utilities / telecom companies of data pertaining to their customers' bills payments in an appropriate format for sharing with Credit Information Companies that would reflect the credit worthiness of their customers
  - Will it be a self regulated entity or regulated by CERC/Other regulators?
- › Issue regulations to govern the functioning of the exchange
  - Who is mandated and who is optional member to contribute data?
  - What kind of data can be contributed?
  - Who can access the data? Who are the specified users?
  - How data can be used by various sectors? What decisions can be taken based on the data?
  - Process for consumer access and modification

# Regulated Tariff vs Competitive Tariff

Association of Power Producers  
1<sup>st</sup> December, 2014



adani™



R.K.M.  
Powergen



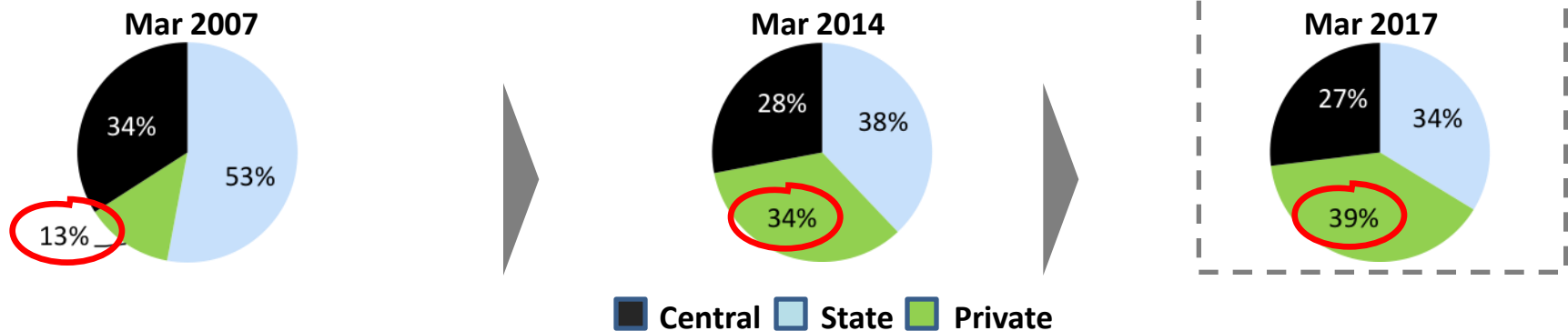
**APP would like to thank the Forum of Regulators (FOR) for giving us the opportunity to present our views on regulated tariff and competitive tariff.**

# Private Sector Role and Contribution

- Private sector participation took off in a significant way after enactment of Electricity Act 2003.

Capacity Addition (incl. RES)	11 <sup>th</sup> Plan (2007-12)	12 <sup>th</sup> Plan (up to 31 Oct 14)
Total (GW)	67.5	54.77
Private (GW)	37.2	36.6
% private contribution	55%	67%

- 3x** increase in private sector contribution to total installed capacity over 10 year period



**Private sector participation critical for sustained growth of the power sector**

# Modes of Tariff Determination

- Regulated Tariff under Section 62.
  - Based on the norms laid by Regulatory Commissions
- Competitive Tariff under Section 63.
  - As mandated under the Tariff Policy.
  - Tariff discovered through bidding adopted by Regulatory Commission pursuant to Sec. 63 of EA

**About 80% of the 153 GW coal based capacity is operating under section 62**

# Tariff under Section 62

**Tariff determined under Sec. 62 is robust, transparent, time-tested & has not faced any controversies/ litigations**

- Current coal based operating capacity is ~1.5 lakh MW out of which more than 75% of tied up capacity is operating under Section 62 regime, which has never faced litigations of the type currently faced by Section 63 projects
- For entire NTPC's ~43,000 MW capacity, tariff is determined under Sec. 62
- Under Section 62, the tariffs are transparently determined by appropriate regulatory body i.e. CERC/ SERCs, based on a tariff regulation
- Regulatory Supervision: Equitable risk and reward allocations. Necessary authority & power to deal with exigencies.

**Notwithstanding Tariff Policy stipulation, public sector has shown distinct preference to securing PPAs with tariff determination under Sec. 62 of the Act.**



# Tariff under Competitive Bidding (Section 63)



- Rigid structure under competitive bidding framework (Case 1 and Case 2)
- Retrospective changes in Government policies
- No flexibility for regulatory oversight in case of retrospective changes in the Govt. policies impacting operations or materially adverse situations either for procurer or generator.

## ***Majority of private sector projects under section 63 are facing viability challenges - an industry-wide problem of mammoth magnitude***



### **Key challenges**

- Under recovery of fixed and variable costs due to factors beyond the control of developers
- *52,100 MW with Investment of Rs. 4,55,000 Cr.*

### **Key challenges**

- Projects without long term PPAs (commission/to be commissioned by 2017) (retrospective policy changes)
- *24,751 MW with Investment of Rs. 99,252 Cr.*

### **Key challenges**

- Projects impacted by SC Judgment on coal mines
- *20,000 MW of IPPs with Investment of Rs. 1,21,000 Cr.*

**If the remedial steps are not taken, then most of these projects will have to be mothballed posing a systemic risk to banking sector and the utilities would need to source alternate and more expensive power.**

# Design/Structural flaws in CBG & SBDs

**Rigid Contractual Structure under Competitive bidding framework for no provision for contract opening.**

- **Does not address change in law in overseas countries** for imported coal based projects / **factors beyond the control of developers** like changes in GoI policy e.g. partial supplies under linkage coal FSAs / de-allocation of captive coal blocks/increase of domestic coal price not linked with any indexation formula/retrospective policy changes
- **Does not recognize macro-economic changes** – Steep Exchange Rate movements, Steep interest rate movements, inflation, etc
- **Does not mitigate risks due to delay in development period** due to delayed clearances / permits, **delay by procurers (for Case 2 projects) in performing their obligations**, etc.
- Flawed formula for compensation for Change in Law during construction
- Difficulties in transmission planning as the plants are unable to locate/fix buyers even after COD (Case 1 projects) leading to stranded capacities because of absence of PPAs.
- No guarantee that the power would be procured from these plants by any procurer
- Inability to supply short and medium term power in view of condition of long term PPA for coal usage.






# Issues

- What is the way forward for revival of stranded generation projects to enable them to supply power and meet their debt obligation?
- How to ensure competitive and commercially viable price discovery in an equitable and sustainable framework.

**What is the way forward for revival of stranded generation projects to enable them to supply power and meet their debt obligation?**

# Stressed Assets: Solutions explored till date – do not deal with a vast majority of reasons; are long drawn and outcome is uncertain

## Major Factors impacting Energy Charge

-  Domestic linkage coal - shortage of coal supply by CIL incl. grade slippage
-  Imported coal - change in law in coal source country
-  Domestic linkage coal - Applied for linkage, however, no linkage granted
-  Captive coal - mines delayed and now de-allocated by Hon'ble SC's order
-  Domestic linkage coal – CERC index not reflecting actual CIL prices

## Major factors impacting Capacity Charge

-  Unforeseen and material adverse changes (inflation, interest rates etc.)
-  Substantial increase in land and R&R costs
-  Delays in land acquisition and grant of clearances
-  Partial compensation for cost increase due to change in law events
-  Steep depreciation of Indian Rupee

**X**: No compensation granted by CERC

**✓**: Compensation granted through CCEA/by CERC

*Compensation by CERC: Haryana, Gujarat, Maharashtra, Rajasthan and Punjab challenged in APTEL  
CCEA decision on coal cost pass through not implemented by all states uniformly*

## **Solutions explored till date – do not deal with a vast majority of reasons; are long drawn and outcome is uncertain**

- Legal / regulatory process in India is long-drawn; may take several (5-10) years for final resolution, in the meantime, these Projects will :
  - **face massive financial losses**
  - face significant cash flow shortfall not even covering debt servicing;
  - get stranded / stuck midway through construction phase;
  - be subjected to bankruptcy; and
  - ultimately close down
- **Consequences for procurer states :**
  - remain embroiled in long drawn litigations;
  - face uncertainty of power supply and massive power deficits;
  - **purchase long-term power at much higher tariffs (Rs. 5-6 /kWh);**
  - Discoms to continue to remain under financial stress perpetually.

**Urgent need for policy intervention by Government of India**

# Way Forward

**One time shift of all the stressed competitively bid projects and projects with capped tariffs to regulated tariff regime under Section 62**

→ In Section 62, tariffs are transparently determined by appropriate regulatory commission based on a tariff regulation

→ Even after re-determination of tariffs, tariffs of such projects will be cheaper by ~35–50% compared to recently discovered tariff through bidding of Rs. 5 – 6/ kWh

→ This would eliminate risk of NPAs of Rs.3.18 Lac Cr. in the financial sector

**Recommendation by a Working Group constituted by Ministry of Finance under the Chairmanship of IIFCL CMD Shri Santosh Nayar:** One time shift of such stressed assets from competitive bidding regime to regulated tariff regime.

**Co-existence of Section 62 and Section 63 till the uncertainty regarding fuel off take and transmission constraint are addressed and other segments of power sector move towards a more competitive market structure.**



# Way Forward

- Eminent jurists /senior counsels have opined that such tariff redetermination:
  - **does not warrant any amendments to the Electricity Act**
  - **amendments to NTP and CBG can provide a sustainable legal framework**

**How to ensure competitive and commercially viable price discovery in an equitable and sustainable framework?**

# Tariff Determination for prospective capacity addition



## Revision of SBDs by Govt.

- **Why reinvent the wheel**- instead of addressing specific concerns.
- The stakeholders including the banks, also felt that the ideal solution would be to incorporate the above key takeaways in the existing documents instead of introducing a completely new framework.
- CERC too had commented adversely on the new proposed structure.
- Instead of depending on market judgment or regulatory framework for energy charges the new documents are based on pre-determined base prices/caps and arbitrary escalation rates.
- Concept of 'open capacity' & approval of AFSA.

# Tariff Determination for prospective capacity addition



- The bids received based on the new documents are not sustainable.
- Considering the risk allocation in the bid documents the bidders are bound to load their fixed cost.

## **Recently discovered prices in Kerala (450 MW)**

- Winning bid (Wt. avg) ~ Rs 4.10/unit; Fixed cost ~ Rs 2.98/unit
- winning bidder quoted fixed cost at 72% of the total tariff. The fixed cost determined as per the old SBDs were in the range of 30-40% of the total tariff.
- CERC Tariff as per (~ project cost Rs 6 Crore/MW)
  - Levellised Fixed Cost – Rs 1.31/unit

# Summary of Recommendations



- One time shift of all the stressed competitively bid projects and projects with capped tariffs to regulated tariff regime under Section 62.
- Tariff determination under Section 62 to continue.
- Combination of Section 62 & 63 based on fixed cost price discovery through competition
  - Projects to be bid out post all clearances.
  - construction risk till COD to rest with developers.
  - post COD for operational period of 25 years tariff to be governed based on CERC regulations.
  - APP has submitted the revised documents on the above lines (proposed by KPMG) to Govt. for consideration.

**Thank You!**

# *LOSS REDUCTION INITIATIVES IN PUNJAB*

*Presentation by:*

***Punjab State Electricity Regulatory Commission***

# Electricity Sector of Punjab

After unbundling of PSEB in April 2010, two companies have been carved out, one for **Transmission (PSTCL)** and other for **Distribution & Generation business (PSPCL)**.

- PSTCL is managing the 132 kV & above transmission assets

## ***Grid Sub-Station***

<b>– Voltage</b>	<b>number</b>	<b>Capacity</b>
400 kV:	4	1630 MVA
220 kV	88	20970 MVA
132 kV	79	6144 MVA

## ***Transmission Lines***

<b>- Voltage</b>	<b>CKT.KMs</b>
400 kV	1517
220 kV	6372
132 kV	3196

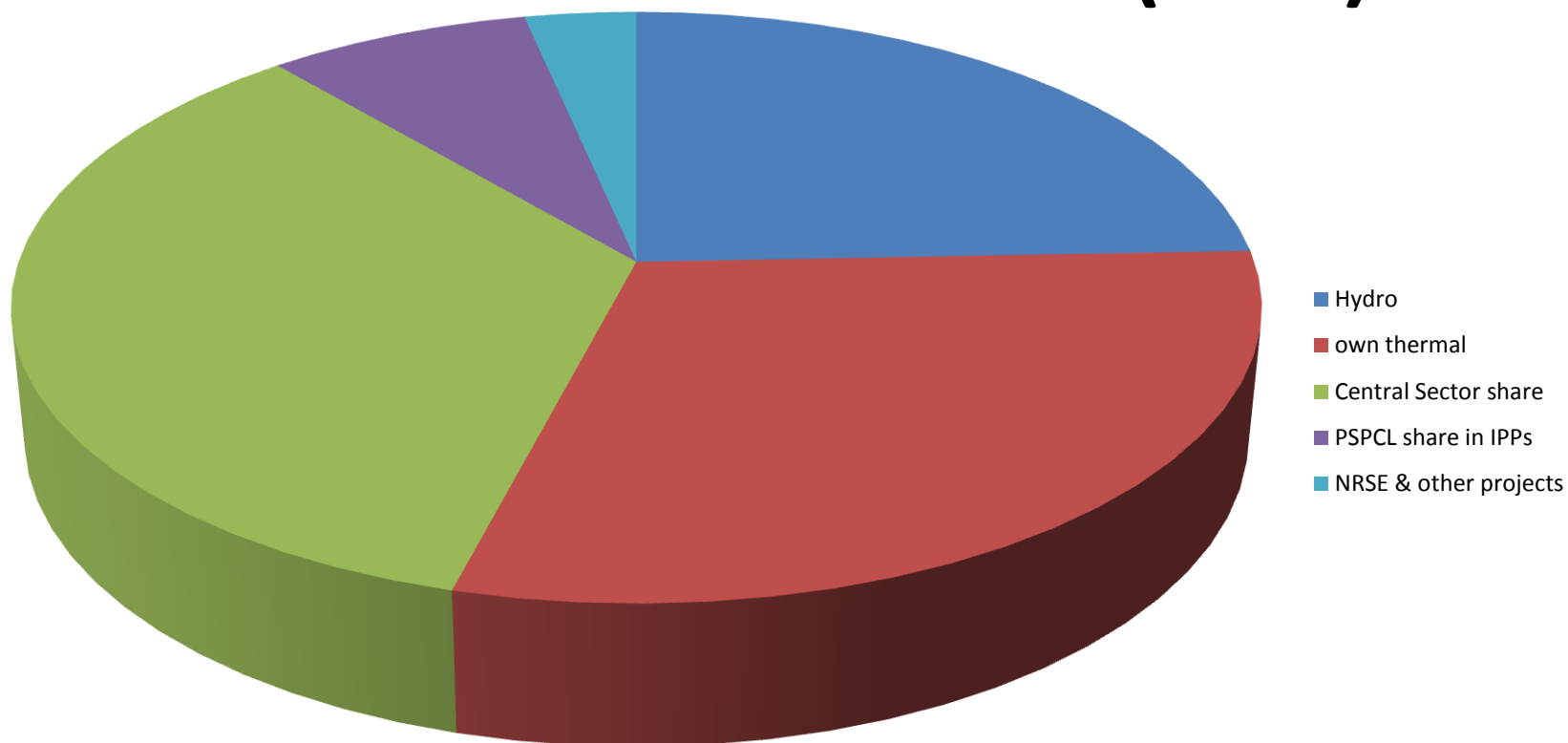


# PSPCL AT A GLANCE

PSPCL is looking after 33/66 kV sub-transmission and distribution network in the state. PSPCL is also operating all Generating stations

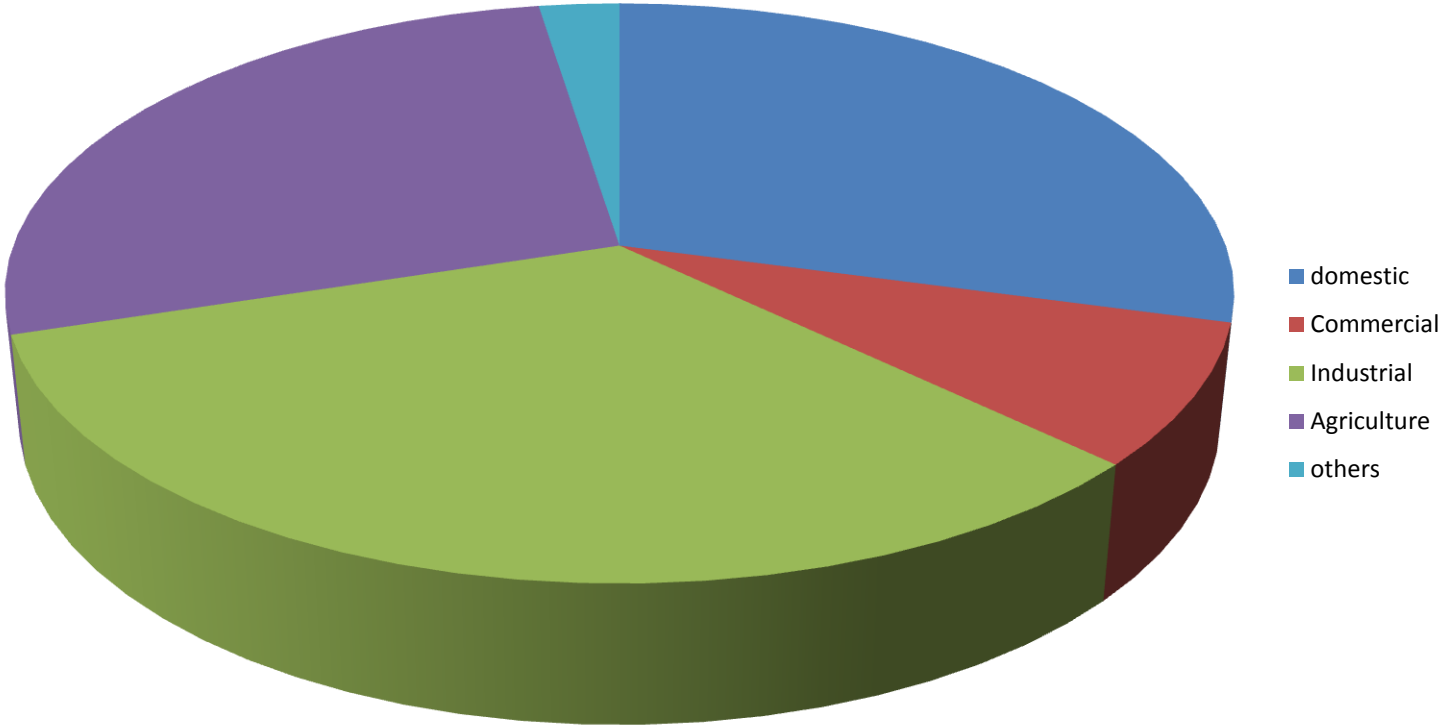
- Total consumer base of Punjab: 78.85 lac
- Total capacity(no.)of 66 kV sub-stations: 16281MVA(647)
- Total capacity(no.)of 33 kV sub-stations: 512 MVA (29)
- Total capacity of 6.68 lac DTs: 24301MVA
- Total number of 11 kV feeders: 9373
- Length of 11 kV lines (CKT. KM): 209759
- Length of LT lines (CKT. KM): 152497
- **LT/HT ratio:** **0.73**
- Per capita consumption: 1356

# INSTALLED CAPACITY (MW)



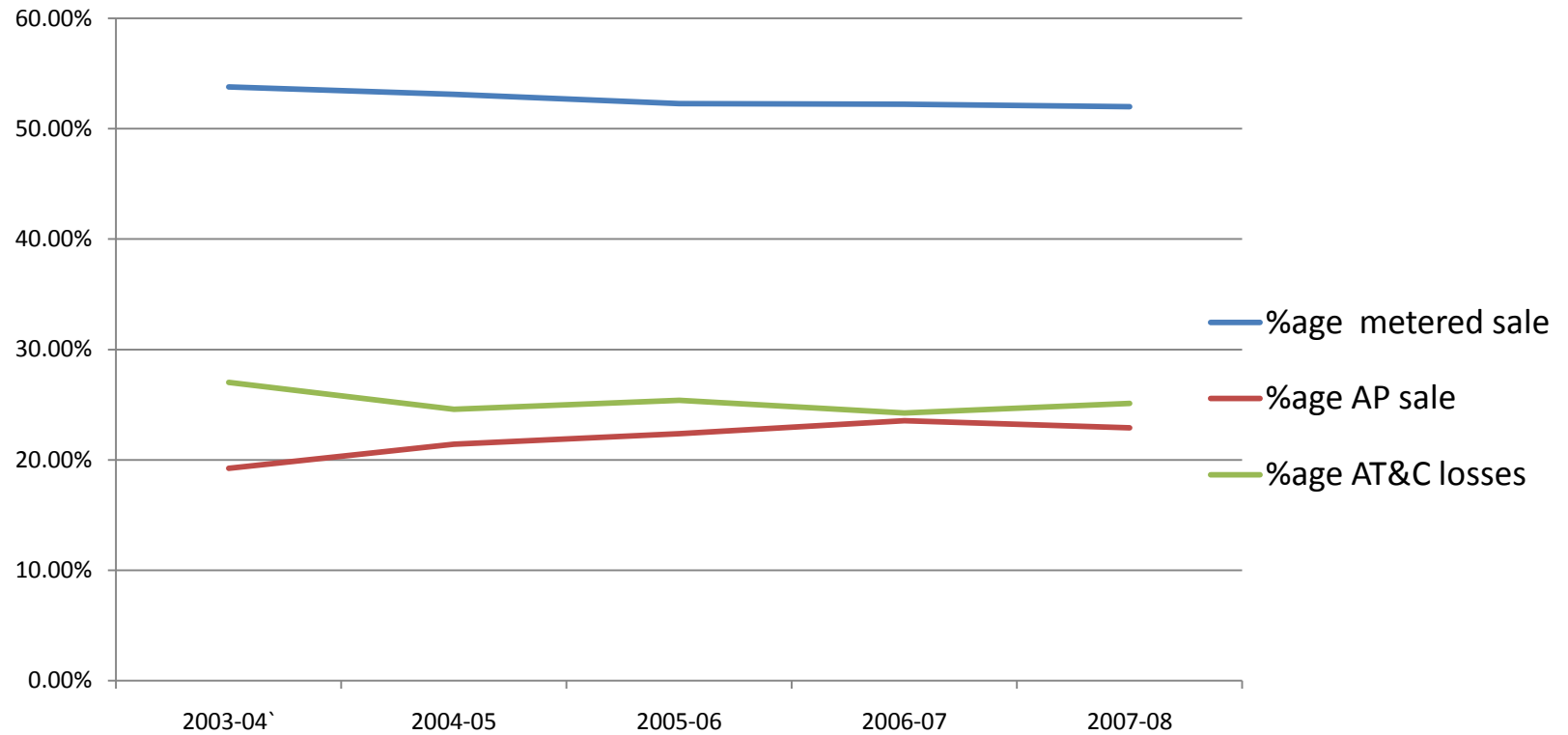
Hydro	Own Thermal	Central Sector Share	PSPCL share in IPPs	NRSE & others	Total
2161	2630	3071	700	297	8859
24.39%	29.69%	34.66%	7.91%	3.35%	100%

# ENERGY SOLD WITHIN THE STATE (MU) vis-a-vis REVENUE SHARE FROM DIFFERENT CATEGORIES (PSPCL Claim)



Category	Domestic	Commercial	Industrial	Agriculture	others	Total
Energy	10907	2941	12348	10223	927	37346
%age sale	29%	8%	33%	27%	2%	100%
Revenue share	29%	13%	52%	0%	6%	100%

## AT&C losses vis-a-vis Metered & AP sale (from 2003-04 to 2007-08)



parameter	2003-04`	2004-05	2005-06	2006-07	2007-08
%age metered sale	53.77%	53.09%	52.26%	52.22%	51.99%
%age AP sale	19.23%	21.42%	22.36%	23.53%	22.89%
%age AT&C losses	27.00%	24.59%	25.38%	24.25%	25.12%

# RURAL SCENARIO IN PUNJAB

- Total number of AP consumers: 11.91 lac
- Total number of villages: 12428
- Total number of 11 kV AP feeders: 4660
- Total number of 11 kV Urban Pattern supply(UPS) feeders catering non-AP rural load : 1256
- Number of mixed load feeders (feeding kandi area) : 245
- Share of AP consumption (9296 MU) to total sales (36383 MU) : 25.5%

# Punjab Experience of feeder segregation

- Work of segregating about 2000 mixed feeders was started in 1996-97 & completed in 2003-04. 50% job of the project launched to segregate 11 kV feeders was carried out departmentally and remaining through turnkey basis
- Simultaneously work for segregating AP load from other mixed rural loads (virtual segregation) started in 1996-97 by erecting 4<sup>th</sup> wire on mixed rural feeders
- After restricted three phase supply on mixed rural feeders, two phase supply was provided to non-AP loads in villages through 4<sup>th</sup> wire
- About 900 mixed feeders were covered under this scheme which was discontinued due to high accident rate & also failure to record pumped energy to AP sector

# Punjab Experience of feeder segregation -Contd.

- All 12428 villages provided with Urban Pattern Supply (UPS)
- In addition, the work of providing single phase supply through single phase transformers by extending one phase of UPS feeder to about 695 deras/dhanis & over 5700 clusters of 5 houses within a radius of 300 Meter started in 2007-08 and completed in 2009-10
- The work of physical segregation of 900 three phase four wire feeders by erecting separate 11 kV UPS line was started in 2008-09 and has been completed during 2013-14
- Now all rural feeders except 245 kandi (sub-mountainous area) feeders have been segregated
- The DPRs for these kandi area feeders are also under sanction with REC

# Segregation of rural feeders-Benefits

- Facilitated 24x7 quality power supply to non agricultural rural sectors
- Improved standard of living in villages
- Gave greater flexibility in grid operations
- Enabled correct assessment of AP consumption
- Facilitated identification of high T&D loss areas
- Helped in growth of rural economy through agro based industry
- Helped in crop diversification by encouraging horticulture/floriculture & AP high tech farming



# Challenges post Feeder Segregation

- After segregation, it was observed that AT&C losses of UPS feeders were in the range of 50-70%
- With increased supply hours to UPS feeders, the AT&C losses mounted after segregation
- Although supply hours have increased but quality and reliability of supply on UPS feeders was very poor

# Steps take to tackle high AT&C losses-before 2007

- Greater stress on checking by DS & enforcement teams
- Since 1990, the energy of large industrial consumers is being recorded at both consumer & feeding grid sub-station end.
- Mobile Meter Testing Squads (MMTS) under Executive Engineers made operational in early 1990
- The 33 kV system replaced by 66 kV & 132kV system replaced with 220 kV largely
- 11 kV bus bar losses calculated at each grid sub-station
- Replacement of electro-mechanical meters with electronic meters

# Converting the Challenges to Opportunities - after 2007

To reduce AT&C losses on UPS feeders, pilot projects by shifting consumer meters to pillar boxes was started in 2007-2008 comprising:

- Shifting of meters outside consumer premises to pillar boxes
- Replacing bare LT conductor and main/sub mains in the villages with four core XLPE cable to prevent direct hooking of lines
- Upgrading/Replacing 11 kV conductor, adding distribution transformers, load balancing on all distribution transformers
- Robust earthing carried out across the system
- Bringing down LT/HT ratio from 1.55 in 2003-04 to 1.04 in 2009-10 & further to 0.73 ending March 2014

# Converting the Challenges to Opportunities: AP Feeders

- To cut technical losses on AP feeders, 2.21 lac AP connections were converted from LVDS to HVDS
- Under the HVDS scheme, all the new AP connections are being released w.e.f year 2008 with dedicated transformers with Zero LT
- Due to high incidents of theft of small rating distribution transformers, PSPCL has now adopted less-LT system(Max LT 200 Mts) instead of zero LT system for old connections (about 7 lac): PSERC recommended use of Aerial bunched Conductor.

## PILOT PROJECT BRIEF

### 1) **Urban Area: 11KV Hospital feeder (work completed during Jan. 2008)**

Total material cost: ₹ 5 lac

Saving in Losses: 22 LU

Annual Saving @ 4/kWh : ₹ 88 lac

PAY BACK PERIOD: Less than month

Sr. No.	Description	Before Implementation (Jan 07 to Dec. 07)	After Implementation (Jan 08 to Dec. 08)
1	No. of consumers	970	970
2	Energy input(LU)	111.81	93.09
3	Billed energy(LU)	79.97	84.97
4	Losses %	28.43 %	8.72 %
5	No. of D.T. installed	21	21
6	Damage rate of T/F's	5%	Nil
7	No. of Complaints	substantial	Minimal
8	Max. Demand in Amp.	145	130

## 2) **Urban Basti Area: 11KV Badungar Feeder Patiala (Work completed Sept. 2008)**

Total material cost: ₹ 25 lac  
Saving in Losses: 2.06 LU  
Annual Saving @ 4/kWh : ₹ 8.24 lac  
PAY BACK PERIOD: 3 years

Sr. No.	Description	Before Implementation (Nov. 07to Dec. 07)	After Implementation (Nov. 08 to Dec. 08)
1	No. of consumers	1058	1102
2	Energy input (LU)	4.44	2.63
3	Billed energy(LU)	2.01	2.41
4	Losses %	54.72%	8.36 %
5	No. of DT installed	8	10
6	Damaged rate	25%	Nil
7	No. of Complaints	Substantial	Minimal
8	No. of new connections applied	NIL	44
9	Max. Demand in Amp.	35	20

### 3) Rural Area:

#### a) 11KV Ablowal UPS Feeder, Patiala (work completed during April 2008)

This feeder supplies electricity to 10 villages of DS/NRS category besides few Atta Chakkis.

Total material cost: ₹ 50 lac

Saving in Losses: 15.43 LU

Annual Saving @ 4/kWh : ₹ 61.72 lac

PAY BACK PERIOD: Less than one years

Sr. No.	Description	Before Implementation (July 07 to Feb.08)	After Implementation (July 08 to Feb.09)
1	No. of consumers	2241	2389
2	Energy input (LU)	48.31	37.26
3	Billed energy(LU)	24.16	30.53
4	Losses %	49.98	18.06
5	No. of T/F's installed	31	39
6	Damage rate transformers	15.3%	Nil
7	No. of Complaints	substantial	Minimal
8	No. of new connections applied	NIL	148
9	Max. Demand in Amp.	110	80

**b) 11KV Dakala UPS feeder, Patiala(Work completed during October, 2008)**

This feeder supplies electricity to single village of Dakala comprising around 850 DS/NRS consumers.

Total material cost: ₹ 18 lac

Saving in Losses: 5.85 LU

Annual Saving @ 4/kWh : ₹ 23.4 lac

PAY BACK PERIOD: Less than one years

Sr. No.	Description	Before Implementation (Nov. 07 to Dec. 07)	After Implementation (Nov. 08 to Dec. 08)
1	No. of consumers	812	857
2	Energy input(LU)	10.41	4.41
3	Billed energy(LU)	2.48	3.53
4	Losses %	76.17	19.95
5	No. of DT installed	12	12
6	Damaged rate	40%	Nil
7	Complaints	substantial	Minimal
8	No. of new connections applied	NIL	45
9	Max. Demand in Amp.	85	40



# PILOT STUDIES:REDUCTION OF LOSSES DUE TO SHIFTING OF METERS (2007-08)

Name of Feeder	Before (in %)	After (LT is minimised) (in %)
11 KV Hospital Feeder	28.43	8.72
11 KV Badungar Feeder	54.72	8.36
11 KV Ablowal UPS Feeder	49.98	18.06
11 KV Dakala UPS Feeder	76.17	19.95



WELCOME











PILLAR-BOX-NO.2 T.F.18

R-APDRP

AP T.F. 18

Pravara Road

SURJANA SINGH



PISFAIS1615A

L-0.40

GURDEEP SINGH



PISFAIS1615D X

L-3.43

BALDIK SINGH



PISFAIS1615CA

L-0.53

HARJEET SINGH



PISFAIS1615B Y

L-3.13

HARHAJAM SINGH



PISFAIS1615A

L-4.78

HARINDER SINGH



PISFAIS1615 Y

L-0.92

NIRMAL SINGH



PISFAIS1615CA

L-4.61

NADVINDER SINGH



PISFAIS1615B Y

L-1.35

NAVAB SINGH



PISFAIS1615A

L-0.60

NAVAB SINGH



PISFAIS1615CA

L-0.58

DARSHAN SINGH



PISFAIS1615CA

L-0.58

DALIP SINGH



PISFAIS16172

L-0.50

NAVAB SINGH



PISFAIS1615B Y

L-1.66

BALDIK SINGH



PISFAIS1615B Y

L-1.70

NAVAB SINGH



PISFAIS1615B Y

L-1.70

HARINDER SINGH



PISFAIS1615B Y

L-1.96

DANGER

415

VOLTS

415

खतरा

रहित

ADMISSION OPEN  
PILLAR-BOX-NO.2  
T.F.18  
Pravara Road  
Mumbai 400 001  
Authorized  
P.S.E.B.  
TOTAL ENGLISH  
MEDIUM  
Near Junction, Sahyadri  
Village, Pravara  
Road, Mumbai  
98886 60056  
Ph: 2233958



# Impact

Sr. no.	Circle	Division	Name of 11 KV feeder	Benefits (%)					
				Reduction in Load/Max . demand (A)	Reduction in pumped in energy	Increase in Revenue Collection	Reduction in losses	Reduction in DT's damage rate	Reduction in no supply consumer complaint
1	Ferozepur	City Ferozepur	Mana Singh Wala	(-) 2.17	(-) 0.87	(+) 56.31	(-) 54.48	(-) 66.00	(-) 80
2	Ferozepur	City Ferozepur	Sodhe Wala	(-) 8.82	(-) 26.02	(+) 12.13	(-) 48.81	(-) 75.00	(-) 79
3	Ferozepur	Jalalabad	Mohar Singh Wala UPS	(-) 21.53	(-) 16.36	(+) 15.96	(-) 52.00	(-) 75.00	(-) 72
4	Ferozepur	Jalalabad	Sunderpura UPS	(-) 10.34	(-) 15.55	(+) 9.40	(-) 48.60	(-) 66.00	(-) 78
5	Ferozepur	Zira	UPS-2	(-) 16.67	(-) 6.06	(+) 56.60	(-) 60.00	(-) 66.67	(-) 59
6	Ferozepur	Zira	UPS Meshari + Lalle	(-) 27.27	(-) 12.04	(+) 44.01	(-) 54.00	(-) 75.00	(-) 61
7	Ferozepur	Zira	UPS Dhanna Sahib	(-) 25.00	(-) 8.57	(+) 116.75	(-) 34.15	(-) 66.67	(-) 69
8	Ferozepur	S/U Ferozepur	UPS Madhre	(-) 14.70	(-) 34.95	(+) 21.04	(-) 163.93	(-) 50.00	(-) 237
9	Gurdaspur	S/U Batala	Qilla Lal Singh	(-) 9.33	(-) 19.73	(+) 12.64	(-) 10.00	(-) 100.00	(-) 95
10	Gurdaspur	Gurdaspur	Babehali	(-) 37.5	(-) 35.60	(+) 61.87	(-) 45.83	(-) 66.66	(-) 82 <sup>24</sup>

# Impact

Sr.n o.	Circle	Division	Name of 11 KV feeder	Benefits (%)					
				Reduction in Load/Max. demand (A)	Reduction in pumped in energy	Increase in Revenue Collection	Reduction in losses	Reduction in DT's damage rate	Reduction in no supply consumer complaint
11	Hoshiarpur	Dasuya	Panwa	(-) 30.46	(-) 20.91	(+) 19.13	(-) 24.47	(-) 0.00	(-) 47
12	S/U Amritsar	Jandiala Guru	Mula Chack	(-) 4.90	(-) 11.47	(+) 46.04	(-) 19.18	(-) 66.66	(-) 77
13	S/U Amritsar	Jandiala Guru	Chati Wind	(-) 20.79	(-) 14.88	(+) 118.63	(-) 24.17	(-) 0.00	(-) 59
14	Kapurthala	S/U Kapurthala	Model Town	(-) 22.42	(-) 30.93	(+) 13.54	(-) 25.95	(-) 0.00	(-) 22
15	Kapurthala	Kartarpur	Hamira	(-) 26.31	(-) 9.60	(+) 21.10	(-) 30.70	(-) 66.67	(-) 42
16	Kapurthala	Kartarpur	Pattar Kalan	(-) 20.80	(-) 11.90	(+) 21.99	(-) 17.70	(-) 66.66	(-) 56
17	Kapurthala	Kartarpur	Ibrahimw al	(-) 20.57	(-) 29.95	(+) 29.86	(-) 84.50	-	(-) 20
18	Faridkot	City Moga	Bughipur	(-) 45.00	(-) 33.00	(+) 6.92	(-) 72.42	(-) 100	(-) 81
19	Faridkot	Suburban Moga	Kokri Vehniwal	(-) 11.11	(-) 16.67	(+) 15.42	(-) 53.42	-	(-) 79
20	Amritsar	East Amritsar	Gumtala	(-) 13.80	(-) 10.28	(+) 67.98	(-) 51.62	(-) 14.54	(-) 36

# Urban Resurgence PATIALA CITY

Year	AT&C loss
<b>2010-11</b>	<b>21.90%</b>
<b>2011-12</b>	<b>15.77%</b>
<b>2012-13</b>	<b>12.31%</b>
<b>2013-14</b>	<b>8%</b>



# Improvement in tail end voltage

T/F No	T/F Capacity	S.O.P.	Length of LT Cable	Voltage on T/F	Tail end premises		No. of poles
					A/c No	Voltage	
1	100 KVA	Chinto Devi	316	240	MA-25/ 1344	210	10
2	100 KVA	Gurudwara Sahib	188	237	MA-13/ 1784	226	7
3	100 KVA	Guga Mari, Pillar no. 19	76	238	MA-24/ 1640	230	4
4	100 KVA	Peer Baba, Pillar no. 25	136	240	MA-13/ 1823	232	5
5	63 KVA	Pillar no. 22, Badugnar	48	238	MA-13/1583	229	2
6	100 KVA	Mandir Sh. Balmik Ji	208	236	MA-13/ 392	215	7
7	100 KVA	Main Market (Bawa atta chakki) J.J. Colony	240	235	MA-13/ 1957	225	6
8	63 KVA	Pillar No. 46, J.J. Colony	76	235	MA-13/ 1774	224	3
9	100 KVA	Military Gate, J.J. colony	150	236	MA-13/ 239	225	5
10	63 KVA	Pillar No. 59, J.J. colony	112	240	MA-13/1644	228	3
11	100 KVA	Gurudwara Sahib	228	237	MA-13/1600	226	4
12	63 KVA	Pillar No. 51 & 54, J.J. Colony	148	235	MA-13/1270	230	3

Time:- 08-30 to 10-00 PM

Date:- 10-10-08

# Assessment of AP Consumption-before segregation (on basis of sample meters)

- Till 2000-01, AP consumption was assessed on the basis of AP factor worked out through recording of consumption of just 3220 sample meters which was 0.38% of the total AP connections
- The sample size was increased to about 1 lac meters which was about 10% of AP connections by 2011-12 but the reading data was not reliable
- Field staff was not taking actual readings of these meters & many meters were reported defective. Also there was resistance from farmers
- The AP factor was manipulated to show less T&D losses

# Assessment of AP Consumption-after segregation (on Pumped Energy basis w.e.f 2010-11)

- All 11 kV feeders (including AP) are now metered in PSPCL
- The pumped energy data of all AP feeders recorded at grid sub-stations are being collected monthly at PSPCL headquarters through web based application. Same data is then transmitted to the Commission every month and agricultural consumption is worked out.
- The pumped energy data is also cross verified from AMR data of about 2200 feeders available on real time basis

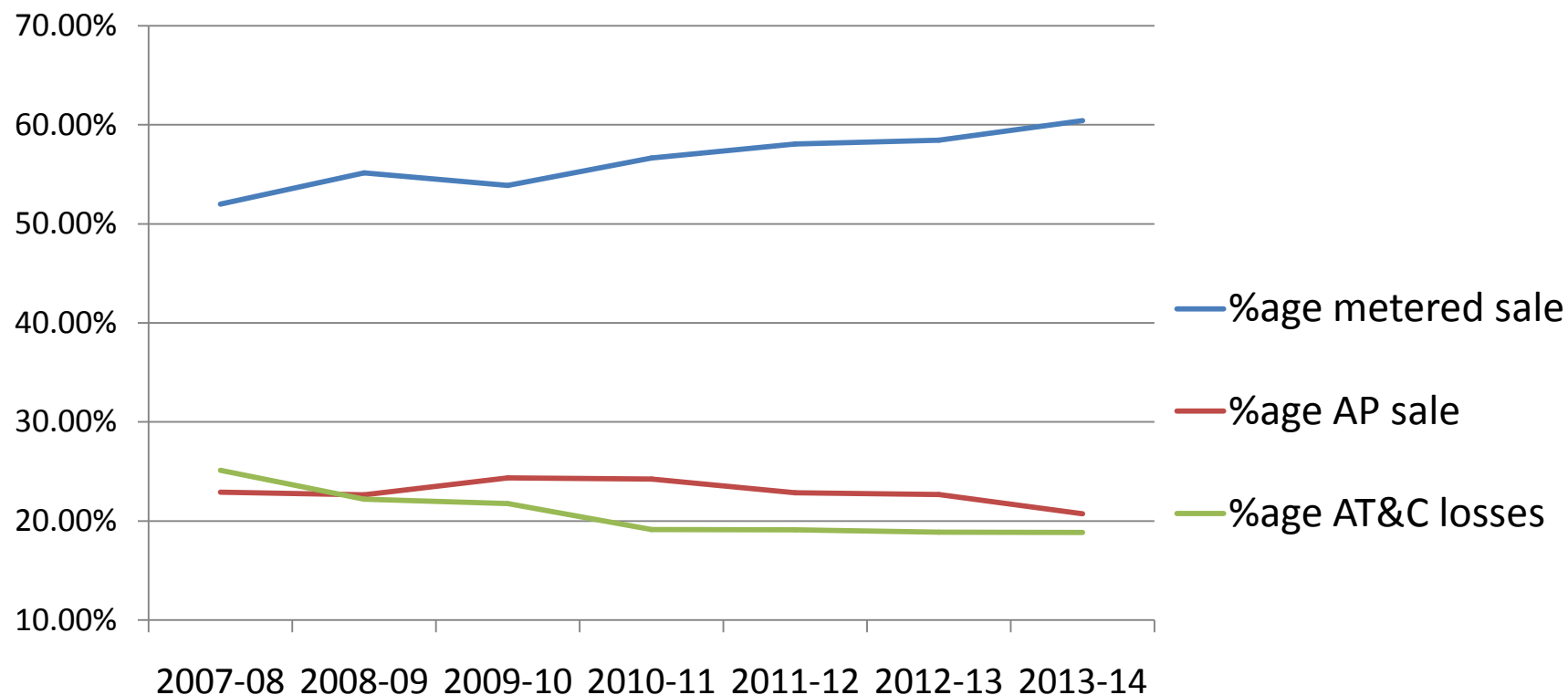
# AMR OF AP FEEDERS

- The project to cover AP feeders under AMR was started in 2008-09. About 3500 AP feeders are covered under AMR project
- AMR compatible meters have been installed on all AP feeders but due to some problems with communication hardware, data for about 2200 AP feeders are available
- All AP feeders shall be covered under AMR project

# ASSESSMENT OF AP CONSUMPTION AS PER PUMPED ENERGY

YEAR	AP CONSUMPTION CLAIMED BY PSPCL ON BASIS OF SAMPLE METERS (MU)	AP CONSUMPTION WORKED OUT ON THE BASIS OF PUMPED ENERGY (MU)	% AGE REDUCTION IN ESTIMATION OF AP CONSUMPTION
2010-11	10152	9656	-5.14
2011-12	10256	9455	-8.47
2012-13	10687	9877	-8.20
2013-14	11034	9726	-13.45

# AT&C losses vis-a-vis Metered & AP sale-after 2007-08



parameter	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
%age metered sale	51.99%	55.16%	53.90%	56.65%	58.07%	58.46%	60.42%
%age AP sale	22.89%	22.63%	24.34%	24.22%	22.83%	22.68%	20.73%
%age AT&C losses	25.12%	22.21%	21.76%	19.13%	19.10%	18.86%	18.85%

➤ AT&C losses include 2.5% transmission losses of 132/220 kV levels also

➤ AT&C loss target for 2014-15 ---16.00%

Detailed Parameters Regading Energy Sales											
parameter	2003-04`	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
input energy	29878	30209	32720	34993	38883	37095	39760	39875	41407	43555	44834
metered sale	16065	16038	17099	18272	20214	20461	21430	22590	24044	25462	27087
%age metered sale	53.77%	53.09%	52.26%	52.22%	51.99%	55.16%	53.90%	56.65%	58.07%	58.46%	60.42%
AP sale	5745	6472	7317	8235	8902	8395	9678	9656	9455	9877	9296
%age AP sale	19.23%	21.42%	22.36%	23.53%	22.89%	22.63%	24.34%	24.22%	22.83%	22.68%	20.73%
%age AT&C losses	27.00%	24.59%	25.38%	24.25%	25.12%	22.21%	21.76%	19.13%	19.10%	18.86%	18.85%
AP load (MW)	3481	4309	4474	5094	5606	6096	7378	7728	7925	8116	8389
AP factor (kWh/kW/ year)	1650.39	1501.97	1635.45	1616.61	1587.94	1377.13	1311.74	1249.48	1193.06	1216.98	1108.12

# Status of implementation of project- (Non-RAPDRP Areas)

- There are around 38 lac meters in rural and sub-urban areas
- Under Phase-I of the scheme, 20.57 lac meters have been shifted out at a cost of around ₹700 Cr on turnkey basis
- The Phase-II of the scheme at a cost of around ₹ 1000 Cr is under implementation and 0.44 lac meters have been shifted out till date
- A total of 21.01 lac out of 38 lac meters in Non-RAPDRP (Rural) areas have been shifted in pillar boxes
- Balance 17.14 lac meters are expected to be shifted by 31.3.2015



# Present Status in Urban (R-APDRP areas)

- There are around 30 lac connections in urban areas
- Under the Part-B of R-APDRP scheme covering 46 towns, 13.50 lac meters are to be shifted & till date around 4 lac meters have been shifted out
- Balance 16.5 lac meters shall be shifted through PSPCL resources

# Consumer benefits achieved in Rural & City Areas by shifting of meters

- 1) Reliability of supply for rural consumers at par with urban consumers
- 2) Reduced outages and number of complaints
- 3) Timely restoration of supply
- 4) Voltage Improvement at tail-end
- 5) Damage rate of Transformers drastically reduced in rural areas

# Payback Period

## *Rural Area*

- Target investment in low cost maintenance project under non RAPDRP scheme- ₹ 1700 cr.
- Number of consumers to be covered-38 lac
- Investment per consumer < ₹ 4500
- Average loss on UPS feeders reduced from 50-70% to 18-20%.
- Payback period- 3 to 4 year (Calculated feeder wise at launch of pilot scheme).

# Payback Period

## *City Area(Patiala)*

- Investment in low cost maintenance project under RAPDRP scheme- ₹ 38 cr.
- Number of consumers covered-1.3 lac
- Investment per consumer < ₹ 3000
- Average loss of Patiala city reduced from 21.9 to 8%.
- Payback period- 2 years.



## Pillar Box – The Game Changer

